

PROJECT REVIEW PLAN

BRUSH CREEK BASIN

Feasibility Study

Kansas City District

Program Code = 013396

MSC Approval Date:

Last Revision Date:



**US Army Corps
of Engineers ®**

**REVIEW PLAN
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1. PURPOSE AND REQUIREMENTS

- a. Purpose.** This Review Plan defines the scope and level of review for the feasibility report with integrated environmental assessment on the Brush Creek Basin Feasibility Study.
- b. References**
- 1) Brush Creek & Tributaries, Missouri & Kansas, Feasibility Report on Flood Damage Reduction, Technical Support Annex to Appendix C, U.S. Army Corps of Engineers, September 1981
 - 1) Engineering Circular (EC) 1165-2-214, Civil Works Review, 15 Dec 2012
 - 2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 2011
 - 3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 2006
 - 4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 2007
 - 5) ER 1110-2-1150, Engineering and Design for Civil Works projects, 31 Aug 1999
 - 6) Brush Creek Basin, Watershed & Feasibility Planning Study, Project Management Plan (PMP), 1 Apr 2008
 - 7) Review Plan, Brush Creek, Planning Study, Feasibility Phase, approved 14 Mar 2008
 - 8) Kansas City District Quality Management System Program Management Plan, 3 Jan 2011
 - 9) Northwestern Division Quality Management Sys. Program Management Plan, 28 Sep 2010
- c. Requirements.** This review plan was developed in accordance with EC 1165-2-214 (15 Dec 2012), which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the review effort described in this Review Plan is the Ecosystem Planning Center of Expertise (ECO PCX).

The RMO will coordinate with the Civil Works Cost Engineering Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. STUDY INFORMATION

- a. Decision Document.** This review plan is for the Brush Creek Basin feasibility study, and the plan is for use on the product produced by the project delivery team (PDT). Congress directed the Secretary of the Army to “review the report of the Chief of Engineers on Brush Creek and Tributaries, Missouri and Kansas, dated January 3, 1983, and other pertinent reports to determine whether modifications to the recommendations contained therein are advisable at the present time

in the interest of flood damage reduction, environmental restoration, and project and related purposes in the vicinity of Johnson County, Kansas, and Kansas City, Missouri.” The final report requires MSC, HQUSACE, and Chief of Engineers approval to enable a Chief of Engineers Report transmittal to Congress. Congressional authorization is then needed to move forward with any recommended construction project. It is anticipated at this time that an Environmental Assessment will be integrated into the final report and provide the supporting environmental and NEPA documentation for any recommended Federal action(s).

- b. Study/Project Description.** The U.S. Army Corps of Engineers Kansas City District (NWK) and the joint local project sponsors Johnson County, Kansas (JOCO) and the City of Kansas City, Missouri (KCMO), are conducting a feasibility study of the Brush Creek Basin utilizing a watershed based Three-Prong Approach. The feasibility project is not authorized as a watershed study, however the *watershed perspective* planning guidance, as well as requirements to consider systems approach, may be used per the *Planning Guidance Notebook (ER 1105-2-100)*. The basic components of the watershed planning effort’s Three-Prong Approach includes: development of an integrated watershed management plan, development of an organizational framework, and formulation of project sites that meet watershed goals and objectives.

The Brush Creek Basin straddles the Kansas-Missouri State Line, with an overall drainage area of nearly 30 square miles. Roughly half of the drainage basin is located in each of the states of Kansas and Missouri. The basin includes portions of Kansas City, Missouri and the cities of Fairway, Mission, Mission Hills, Mission Woods, Overland Park, Prairie Village, Roeland Park, Westwood, and Westwood Hills in northeast JOCO. Brush



Figure 1. Brush Creek and Tributaries.

Creek flows in a northeasterly direction to the Blue River in KCMO. The basin is characterized by gently rolling topography and a well defined system of streams and valleys. In addition to the main channel of Brush Creek, the basin also includes the tributaries Rock Creek and Town Fork Creek (Figure 1).

Numerous past studies identified in the 905(b) report have looked at and constructed or are currently under construction a number of flood damage reduction measures within the basin. The PDT conducting this feasibility study will take a multi-purpose watershed approach in considering opportunities for environmental ecosystem restoration. A rough estimate for cost of alternatives is \$30 million, in regards to the construction and design cost for features associated with three project sites in the watershed. Plans will be technically viable, economically feasible and environmentally acceptable.

