



US Army Corps
of Engineers
Kansas City District

**KANSAS CITY DISTRICT
CORPS OF ENGINEERS
and the
GARDEN OF EDEN DRAINAGE DISTRICT – Section 2**

**Public Law 84-99 of the Flood Control Act of 1944
Levee Rehabilitation – NEPA Review, Environmental
Assessment & Finding of No Significant Impact**

**GARDEN OF EDEN DRAINAGE DISTRICT – SECTION 2,
ITEM NO. 139S2, NON-FEDERAL,
EMERGENCY LEVEE REHABILITATION PROJECT**

**Missouri River
Chariton County, Missouri**

March 2008



DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
700 FEDERAL BUILDING
KANSAS CITY, MISSOURI 64106-2896

DRAFT

Finding of No Significant Impact

Garden of Eden Drainage District – Section 2
(Item 139S2)
Levee Rehabilitation Project
Chariton County, Missouri

Project Summary

The U.S. Army Corps of Engineers, Kansas City District (CENWK), in cooperation with the project sponsor, Garden of Eden Drainage District – Section 2, propose to construct the Garden of Eden Drainage District – Section 2 Levee Rehabilitation Project, under the authority of Public Law 84-99 of the Flood Control Act of 1944. The proposed action is needed to repair the agricultural levees damaged by the declared flood event of 6 May 2007. The proposed repairs are located in Chariton County, Missouri, near the town of Triplett, along the left descending bank of the Grand River between River Mile 22.0 and River Mile 15.5.

Alternatives Considered

Three alternatives were considered: (1) In-place repairs; (2) Landward levee setbacks and (3) No action.

**STATIONS 89+00 to 91+00, 93+05 to 94+70, 100+00 to 107+50, and 137+40 to 141+90;
SEVERE LANDSIDE SLIDES:**

Alternative 1 (Recommended Plan): In-place repairs are the recommended repair action. This action would involve the repair of damaged areas on the original levee alignment. All material would be excavated from the weakened areas, then re-compacted back into the levee alignment (provided it is suitable) and smoothed to design grades. Landside stability berms are included to provide needed levee stability. Stability berms would add approximately 6,950 cubic yards (cy) of fill to repair actions.) The berm configuration would start (spring point) 12-feet down from the levee crest elevation; extend on a 1-foot vertical on 15-foot horizontal slope for 30 feet, then 1-foot vertical on 3-foot horizontal slope to toe-out.

Alternative 2: In-place repairs without stability berms and a 5-foot slope were considered for this repair action. This action would involve the repair of damage areas on the original alignment. All material would be excavated from the weakened areas, then re-compacted back into the levee alignment (provided it is suitable) and smoothed to design grades. To compensate

for head-water pressures, an increased (flatter) landside embankment slope would be constructed (i.e. from existing 1-foot vertical on 3-feet horizontal slope to a 1-foot vertical on 5-feet horizontal slope.) Borrow will be obtained from the adjacent landside agricultural land.

Alternative 3: The No Action alternative would result in no repairs to the severe landside slides. Therefore, public and private infrastructure and agricultural croplands would continue to be exposed to a high risk of future flooding.

STATION 316+65 to 319+40; SEVERE RIVERSIDE EROSION:

Alternative 1 (Recommended Plan): This action would involve repair of damage with approximate 1,213 linear feet of landward setback with stability berms. The maximum landward setback would be approximately 100 feet from the original alignment. The landward levee setback would include the removal and replacement of an existing 5-foot by 6-foot concrete box culvert, with sluice gate, along with a 48-inch smooth steel pipe. The landward setback would begin at levee station at 311+00 and tie into the existing levee station at 324+00. The new levee embankment would have a 12-foot crown-width, with 1-foot vertical on 3-feet horizontal side slopes, and landside and riverside stability berms. The stability berms would add approximately 3,000 cubic yards of fill material to the repair action. The berm configurations would start 16 feet down from the levee crest elevation; extend on a 1-foot vertical on 20-foot horizontal slope for 20 feet, then 1-foot vertical on a 3-foot horizontal slope to the toe out. The landward setback option would isolate an additional 3.4 acres riverward of the levee.

Alternative 2: This action would involve repair of damage with a slight landward levee setback; and grading the existing Grand River bank line and riverward levee slope to an approximate 1-foot vertical on 2.5-foot horizontal slope. In addition, a 3-foot layer of quarry-run-stone protection would be required on graded slope for protection from erosion. During grading operations the levee embankment would be re-established by "shifting" levee alignment slightly landward. A landside stability berm is included, which merely replaces displaced berm resulting from repair action. The existing drainage structures located at station 319+00 (a 4' by 5' concrete box culvert and a 48" smooth steel pipe), would require landward extensions to them resulting from landward setback. In addition, to ensure stability of bank line downstream of drainage structures, stone bank protection would be required from approximate levee station 319+40 to 323+00.