- c. **Factors Affecting the Scope and Level of Review.** This section points out significant elements of the project that will affect the review of the decision document.
- A flood risk management consideration, residual risk: The project team has emphasized residual risk of property damage and loss of life associated with channel widening, and will continue to do so.
 - Regarding loss of life, there is a significant risk to loss of life. The project will address risk to life safety at three of ten project sites, as budgeted for the study. The other seven sites would require additional funding to assess and do plan formulation.
 - Life safety may be affected by anyone of these flood related variables: depth of water, velocity, proximity of population, and warning time (rate of rise). The Brush Creek stakeholders face all of these. Warning time for a USGS gage on Brush Creek and State Line Road has shown a rate of rise of 7 feet per hour.
 - Governors of Kansas and Missouri have not and likely will not make requests for a peer review by independent experts;
 - The project has not yet and should not cause a public dispute. Thus far public meetings have indicated support for the green aspects of project measures and called for continuing analysis and assessment of the nature of the flood hazards.
 - For environmental considerations, the PDT has engaged EPA and others in doing adequate analysis of measures for both flood and environmental improvement. The PDT has therefore taken environmental restoration opportunities seriously, and to have a complete feasibility study, the PDT is evaluating effects of upland measures versus measures strictly located in stream corridors but is only doing evaluation of stream corridor using the ecosystem output model discussed below.
 - No novel methods are used in justifying USACE construction. This feasibility report is not anticipating a design that will require redundancy, resiliency, or robustness. No unique construction sequencing is anticipated.
- d. **In-Kind Contributions.** Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC and ATR. The sponsor has not provided any products requiring DQC or ATR, nor will they be, although their biologists have participated in meetings to enhance the ecosystem output model.
- e. **Product Delivery Team (PDT).** The PDT is presented in Attachment 1. The project manager is the main point of contact at the Kansas City district for more information about this project and the review plan.
- f. **Architect Engineering Team (A/E).** The A/E team is HDR. The A/E Team members are also presented in Attachment 1.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The Kansas City District will manage the DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and Northwestern Division.

- a. **Documentation of DQC.** The DQC team will use the standard USACE tool and internet-based

DrChecks to comment, evaluate, and resolve issues identified during reviews. The review by the DQC team will be available to the ATR team to reference.

- b. Products to Undergo DQC.** The DQC team will review alternatives, recommendations, and cost estimates in the final screening of alternatives within the planning process. DQC will continue with final economic analysis, supporting engineering and technical appendices, and the feasibility report documentation to include the environmental assessment. Products for each of these milestones will be addressed: FSM, AFB, draft and final reports. Additionally, the PDT is responsible for a complete reading of the report to assure the overall integrity of the report, technical appendices, and the recommendations before approval by the District Commander.
- c. Required DQC Expertise.** The following disciplines are and will be involved in DQC:
 - 1) Plan Formulation
 - 2) Environmental/NEPA specialties
 - 3) Hydrology & Hydraulics
 - 4) Structural
 - 5) Geotechnical
 - 6) Civil / Site Engineer
 - 7) HTRW
 - 8) Cost Estimating
 - 9) Economics
 - 10) Real Estate Specialists

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents including supporting data, analyses, etc. The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers.

ATR is managed within USACE and conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. The ATR team lead is from outside the home MSC. The ATR team lead has not yet been assigned. Additional team members may be added from other Districts as needed.

- 1) **Products to Undergo ATR.** Specific products that have or will undergo ATR as the study progresses. All products will undergo ATR at the FSM, AFB, draft, and final feasibility report milestones.
- a. Required ATR Team Expertise.** The following disciplines were used on the PDT and therefore require similar roles to review the work products under ATR. Roles may be consolidated to a smaller list of individuals.

| ATR Team Members/Disciplines | Expertise Required |
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| ATR Lead – May be combined with Plan Formulation | The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. |