Borrow will be obtained by degrading an existing levee segment positioned riverward of the new levee setback, by excavating a landside drainage ditch near the landside toe-line of the new setback, and by enlarging an existing landside drainage ditch. A small amount of timber (< 9-inches diameter breast height) will be removed to obtain the borrow material.

Alternative 3: The No Action alternative would involve no repair to severe riverside erosion and the levee would remain in its damaged condition. The No Action alternative would continue to expose public and private infrastructure and agricultural croplands to a high risk level of future flooding.

Summary of Environmental Impacts

The proposed action would involve restoring the Garden of Eden Drainage District Section 2 level of flood risk management to the pre May 2007 flood event level. This project would result in minor, short-term impacts to farmed wetlands as 4.3 acres would be excavated to an approximate depth of 24" for borrowing. Some opportunistic vegetation measuring < 9 inches diameter breast height (dbh) would be removed during borrow activities. Long-term beneficial impacts to farmed wetlands result from the removal of sediment due to borrowing, which increases wetland depth, and the sloping of perimeter faces upon completion of borrowing increases wetland hydrology. About 0.2 acres of farmed wetland would be impacted by the landward levee setback. The landward levee setback would result in a long-term minor impact regarding the return of approximately 6.2 acres of active agricultural land to the floodplain that would develop into wetlands or riparian habitat, which would benefit fish and wildlife and increase water conveyance. The proposed action would have no impact to sites listed on or eligible for inclusion on the National Register of Historic Places or threatened and endangered species. Overall, the minor impacts associated with this project are outweighed by the long-term social and economic benefits.

Mitigation Measures

The recommended plan would result in beneficial impacts to wetlands by the enhancement of 4.3 acres of farmed wetlands and the return of 6.2 acres of agricultural land to the floodplain. About 0.2 acres of farmed wetland would be impacted by the landward levee setback. General permit number NWKGP-41 authorizes these actions. A small fringe of cottonwoods and willows measuring < 9 inches dbh would be removed during project construction. CENWK has determined in coordination with the Missouri Department of Conservation and the U.S. Fish and Wildlife Service that natural plant succession should provide adequate re-vegetation of impacted areas. Mast-producing trees are not affected by the project. As such, no mitigation is warranted or proposed.

Public Availability

Prior to a decision on whether to prepare an Environmental Impact Statement, CENWK circulated a Notice of Availability (Notice) of the Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI), dated _____, 2008, with a thirty-day comment period ending on _____, 2008 to the public and resource agencies. The Notice was e-mailed to individuals/agencies/businesses listed on CENWK-Regulatory Branch's e-mail mailing list. The Notice informed these individuals that the EA and Draft FONSI were available on the CENWK webpage or that they could request a hard copy of the EA and Draft FONSI in order to provide comment.

Levee rehabilitation projects completed by the Corps under authority of Public Law 84-99 generally do not require the preparation of an Environmental Impact Statement. These projects typically result in long-term social and economic benefits and the adverse environmental effects are typically minor/long-term and minor/short-term construction related. Minor, long-term impacts associated with these projects are typically well outweighed by the overall long-term

social and economic benefits of these projects. As described above, the recommended plan is consistent with this assessment of typical levee rehabilitation projects completed by the Corps under authority of Public Law 84-99 of the Flood Control Act of 1944.

Conclusion

After evaluating the anticipated environmental, economic, and social effects of the proposed activity, it is my determination that construction of the proposed Garden of Eden Drainage District – Section 2 Levee Rehabilitation Project does not constitute a major Federal action that would significantly affect the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Date: _____

Roger A. Wilson, Jr.
Colonel, Corps of Engineers
District Commander



DEPARTMENT OF THE ARMY
KANSAS CITY DISTRICT, CORPS OF ENGINEERS
700 FEDERAL BUILDING
KANSAS CITY, MISSOURI 64106-2896

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers, Kansas City District (CENWK), in cooperation with the project sponsor, Garden of Eden Drainage District – Section 2, proposes to construct the Garden of Eden Drainage District – Section 2 Levee Rehabilitation Project under the authority of Public Law 84-99 of the Flood Control Act of 1944. The proposed project would involve in-place repairs of all severe landside slides, and repair of severe riverside/foreshore area erosion with an approximately 1,213-linear-foot-long landward levee setback approximately 100-ft. from the original levee alignment to repair the agricultural levees damaged by the declared flood event of 6 May 2007.

The Garden of Eden Drainage District – Section 2 levee segment consists of approximately 33,700 linear feet of earthen flood control works (FCW) on the left descending bank of the Grand River between river mile 22.0 and 15.5, in Chariton County, near the town of Triplett, Missouri. The FCW protect approximately 3,500 acres of agricultural lands (3,000 acres in cropland), approximately three miles of State Highway Route M, and approximately five miles of unimproved farm to market roads, approximately three miles of fiber optic lines, three miles of buried pipeline, and eight miles of buried water lines. The recommended plans consist of in-place repair with landside stability berms of all severe landside slides (sta. 89+00 to 91+00, 93+05 to 94+70, 100+00 to 107+50, and 137+50 to 141+90), and repair of the severe riverside/foreshore area erosion (sta. 316+65 to 319+40), with an approximately 1,213-linear-foot-long landward levee setback. Borrow material will be obtained for repairs as described below:

Borrow will be obtained from the adjacent landside agricultural land, degrading an existing levee segment positioned riverward of the new levee setback, excavating a landside drainage ditch near the landside toe-line of the new setback, and by enlarging an existing landside drainage ditch. Some woody vegetation measuring < 9-inches diameter breast height (dbh) will be removed to obtain the borrow material.

Summary of Environmental Impacts

The proposed action would involve restoring agricultural levees damaged during the May 2007 flood to their pre-flood protection levels. This project would result in minor, short-term adverse impacts to the aquatic ecosystem and a long-term, minor impact to agriculture and wetland as a result of the levee setback. Approximately 6.2 acres of agricultural land would be removed from production due to the setback, but this acreage would become part of the riverward floodplain, which would benefit the aquatic ecosystem. About 0.2 acres of farmed wetland would be impacted by the levee setback and some opportunistic woody vegetation measuring < 9 inches dbh would be removed to facilitate borrowing. The project would result in beneficial impacts to the aquatic ecosystem as sediment would be removed from 4.3 acres of existing farmed wetlands as a result of excavation and the sloping of perimeter faces when borrowing is complete. The

proposed action would have no impact to sites listed on or eligible for inclusion on the National Register of Historic Places or threatened and endangered species. Overall, the minor short-term impacts associated with this project are outweighed by the long-term social and economic benefits. CENWK in cooperation with the Missouri Department of Conservation and the U.S. Fish and Wildlife Service has stated that natural plant succession should provide adequate re-vegetation of impacted areas. Mast-producing trees are not affected by the project. As such, no mitigation is warranted or proposed.

Prior to a decision on whether to prepare an Environmental Impact Statement, CENWK circulated a Notice of Availability (Notice) of the Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI), dated _____, 2008, with a thirty-day comment period ending on _____, 2008 to the public and resource agencies. The Notice was e-mailed to individuals/agencies/businesses listed on CENWK-Regulatory Branch's e-mail mailing list. The Notice informed these individuals that the EA and Draft FONSI were available on the CENWK webpage or that they could request a hard copy of the EA and Draft FONSI in order to provide comment.

Additional information concerning this project may be obtained from Mr. Richard A. Skinker, Environmental Resources Specialist, PM-PR, Kansas City District - U.S. Army Corps of Engineers, by writing the above address, or by telephone at 816-389-3134.

**NEPA REVIEW
ENVIRONMENTAL ASSESSMENT
&
DRAFT FINDING OF NO SIGNIFICANT IMPACT**

**PUBLIC LAW 84-99
GARDEN OF EDEN DRAINAGE DISTRICT
SECTION 2
LEVEE REHABILITATION PROJECT
CHARITON COUNTY, MISSOURI**

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**PUBLIC LAW 84-99
GARDEN OF EDEN DRAINAGE DISTRICT
SECTION 2
LEVEE REHABILITATION PROJECT
CHARITON COUNTY, MISSOURI**

Section 1: INTRODUCTION

This Environmental Assessment provides information that was developed during the National Environmental Policy Act (NEPA) public interest review of the proposed Public Law 84-99 Garden of Eden Drainage District – Section 2 Levee Rehabilitation Project.

Section 2: AUTHORITY

The Kansas City District – U.S. Army Corps of Engineers (CENWK), in cooperation with the project sponsor, the Garden of Eden Drainage District – Section 2, propose to construct the Garden of Eden Drainage District – Section 2 Levee Rehabilitation Project under the authority of Public Law 84-99 of the Flood Control Act of 1944.

Section 3: PROJECT LOCATION

The Garden of Eden Drainage District – Section 2 levee consists of approximately 33,700 linear feet of earthen flood control works (FCW) and is located in Chariton County near the town of Triplett, Missouri, along the left descending bank of the Grand River between river mile 22.0 and 15.5.