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| | The ATR lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc). |
| Plan Formulation | The Planning reviewer should be a senior water resources planner with experience in current flood risk management planning and policy guidance, and have experience in plan formulation for multipurpose projects, specifically integrating measures for flood risk management, ecosystem restoration, recreation, a watershed approach, and planning in a collaborative environment. Minimum years of experience needed is 10 years. This role could be consolidated with others. |
| Landscape Architect | A LEED certified architect, whom is familiar with benefits for treating rain where it falls, is desired. This role may be consolidated with the biologist and / or plan formulator. |
| Economics | Team member will have extensive experience in related flood risk management multipurpose projects, and have a thorough understanding of HEC-FDA. This team member should be able to provide guidance on cost effective / incremental cost analysis (CE/ICA) and trade-off analysis. A team member able to review the ecosystem restoration alternatives as applicable for an urban watershed is preferred, specifically in terms of applying IWR-PLAN on a watershed-wide basis. This team member should have at least 10 years experience. This team member can also serve as the risk reviewer. |
| Environmental Resources | This Environmental Resource specialist needs to be familiar with the Clean Water Act (CWA) compensatory mitigation per the Habitat Evaluation Procedures. Also, this ATR team member will be a biologist or ecologist familiar with CWA compensatory mitigation per the Habitat Suitability Index Models for flood risk management. This team member should be familiar with use of the watershed perspective. In addition, this team member should be familiar with best management practices and stream corridor restoration techniques, as applicable within urban watersheds between 30 to 100 square miles in area. The team member should be familiar with the standard Habitat Evaluation Procedure habitat model and the NRCS field assessment. Minimum years experience will be a minimum of 10 years. For the UTC project, a biologist from Omaha District was involved in review of the existing conditions phase, however this SME has retired. This role may be consolidated with the plan formulator and / or the landscape architect. |
| Cultural Resources | Team member will be familiar with cultural resource management but may not be necessary depending on the PDT member's findings with the Kansas SHPO. |
| Hydrology | Team member will be an expert in the field of urban hydrology & hydraulics, have a thorough understanding of the dynamics of the both open channel flow systems, enclosed systems, application of detention / retention basins, effects of best management |

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| | practices and low impact development on hydrology, approaches that can benefit water quality, application of levees and flood walls in an urban environment with space constraints, non-structural measures especially as related to multipurpose alternatives including ecosystem restoration, non-structural solutions involving flood warning systems, and non-structural alternatives related to flood proofing. The team member will have an understanding of computer modeling techniques that will be used for this project (HEC-1, HEC-RAS). A certified floodplain manager (CFM) is recommended but not required. Required years of experience will be a minimum of 10 years. This team member can also serve as the risk reviewer. This role can be consolidated with Hydraulic Engineering. |
| Hydraulic Engineering | See above hydrologist. This role may be consolidated with the Hydrology reviewer. |
| Geotechnical Engineering | Team member will have extensive experience in levee & floodwall design, post-construction evaluation, and rehabilitation. This is a critical ATR team member, and a certified professional engineer is recommended with a minimum of 10 years experience. This role may be combined as geotechnical, civil, and structural engineer. |
| Risk Analysis | The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. |
| Civil Engineering | Civil / Site / Utilities / Relocations: This discipline may require a dedicated team member, or may be satisfied by structural or geotechnical reviewer, depending on individual qualifications. Team member will have experience in utility relocations, positive closure requirements and internal drainage for levee construction, and application of non-structural flood risk management, specifically flood proofing. A certified professional engineer is suggested. Minimum years of experience needed is 10 years. This role may be combined as geotechnical, civil, and structural engineer. |
| Structural Engineering | Team member will have a thorough understanding of non-structural measures, levee, flood wall, and retaining wall design, and structures typically associated with levees (pump stations, gatewell structures, utility penetrations, stoplog & sandbag gaps, and other closure structures). Experience with internal drainage structures similar to flap gates is preferred. Minimum years of experience for this team member is 10 years. A certified professional engineer is recommended though not required. This role may be combined as geotechnical, civil, and structural engineer. |
| Cost Engineering | Team member will be familiar with cost estimating for similar |

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| | projects. Team member will review only on the selected plan, not the entire suite of formulated alternatives, as presented by the PDT in the latest version of MCACES, which is MII. Team member will be a Certified Cost Technician, Certified Cost Consultant, or Certified Cost Engineer. These efforts will be coordinated with Cost Engineering Directory of Expertise at the Walla Walla District. Minimum years of experience needed is 10 years. |
| Real Estate | Team member should be familiar with necessary components in a real estate plan for a flood risk management project involving structural and nonstructural approaches. An understanding of the difference of a gross appraisal from screening methods is essential for the plans formed. |
| Hazardous, Toxic and Radioactive Waste (HTRW) | Only if deemed necessary by team leader. A memo on HTRW review is available and could be reviewed by the team leader. |
| Other disciplines/functions | The team leader will make a decision on the need for these disciplines. The notable disciplines that need ATR by subject matter experts (SMEs) on this project include the disciplines of Water Quality, Environmental/NEPA, Cultural Resources, Hazardous/Toxic Waste, and Legal. These disciplines should have a minimum of 10 years experience each. Legal review is not under the purview of the ATR Team Leader but is instead responsible to the Corps of Engineers Office of Counsel chain-of-command. |

b. Documentation of ATR. DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

- 1) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- 2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not been properly followed;
- 3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
- 4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any vertical team coordination (the vertical team includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be

elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- 1) Identify the document(s) reviewed and the purpose of the review;
- 2) Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- 3) Include the charge to the reviewers;
- 4) Describe the nature of their review and their findings and conclusions;
- 5) Identify and summarize each unresolved issue (if any); and
- 6) Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

ATR may be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed, based on work reviewed to date, for the AFB, draft report, and final report. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

Generally IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is made as to whether IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- **Type I IEPR.** Type I IEPR reviews are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.
- **Type II IEPR.** Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and

flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. Type II IEPR reviews will consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

- a. **Decision on IEPR.** Type I IEPR will be required during Feasibility phase for the Draft Feasibility Report, as required for all studies with flood risk management as part of their authorization. A Type I IEPR contract will be coordinated through the PCX. Planning team anticipates that Type II IEPR will be required during PED phase. Type II IEPR Safety Assurance considerations should be addressed during Type I IEPR per the EC requirements.
 - 1) The project is not expected to cost more than \$45 million
 - 2) Governors of Kansas and Missouri have not and likely will not make requests for a peer review by independent experts;
 - 3) A flood risk management consideration, residual risk: The project team has emphasized residual risk of property damage and loss of life associated with channel widening, and will continue to do so.
 - 4) Regarding loss of life, there is a significant risk to loss of life. The project will address risk to life safety at three of ten project sites, as budgeted for the study. The other seven sites would require additional funding to assess and do plan formulation.
 - 5) Life safety may be affected by anyone of these flood related variables: depth of water, velocity, proximity of population, and warning time (rate of rise). The Brush Creek stakeholders face all of these. Warning time for a USGS gage on Brush Creek and State Line Road has shown a rate of rise of 7 feet per hour.
 - 6) The project has not yet and should not cause a public dispute. Thus far public meetings have indicated support for the green aspects of project measures and called for continuing analysis and assessment of the nature of the flood hazards.
 - 7) For environmental considerations, the PDT has engaged EPA and others in doing adequate analysis of measures for both flood and environmental improvement. The PDT has therefore taken environmental restoration opportunities seriously, and to have a complete feasibility study, the PDT is evaluating effects of upland measures versus measures strictly located in stream corridors but is only doing evaluation of stream corridor using the ecosystem output model discussed below.
 - 8) No novel methods are used in justifying USACE construction. This feasibility report is not anticipating a design that will require redundancy, resiliency, or robustness. No unique construction sequencing is anticipated.
- b. **Products to Undergo Type I IEPR.** The Draft Feasibility Report will undergo Type I IEPR. An IEPR contract will be coordinated through the PCX and awarded to an Outside Eligible Organization (OEO) in accordance with USACE policies. The IEPR panel will be selected and managed by the OEO per the EC. The IEPR panel will be identified and then expected to conduct a project site visit near the start of their review.
- c. **Required Type I IEPR Panel Expertise.** The IEPR panel would likely be as many as six individuals although some roles may be combined. The panel expertise should be mustered specifically to evaluate the plan formulated for urban storm drainage, where primarily suburban development has built out within a watershed under 50 square miles. Panel expertise would need to be

focused on ecosystem restoration mission of USACE, as compatible with the flood risk management mission, so that type of dual experience would be preferred. Another aspect for panel expertise is related to the geotechnical analysis for underseepage: Timing of drainage is generally complete within 12 hours, so geotechnical and structural engineers do not have to focus on wet soil analysis needed for riverine areas that can face sustained wet periods and saturated soils. However, those disciplines may still be necessary, so the structural engineer is a low priority. Should a levee/floodwall alternative become possible, the hydrologist and hydraulic engineer can both offer perspective on interior drainage features. Consider combining the civil engineer, the hydraulic, hydrology expert roles; also, the geotechnical and structural could be combined, depending on features yet to be fully identified in plan formulation.