Section 4: EXISTING CONDITION

The declared flood event on 6 May 2007 caused damages to the Garden of Eden Drainage District – Section 2 flood control works. These damages consist of four landside slides at approximate levee stations 89+00 to 91+00, 93+05 to 94+70, 100+00 to 107+50, and 137+40 to 141+90; and one severe riverside erosion area on a damaged levee embankment at approximate levee station 316+65 to 319+40 (Borrow Maps 1 and 2).

Section 5: PURPOSE & NEED FOR ACTION

The project purpose and need is to rehabilitate the damaged levees and restore the associated social and economic benefits. The Garden of Eden Drainage District – Section 2 received damages to sections of their levees during the 6 May 2007 declared flood event. Prior to the

May 2007 event, the Garden of Eden Drainage District – Section 2 levee provided an approximate 10-year level of flood risk management. In its current damaged state, the Garden of Eden Drainage District – Section 2 levee is estimated to provide an approximate two-year level of protection. The existing condition exposes all public and private infrastructure and agricultural croplands to an increased level of risk from future flooding. Failure to restore the flood risk management capability of the levee system would keep area residents' livelihood and social well-being in turmoil, subject to the continuous threat of flooding until a level of flood protection is restored. Failure to reconstruct the levee could adversely affect the tax base of the county and municipal government. In addition, loss of jobs and potential losses in agricultural production on lands previously protected by the levee would also be incurred.

Section 6: ALTERNATIVES CONSIDERED

The repair alternatives considered for each type of levee damage include:

Stations 89+00 to 91+00, 93+05 to 94+70, 100+00 to 107+50, and 137+40 to 141+90; Severe Landside Slides: (1) In-place repairs with landside stability berms (**RECOMMENDED**); (2) In-place repairs; and (3) No action. A new landward levee setback was not considered a prudent and economical alternative due to the high costs involved with the increased length of repair and the increased cubic yards of fill required to construct a landward levee setback compared to the other repair alternatives considered.

The primary difference between the in-place repair alternative and the in-place repair alternative with landside stability berms is that in-place repairs without the addition of landside stability berms would not provide adequate foundation support for the levee embankment and the embankment could subsequently fail. Landside stability berms result in a slightly different berm configuration (1-foot vertical on 15-foot horizontal slope for 30 feet, then 1-foot vertical on 3-foot horizontal slope to toe-out, compared to 1-foot vertical on 3-foot horizontal slope to a 1-foot vertical on 5-foot horizontal slope without stability berms). The configuration for in-place repairs without stability berms is required to compensate for head-water pressures. The no action alternative is unacceptable as it would result in an increased risk of flooding to the previously protected area and would not return the flood risk management level to a pre-flood level.

No Action Alternative: The no action alternative is unacceptable as it would result in an increased risk of flooding to the previously protected area and would not return the flood risk management level to a pre-flood level.

Station 316+65 to 319+40; Severe Riverside Erosion: (1) Approximate 100-ft. landward levee setback with landside stability berms (**RECOMMENDED**); (2) Slight levee setback with landside stability berms; and (3) No Action. In-place repairs were considered non-practical repair alternatives given the severity of bank erosion.

A slight levee setback would result in a new setback just landward of the existing levee alignment and grading the existing Grand River bank line and riverward levee slope to an approximate 1-foot vertical on 2.5-foot horizontal slope. A 3-foot layer of quarry-run-stone

protection would be required on graded slope for erosion protection. During grading operations the levee embankment would be re-established by "shifting" levee alignment slightly landward. A landside stability berm is included, which merely replaces displaced berm resulting from repair action. The existing drainage structures located at station 319+00 (a 4' by 5' concrete box culvert & a 48" smooth steel pipe), would require landward extensions to them resulting from the landward setback. Stone bank protection would be required from approximate levee station 319+40 to 323+00 to ensure bank line stability downstream of the drainage structures.

Similar to in-place repairs, the increased amount of fill required to repair the severe bank erosion results in this alternative being less practical compared to the other setback considered (100 ft. landward levee setback).

No Action Alternative: The no action alternative is unacceptable as it would result in an increased risk of flooding to the previously protected area and would not return the flood risk management level to a pre-flood level.

Section 7: RECOMMENDED PLAN

The recommended plan consists of the recommended repair alternatives selected for each type of levee damage. The recommended plan consists of in-place repairs with landside stability berms for severe landside slides and an approximate 100-ft. landward levee setback with riverside stability berms to repair severe riverside erosion.