| IEPR Panel Members/Disciplines | Expertise Required |
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| Economics | The Panel Member should have a degree in economics or a related field and should be able to evaluate the appropriateness of cost effectiveness and incremental cost analysis (CE/ICA), as applied to dollar costs and ecosystem restoration benefits, and preferably familiar with the Corps of Engineers tool for CE/ICA called IWR-Planning Suite. Panel member should also have experience with National Ecosystem Restoration analysis procedures. This team member should have at least 10 years experience. |
| Plan Formulation | The Panel Member should have a degree in planning or a related field and should have experience in the plan formulation process. Panelist should be familiar with evaluation of alternative plans for ecosystem restoration projects. Familiarity with USACE standards and procedures is required. The Panel Member should be a professional from academia, a public agency, consulting firm, or similar vocation with a minimum of five years of experience. Panel member should be familiar with large, complex civil works projects with high public and interagency interests. Preferable experience would be in the area of riverine restoration to achieve ecological benefits, and preferably knowledge of urban planning and a watershed perspective. The Panel Member should have a degree in planning or a related field and should have experience in the plan formulation process. Panelist should be familiar with evaluation of alternative plans for ecosystem restoration projects. Familiarity with USACE standards and procedures is required. Minimum years of experience needed is 10 years. This role may be consolidated as the plan formulation, and or environmental, and or landscape architect. |
| Landscape Architect | The Panel Member should have a degree in planning or a related field and should have experience in the plan formulation process. Panelist should be familiar with evaluation of alternative plans for ecosystem restoration projects. Familiarity with USACE standards and procedures is required. The Panel Member should be a professional from academia, a public agency, consulting firm, or similar vocation with a minimum of five years of experience. |

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| | <p>Panel member should be familiar with large, complex civil works projects with high public and interagency interests. Preferable experience would be in the area of riverine restoration to achieve ecological benefits, and preferably knowledge of urban planning. The Panel Member should have a degree in planning or a related field and should have experience in the plan formulation process. Panelist should be familiar with evaluation of alternative plans for ecosystem restoration projects. Familiarity with USACE standards and procedures is required. A LEED certified architect, whom is familiar with benefits for treating rain where it falls, is desired. This role may be consolidated as the plan formulation, and or environmental, and or landscape architect.</p> |
| <p>Environmental</p> | <p>The panel member should be a scientist from academia, public agency, non-governmental entity, or Consulting Firm with a minimum 10 years demonstrated experience in biology, NEPA, and riverine systems ecology. Researchers should have a focus on the urban riverine system. The panel member should have a minimum MS degree or higher in Biology, Ecology or Physical Science.</p> <p>The Panel Member should have at minimum a Masters Degree in ecology or biology. Panelist should have particular knowledge of ecosystem restoration. Panel Member should have experience in riverine wetland and riparian ecology, preferably in urbanize riverine situations. Minimum years experience will be a minimum of 10 years. This role may be consolidated as the plan formulation, and or environmental, and or landscape architect.</p> |
| <p>Hydrologic Engineering</p> | <p>Team member will be an expert in the field of urban hydrology & hydraulics, have a thorough understanding of the dynamics of the both open channel flow systems, enclosed systems, application of detention / retention basins in an urban watershed of 20-30 square miles, effects of best management practices and low impact development on hydrology, approaches that can benefit water quality, application of levees and flood walls in an urban environment with space constraints, non-structural measures especially as related to multipurpose alternatives including ecosystem restoration, non-structural solutions involving flood warning systems (important), and non-structural alternatives related to flood proofing. The team member will have an understanding of computer modeling techniques that will be used for this project (HEC-HMS, HEC-RAS). Professional engineer registration is recommended. Required years of experience will be a minimum of 10 years. This role may be consolidated as the hydrologist and or hydraulic engineer.</p> |
| <p>Hydraulic Engineering</p> | <p>Member should be from academia, a department of transportation, a road and bridge related public agency or an Architect-Engineer or Consulting Firm with a minimum 10 years demonstrated experience in hydraulic engineering associated with urban stormwater planning and or design projects. Active</p> |

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| | <p>participation in related professional societies is encouraged. .</p> <p>This role may be consolidated as the hydrologist and or hydraulic engineer. A certified floodplain manager (CFM) is desired, but not required.</p> |
| Geotechnical Engineering | <p>The Hydrogeology Panel Member should be a registered professional from academia, a public agency, or an Architect-Engineer or consulting firm with 10 years experience in conducting and evaluating subsurface geologic data including hydraulic conductivity. This role may be consolidated as structural engineering and or civil engineering and or geotechnical engineering.</p> |
| Civil Engineering | <p>Civil / Site / Utilities / Relocations: This discipline may possibly be satisfied by structural or geotechnical reviewer, depending on individual qualifications, or better, combined with the suggested cost engineer panel member discipline. Team member will have experience in utility relocations, positive closure requirements and internal drainage for levee construction, and application of non-structural flood risk management, specifically flood proofing. A registered professional engineer is suggested. Minimum years of experience needed should be 10 years. This role may be consolidated as structural engineering and or civil engineering and or geotechnical engineering.</p> |
| Structural Engineering | <p>The Panel Member should be have demonstrated experience in performing cost engineering/construction management, preferably with knowledge of riverine floodplain ecosystem restoration. Team member should be familiar with similar projects across US and related Cost Engineering. Experience in associated contracting procedures, total cost growth analysis and related cost risk analysis is desired. Panel member should be familiar with construction industry and practices used in Midwest of the United States.</p> <p>. Minimum years of experience for this team member should be 10 years. A registered professional engineer is recommended though not required. This role may be consolidated as structural engineering and or civil engineering and or geotechnical engineering.</p> |
| Cost Engineering | <p>The Cost Engineering/Construction Management Panel Member should be an Engineer from academia, related public agency or an Architect-Engineer or Consulting Firm with a minimum 10 years demonstrated experience in performing cost engineering/construction management for all phases of subsurface geosystem projects including deep cut off walls. Team member should be familiar with similar projects across US and related Cost Engineering. Experience in associated contracting procedures, total cost growth analysis and related cost risk analysis is desired. Panel member should be familiar with construction industry and practices used in Midwest of the United States. Active participation in related professional societies is</p> |

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| | encouraged. Minimum years of experience needed should be 10 years. This role may be consolidated with civil engineering. |
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d. Documentation of Type I IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization(OEO) per EC 1165-2-214, Appendix D. The IEPR panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments in the ATR Section above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed during the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING MANDATORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION

All decision documents will be coordinated with the Cost Engineering MCX at Walla Walla District. This MCX will assist in determining the cost engineering expertise needed on the ATR team and Type I IEPR team (if any), and assist in development of the review charge(s). The MCX will also provide the Cost Engineering MCX certification. The RMO is responsible for coordination with the Cost Engineering MCX.

9. MODEL CERTIFICATION AND APPROVAL

EC 1105-2-412 (Assuring Quality of Planning Models) mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models, for

the purposes of the EC, are defined as any models and analytical tools that planners use to define water resources management problems and opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision making. Note that the use of a certified/approved planning model does not constitute a technical review of the planning product. The selection and application of the model and the use of appropriate input and output data remains the responsibility of the model users and is subject to DQC, ATR, and IEPR.

EC 1105-2-412 does not cover engineering models used in planning studies. The responsible use of well-known and proven USACE developed and commercial engineering software will continue and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever appropriate. The selection and application of the model and the use of appropriate input and output data remains the responsibility of the model users and is subject to DQC, ATR, and IEPR.

- a. **Planning Models.** The following standard planning models are anticipated to be used in the development of the decision document:

| Model Name and Version | Brief Description of the Model and How It Is Applied in the Study | Certification / Approval Status |
|---|---|---------------------------------|
| HEC-FDA 1.2.5a | The PDT is using HEC-FDA for risk-based economic analysis of the existing project conditions and for potential flood risk management measures (EM 1110-2-1619, ER 1105-2-101). The Hydrologic Engineering Center’s Flood Damage Analysis (HEC-FDA) software provides the capability to perform an integrated engineering and economic analysis during the formulation and evaluation of flood risk management plans. | Certified |
| IWR Planning Suite | PDT will use this to determine the cost effectiveness and the incremental cost analysis for project alternatives. IWR Planning Suite assists with plan formulation by combining user-defined solutions to planning problems and calculating the effects of each combination, or "plan." The program can assist with plan comparison by conducting cost effectiveness and incremental cost analyses, identifying the plans which are best financial investments and displaying the effects of each on a range of decision variables. | Certified |
| Qualitative Habitat Evaluation Index (QHEI) | This model will be used to help determine the output in units of habitat for each alternative. QHEI is designed to provide a measure of habitat that generally corresponds to those physical factors that affect fish communities and which are generally important to other aquatic life (e.g., invertebrates). The index is based on six interrelated metrics: substrate, in stream cover, channel morphology, riparian and bank condition, pool and riffle quality, and gradient. | In Review by EcoPCX |