Stations 89+00 to 91+00, 93+05 to 94+70, 100+00 to 107+50, and 137+40 to 141+90; **SEVERE LANDSIDE SLIDES**

Alternative 1-In-place repairs with landside stability berms is the recommended action to repair severe landside slides. This action would involve the in-place repair of severe landslide slides on the original levee alignment. All material would be excavated from the weakened areas, then re-compacted back into the levee alignment (provided it is suitable) and smoothed to design grades. Stability berms are included in the repair action at all locations. Stability berms are not considered a betterment, but necessary to ensure adequate foundation support for the levee embankment. Stability berms would require approximately 6,950 CY of fill. The berm configuration would start (spring point) 12-feet down from the levee crest elevation; extend on a 1-foot vertical on 15-foot horizontal slope for 30 feet, then 1-foot vertical on 3-foot horizontal slope to toe-out. Borrow to repair the severe landside slides would be obtained from the adjacent landside agricultural land.

STATION 316+65 to 319+40; SEVERE RIVERSIDE EROSION

Alternative 1-An approximate 100-ft. landward levee setback with riverside stability berms is the recommended action to repair severe riverside erosion. The setback would measure approximately 1,213 linear feet in length. The landward levee setback would include the removal and replacement of an existing 5-foot by 6-foot concrete box culvert, with sluice gate, along with a 48-inch smooth steel pipe. The landward setback would begin at levee station at 311+00 and tie into the existing levee station at 324+00. The levee embankment would have a

12-foot crown-width, with 1-foot vertical on 3-foot horizontal side slopes, and landside and riverside stability berms. The stability berms would require approximately 3,000 cubic yards of fill material. The berm configurations would start 16 feet down from the levee crest elevation; extend on a 1-foot vertical on 20-foot horizontal slope for 20 feet, then 1-foot vertical on a 3-foot horizontal slope to the toe out. The landward setback repair would provide an additional 3.4 acres of habitat riverward of the levee.

Borrow would be obtained by degrading an existing levee segment positioned riverward of the new levee setback, excavating a landside drainage ditch near the landside toe-line of the new setback, and enlarging an existing landside drainage ditch.

Section 8: NATIONAL ENVIRONMENTAL POLICY ACT REVIEW

As part of the NEPA review for the proposed project, CENWK circulated a Notice of Availability (Notice) of the Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI), dated _____, 2008, with a thirty-day comment period ending on _____, 2007 to the public and resource agencies. The Notice was e-mailed to individuals, agencies, and businesses listed on CENWK-Regulatory Branch's e-mail mailing list. The Notice informed these individuals that the EA and Draft FONSI were available on the CENWK webpage or that they could request the EA and Draft FONSI in writing, in order to provide comment. The following comments were received and evaluated from coordination of the Notice:

(Section pending comments)

Section 9: AFFECTED ENVIRONMENT:

This area is comprised of approximately 3,500 acres of agricultural lands (3,000 acres in cropland), approximately three miles of State Highway Rote M, and approximately five miles of unimproved farm to market roads, three miles of fiber optic lines, three miles of telephone lines, three miles of buried pipeline, and about eight miles of buried water lines. Small pockets of riparian trees are interspersed along the Grand River. Common trees found within this area include willow (*Salix* spp.), eastern cottonwood (*Populus deltoides*) and American sycamore (*Platanus occidentalis*). In addition, various wildlife species occupy the riparian zone such as small fur-bearing species, white tail deer (*Odocoileus virginianus*), and various bird species including neo-tropical migrants.

Section 10: ENVIRONMENTAL CONSEQUENCES:

Primary resources of concern and construction considerations identified during the evaluation of environmental consequences included: noise, water quality, fish and wildlife, threatened and endangered species, woodlands, wetlands, agricultural land, archeological and historical resources, floodplains, economics, aesthetics, and flood risk management. Projects impacts to other resources were determined to be no effect.

Noise

Alternative 1 consisting of in-place repairs with landside stability berms to repair severe landside slides and a landward setback with riverside stability berms to repair severe riverside erosion, would result in minor short-term construction related noise impacts. These impacts are the result of the operation of heavy machinery during project construction. These noise levels would be in addition, but similar to, those produced by agricultural equipment which is routinely operated in the project area. No residences, businesses, churches, park areas or other areas sensitive to increased noise levels were identified in the project area. Project construction could disturb the occasional boater on the nearby Grand River or person(s) participating in outdoor recreation on the private land in the project area.

Repairs resulting from implementation of other alternatives considered would result in noise impacts similar to those described for the recommended plan.

The "No Action" alternative would produce no increase in noise levels in the project area.

Water Quality

The recommended plan, Alternative 1, could result in minor, temporary, construction related adverse impacts to water quality resulting from site runoff and increased turbidity. The potential minor impacts associated with the recommended plan would be avoided and/or minimized to the greatest extent possible by the implementation of Best Management Practices and measures required under the National Pollutant Discharge Elimination System (NPDES) permit. Best management practices would minimize the incidental fallback of material into the river during construction and would minimize the introduction of fuel, petroleum products, or other deleterious material from entering into the waterway. Such measures could consist of erosion control fences; storing equipment, solid waste, and petroleum products above the ordinary high water mark and away from areas prone to runoff; requiring that all equipment be clean and free of leaks, and similar measures. To prevent fill from reaching water sources by wind or runoff, fill would be covered, stabilized or mulched, and silt fences would be used as required. The NPDES permit will be obtained prior to project construction. All appropriate measures will be taken to minimize erosion and storm water discharges during and after construction.