- b. Engineering Models.** The following engineering models are being used in the development of the decision document. Where indicated these models have undergone examination by the Corps of Engineers Hydraulics, Hydrology, & Coastal Engineering sub-Community of Practice (HH&C sub-CoP). (SharePoint site at <https://kme.usace.army.mil/NTCT/HHC/default.aspx>)

| Model Name and Version | Brief Description of the Model and How It Is Applied in the Study | Approval Status |
|------------------------|--|--------------------------|
| HEC-1 version 4.1 | The PDT used the USACE Hydrologic Engineering Center's used to reevaluate peak flows of Turkey Creek at specified locations, screen out detention basins as possible features in alternatives as a means as reducing peak discharges and resultant water surface elevations; use for the load points to HEC-RAS existing conditions analysis and proposed improvements | HH&C CoP Allowed for Use |
| HEC-RAS 4.1 | The PDT is using the USACE Hydrologic Engineering Center's River Analysis System (HEC-RAS) to establish water surface elevations for a range of probable flows for both existing conditions and potential project alternatives. These water surface elevations are generated for both the Big Blue and Kansas Rivers and are eventually used as input to HEC-FDA (<i>see HEC-FDA model above</i>). The model is calibrated and verified to major local flood events. | HH&C Sub-CoP Preferred |

10. REVIEW SCHEDULES AND COSTS

- a. ATR Schedule and Cost.** Schedule includes the following activities:
- Feb/Mar 2014 -- ATR Team Lead participates in IPR with HQ-USACE. Specific date TBD by HQ.
 - 30 Aug 2014 -- Complete engineering appendices (interim product) ATR review.
 - 30 Oct 2014 -- Complete pre-AFB documentation (interim product) ATR review.
 - Jan 2015 -- ATR Team Lead participates in AFB with HQ-USACE. Specific date TBD by HQ.
 - Feb 2015 through Jul 2015 -- Review of draft and final Feasibility Reports and any associated cost estimate and engineering reviews. Exact schedule to be determined by AFB results and Project Guidance Memorandum directives. Final ATR sign-off is expected NLT Jul 2014.

The estimated total cost for ATR is \$50,000 to \$75,000.

- b. Type I IEPR Schedule and Cost.** A single round of IEPR will be undertaken for review of the complete draft Feasibility Report and will begin following the completion of plan formulation of alternatives in early 2014. The current anticipated cost for IEPR is \$100,000 to \$200,000.
- c. Model Certification/Approval Schedule and Cost.** All planning models used on this study are previously certified and approved.

11. PUBLIC PARTICIPATION

In 2005, the Reconnaissance Phase Study for the Brush Creek Basin was completed, which included a Brush Creek Watershed Summit meeting. The Brush Creek Watershed Summit meeting was conducted as a regional effort to foster increased understanding of the watershed's resources, challenges, and opportunities; strengthen commitment to regional policies, goals and watershed-based planning; create

a cooperative framework for partners working in the watershed; and define strategies to overcome challenges and capitalize on opportunities. The Summit brought together over 50 attendees including local, municipal and county representatives, local and regional organizations, city leaders, neighborhood associations, state and federal agencies and political representatives. Feasibility phase public involvement and participation expanded in 2010.

On October 1 and 9, 2010, Bus Tours of the Brush Creek Basin were offered for the purpose of showing various activities that communities have taken and implemented along Brush Creek. On Monday, November 15, 2010 a Public Scoping Meeting was held at The Pembroke Hill High School. This meeting was held jointly by the USACE, JOCO, KCMO, with the support of the area's metropolitan planning organization, the Mid-America Regional Council (MARC). The meeting was from 5:30 to 7:30 in the Centennial Hall Auditorium of The Pembroke School high school, 5121 State Line Road. The purpose of this meeting was to listen to public concerns about the Brush Creek watershed, collect feedback on stakeholders' concerns with corrective measures in the Bi-State Reach project site, and offer knowledge on watershed issues related to environment, flooding, and socio-economic opportunities.