Alternative 2 – Repairs resulting from implementation of this alternative plan could result in minor, temporary, construction related adverse impacts to water quality similar to those describe above. As with the Recommended Alternative, these impacts would be avoided and/or minimized to the greatest extent possible by the implementation of Best Management Practices and measures required under the National Pollutant Discharge Elimination System permit.

In the "No Action" Alternative with the absence of a Federal action addressing levee improvements, a high water event could result in the release of a variety of industrial chemicals and substantially impact the natural and human environment within the project area. Avoiding repair actions could result in adverse impacts to water quality from increased levels of nutrient loading and wastes, including runoff of pollutants from industrial sources, petroleum products, and non-point sources of human and animal wastes.

Fish and Wildlife

The recommended plan, Alternative 1, would result in minor, temporary, construction related adverse impacts to fish and wildlife resources. The impacts to wildlife resources would be related to noise and visual disturbance during the construction activity. The impacts to fishery resources would be related to potential site runoff and increased turbidity, which could make feeding, breeding, and sheltering difficult for species not accustomed to these conditions.

Alternative 2 – Repairs resulting from implementation of this alternative plan would result in similar impacts as described above.

The “No Action” Alternative would have minimal effects on fish and wildlife resources. These impacts would arise from flooding within the now unprotected area. Wetland species may benefit as more frequent flooding could occur in the now unprotected areas. Wetlands would likely recharge more frequently since they are now hydrologically connected to the Grand River. Other terrestrial organisms could be killed, be temporarily displaced or have their habitat degraded by flooding.

Threatened and Endangered Species

The recommended plan would have no adverse effects on any Federally-listed threatened or endangered species or their habitat. Pallid sturgeon (*Scaphirhynchus albus*) are found primarily in the Missouri River and Mississippi River. No work is proposed within the Missouri River. The Indiana bat (*Myotis sodalis*) roosts in trees with exfoliating bark that tend to be greater than 9 inches diameter breast height during the spring and summer, and hibernate in caves during the fall and winter. Levee work would avoid Indiana bat habitat. No impacts to any state listed threatened or endangered species or their habitat were identified.

Alternative 2 – Repairs resulting from implementation of this alternative plan would have no adverse effects on any Federally-listed threatened or endangered species or their habitat for the same reasons as described above.

The “No Action” alternative would have no adverse effects on any Federally-listed threatened or endangered species or their habitat. No impacts to any state listed threatened or endangered species or their habitat were identified.

Vegetation

A small fringe of cottonwoods and willows measuring less than 9 inches diameter breast height (dbh) would be removed due to borrowing activities. The standard operating procedures (SOP) for the identification of borrow sites developed through coordination with the U.S. Fish and Wildlife Service and the Missouri Department of Conservation for the Selection of Borrow Sites Missouri River and Tributaries 1995 Levee Repair concluded that natural plant succession should provide adequate revegetation to impacted areas. No mast-producing trees are anticipated to be impacted by the recommended plan.

Alternative 2 – Repairs resulting from implementation of this alternative plan would result in similar impacts as those described above.

The “No Action” Alternative could result in increases to the floodplain and to floodplain vegetation if levees are not repaired and lands are abandoned from farming due to the high risk of flooding. Overtime, successional vegetative growth would result in increased woodland acreage.

Wetlands

The recommended plan would impact approximately 4.5 acres of farmed wetland; 4.3 acres due to borrowing within farmed wetlands and 0.2 acres due to the levee setback. Fill material would be removed in accordance with Natural Resources Conservation Service specifications that have been coordinated between the project sponsors and the NRCS in the Compatible Use Authorization agreement. Beneficial impacts to wetlands would occur with the enhancement of 4.3 acres of farmed wetlands during borrow operations. The removal of sediment deposited from adjacent agricultural land under permit would provide for increased depth and inundation of farmed wetlands. Upon completion of borrow activities, the perimeter of farmed wetlands would be shaped to allow for increased hydrology that would allow seasonal emergent wetlands to revegetate naturally. Excavation depths would be limited to 24 inches. The borrow sites are located near the proposed levee repairs and are shown on the map (Borrow Maps 1 of 2, and 2 of 2). The levee setback would return about 6.2 acres of agricultural land to the floodplain. This acreage would revert to wetland or riparian habitat, depending on river hydrology. This activity is authorized by general permit NWKGP-41.

Alternative 2 – Repairs resulting from the implementation of this alternative would result in more benefits to wetlands compared to the recommended plan. Since this alternative requires approximately 15,300 more cubic yards of fill compared to the recommended plan, less farmed wetland surface area would have silt removed due to excavation as a result of borrow activities.

The “No Action” Alternative could result in benefits to wetlands located behind the breeched levees as these areas would be subject to increased hydrology due to a new level of future flooding.

Agricultural Land

Alternative 1 – With the implementation of the recommended plan, restoring the levees to their pre-flood levels of protection would protect 3,000 acres of existing cropland from a 10-yr flood event. A long-term, minor impact to agricultural production is the removal of approximately 6.2 acres of crop land from active agricultural activity as this acreage would be returned to the floodplain due to the landward levee setback. Approximately 4.3 acres of farmed wetland would be excavated and enhanced due to borrow activities.

Alternative 2 – Repairs resulting from implementation of this alternative plan would have no impact on agricultural activity or loss of agricultural lands.

The “No Action” Alternative would adversely impact agricultural activity by exposing approximately 3,500 acres of agricultural lands (3,000 acres of croplands) to increased flooding. This loss of agricultural production would have related impacts such as lost income, lower tax base, and decreased land value.

Archeological and Historical Resources

The recommended plan would have no impact to sites listed on or eligible for inclusion on the National Register of Historic Places (NRHP). A background check of the NRHP and site location maps identified one prehistoric archeological site (23CH322) that has been reported as potentially eligible for the NRHP recorded near the proposed project area. The site is believed to be a prehistoric camp site of Late Woodland age (AD 300-800). The site is mapped near a portion of the levee where no work or borrowing is planned. All project borrowing and work will avoid the recorded site location. Instructions to avoid the area will be included in project construction plans.

In a letter to SHPO, the Corps recommended that the project would have no effect on historic properties and that the project should be allowed to proceed. SHPO concurred with this recommendation on November 26, 2007 with the stipulation that project impacts avoid the previously recorded site (Appendix II). The project will be coordinated with appropriate federally recognized Native American tribes (Tribes). If in the unlikely event that archeological material is discovered during project construction, work in the area of discovery will cease, the discovery would be investigated by a qualified archeologist, and the find would be coordinated with SHPO and the Tribes.

Alternatives 2 – Repairs resulting from implementation of the alternative plans would result in no effects to archaeological or historical resources.

The “No Action” Alternative would result in no effects to archaeological or historical resources.

Floodplain

The recommended plan would restore an approximately 10-year level of flood protection to the existing Garden of Eden Drainage District – Section 2 levee system, which would equal the level that existed prior to the declared flood event of 6 May 2007. The area is located in the base floodplain and is subject to Executive Order 11988, “Floodplain Management”. In addition, since the proposed levee repair would restore this levee to its near original alignment and pre-flood grade and cross section, no increase in floodwater surface elevations would occur. The recommended plan would benefit the floodplain as approximately 6.2 acres of crop land would be returned to the floodplain due to the landward levee setback. As the recommended plan would not directly or indirectly support more development in the floodplain or encourage additional occupancy and/or modify of the base floodplain, the Corps has determined that the recommended plan complies with the intent of Executive Order 11988.

Alternative 2 – Repairs resulting from implementation of this alternative plan would result in similar protections as described above for the recommended plan.

The "No Action" Alternative would continue to expose all public and private infrastructure and agricultural croplands previously protected to a high level risk of future flooding.

Economics

Based on the Corps' economic analysis, the recommended plan is the most economical and prudent repair action. With the implementation of the recommended plan, the levees would be restored to a 10-year level of flood protection. Public and private infrastructure and agricultural croplands protected by the levee prior to the flood damage would continue to be protected against a 10-year flood event. Economic conditions are unlikely to change from those of pre-damage levee conditions with the repair of this levee system.

Alternative 2 – Repairs resulting from implementation of this alternative plan would result in similar protections as described above for the recommended plan. However, this alternative is less cost effective than the recommended plan.

The "No Action" Alternative has a zero benefit to cost ratio and would continue to expose all public and private infrastructure and agricultural croplands previously protected by the levee to a high level risk of future flooding. People's livelihood and social well-being would remain in turmoil, subject to the continuous threat of flooding until the level of flood protection is restored. Failure to reconstruct the levee could adversely affect the tax base of the counties and municipal governments and special districts, such as school districts. In addition, loss of jobs and potential losses in agricultural production on lands protected by the levee would also be incurred.