On Thursday, April 21, 2011 a Public Meeting was held at Mission Hills Country Club. This meeting was held jointly by the U.S. Army Corps of Engineers (Corps), the Brush Creek Coordinating Committee, Johnson County, Kansas, the City of Kansas City, Missouri, with the support of the area's metropolitan planning organization, the Mid-America Regional Council (MARC). The meeting was from 5:30 to 7:30 at 5400 Mission Drive, Mission Hills, KS. The purpose of this meeting was to review feedback from stakeholders regarding possible measures for improving water resources in the Brush Creek watershed and how to apply them, first, in the Bi-State Reach project site, while considering other locations in the Brush Creek watershed; present alternatives created from those measures, specifically in the Bi-State Reach project site; discuss integrating environment, flooding, and socio-economic opportunities for the Brush Creek watershed. The sponsors reviewed feedback from the last public meeting, and the planners responded by assembling the publically favored measures in these two alternatives. (see the Project Planning webpage at left for more information)

In the summer of 2013, the public will be invited to the next public meeting. The focus will be about how a watershed management plan (WMP) will benefit the communities in Brush Creek. Focus will be on a floodplain management plan (FMP) as an important subpart to the WMP. The tentative location is the Sylvester-Powell Community Center, which is where the October 2010 bus tours started.

The final Feasibility Report and associated environmental documentation will all be made available to the public on the Brush Creek Basin study website supported by the Kansas City District Corps of Engineers.

12. REVIEW PLAN APPROVAL AND UPDATES

The USACE Northwestern Division Commander is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the Project Management Plan, the Review Plan is a living document and may change as the study progresses. The Kansas City District is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval will be documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) shall be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the

Review Plan, along with the Commanders' approval memorandum, shall be posted on the Kansas City District's webpage. The latest Review Plan will also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- Brush Creek Basin Feasibility Study, Project Manager, Planning Branch, USACE Kansas City District, 816-389-3513.
- District Support Planner, USACE Northwestern Division, Missouri River Basin, 503-808-3858.
- Operational Director, USACE National Ecosystem Planning Center of Expertise, 309-794-5448.

ATTACHMENT 3: REVIEW PLAN REVISIONS

| Revision Date | Description of Change | Page / Paragraph Number |
|----------------------|------------------------------|--------------------------------|
| April 2013 | Major revisions | Entire document update |
| | | |
| | | |

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS (as used in this document).

| Term | Definition | Term | Definition |
|-------------------|--|-------------|--|
| AFB | Alternative Formulation Briefing | JOCO | Johnson County, Kansas |
| ATR | Agency Technical Review | KCMO | Kansas City, Missouri |
| BCB | Brush Creek Basin (and tributaries) | LEED | Leadership in Energy And Environmental Design |
| CENWK | Kansas City District, US Army Corps of Eng. | MCX | Mandatory Center of Expertise |
| CFM | Certified Floodplain Manager per Association of State Floodplain Managers | MSC | Major Subordinate Command |
| CoP | Community of Practice | NED | National Economic Development |
| CSDR | Coastal Storm Damage Reduction | NEPA | National Environmental Policy Act |
| CWA | Clean Water Act | NER | National Ecosystem Restoration |
| CWRB | Civil Works Review Board | NWD | Northwestern Division |
| DPR | Detailed Project Report | NWK | Kansas City District |
| DQC | District Quality Control/Quality Assurance | O&M | Operation and maintenance |
| EA | Environmental Assessment | OMB | Office and Management and Budget |
| EC | USACE Engineer Circular | OMRR&R | Operation, Maintenance, Repair, Replacement and Rehabilitation |
| EIS | Environmental Impact Statement | OEO | Outside Eligible Organization |
| EM | USACE Engineer Manual | OSE | Other Social Effects |
| EPA | U.S. Environmental Protection Agency | PCX | Planning Center of Expertise |
| ER | USACE Engineer Regulation | PDT | Project Development Team |
| FMP | Floodplain Management Plan | PL | Public Law |
| FRM | Flood Risk Management | PMP | Project Management Plan or Project Management Professional |
| FS | Feasibility Study | QHEI | Qualitative Habitat Evaluation Index |
| Home District/MSD | The District or MSC responsible for the preparation of the decision document | RED | Regional Economic Development |
| H&H | Hydrologic and Hydraulic Engineering | RMC | Risk Management Center |
| HEC-FDA | Hydrologic Engineering Center's Flood Damage Analysis model | RMO | Review Management Organization |
| HEC-RAS | Hydrologic Engineering Center's River Analysis System | SAR | Safety Assurance Review |
| HQUSACE | Headquarters, U.S. Army Corps of Engineers | USACE | U.S. Army Corps of Engineers |
| IEPR | Independent External Peer Review | WMP | Watershed management plan |
| IPR | In-Progress Review | WRDA | Water Resources Development Act |