Aesthetics

The recommended plan would result in very minor and temporary adverse aesthetic impacts associated with the construction activity. The human population that could potentially be affected by the activity would be expected to be very low, restricted to the occasional boater on the Grand River or person(s) participating in outdoor recreation on the private land in the project area. Upon completion of the project and the vegetation of disturbed areas, the aesthetics would be very similar to the pre-flood aesthetics.

Alternative 2 – Repairs resulting from implementation of this alternative plan would result in impacts similar to those described above.

The "No Action" Alternative would have no effect on esthetics.

Section 11: SUMMARY OF ENVIRONMENTAL EFFECTS OF THE NON-RECOMMENDED PLANS

Severe Landslide Slides

Alternative 2, in-place repairs without landside stability berms, would require an increased (flatter) landside embankment slope compared to an in-place repair with stability berms to compensate for head-water pressures. Alternative 2 would result in more land disturbance and

excavation as this alternative requires about 15,300 more cubic yards of fill to implement compared to the recommended alternative. However, since borrow activities would result in increased benefits to the aquatic ecosystem due to the excavation of silt from farmed wetlands for borrow, Alternative 2 would provide more environmental benefits compared to Alternative 1.

Alternative 3 - The "No Action" Alternative is unacceptable because it would not meet the project purpose and need of rehabilitating the damaged levee to a pre-flood level of flood risk management and therefore would not restore the associated social and economic benefits. The "No Action" alternative would have no permanent or temporary construction related impacts and would continue to expose all public and private infrastructure and agricultural croplands previously protected by the levee prior to a high level risk of future flooding. Peoples' livelihood and social well-being would remain in turmoil, subject to the continuous threat of flooding until the proposed level of flood protection is restored. Failure to reconstruct the levee could adversely affect the tax base of the county and municipal governments. Loss of jobs and potential losses in agricultural production on lands protected by the levee would also be incurred.

Severe Riverside Erosion

Alternative 2 would not result in the return of 6.2 acres of active agricultural land to the floodplain due to the 100-ft. landward levee setback. About 4.3 acres of farmed wetland would be enhanced due to this alternative, which is the same acreage that would be excavated to obtain borrow for the recommended plan. An additional 0.2 acres of farmed wetland would not be impacted by this alternative, as this impact is due to the landward levee setback.

Alternative 3 - The "No Action" Alternative is unacceptable because it would not meet the project purpose and need of rehabilitating the damaged levee to a pre-flood level of flood risk management and therefore would not restore the associated social and economic benefits. The "No Action" alternative would have no permanent or temporary construction related impacts. The "No Action" alternative would continue to expose all public and private infrastructure and agricultural croplands previously protected by the levee prior to a high level risk of future flooding. People's livelihood and social well-being would remain in turmoil, subject to the continuous threat of flooding until the proposed level of flood protection is restored. Failure to reconstruct the levee could adversely affect the tax base of the county and municipal governments. Loss of jobs and potential losses in agricultural production on lands protected by the levee would also be incurred.

Section 12: CUMULATIVE IMPACTS

The combined incremental effects of human activity are referred to as cumulative impacts (40 CFR 1508.7). While these incremental effects may be insignificant on their own, accumulated over time and from various sources, they can result in serious degradation to the environment. The cumulative impact analysis must consider past, present, and reasonably foreseeable actions in the study area. The analysis must also include consideration of actions outside of the Corps, to include other State and Federal agencies. As required by NEPA, the Corps has prepared the following assessment of cumulative impacts related to the alternatives being considered in this EA.

Historically, the Missouri River and its floodplain has been altered by bank stabilization, dams on the river and its tributaries, roads/bridges, agricultural and urban levees, channelization, farming, water withdrawal for human and agricultural use, urbanization and other human uses. These activities have substantially altered the terrestrial and aquatic ecosystem within the Missouri River watershed.

The Corps, which administers Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act, has issued and will continue to evaluate permits authorizing the placement of fill material in the Waters of the United States and/or work on, in, over or under a navigable water of the United States including the Missouri River and its tributaries. These projects typically result in minor impacts to the aquatic ecosystem.

The Corps, under the authority of the Public Law 84-99 Levee Rehabilitation and Inspection Program, has and will continue to provide rehabilitation assistance to Federal and non-Federal levee sponsors along the Missouri River which participate in the Public Law 84-99 Program. These projects typically result in minor short term construction related impacts to fish and wildlife and the habitats upon which they depend. Resources typically affected by this type of project generally include, but are not limited to, wetlands, flood plain values, water quality, and fish and wildlife habitat.

Of the reasonably foreseeable projects and associated impacts that would be expected to occur, further urbanization of the floodplain will probably have the greatest impact on these resources in the future.

The proposed action would involve restoring agricultural levees damaged during the May 2007 flood to their pre-protection levels. These projects would result in minor impacts to the aquatic ecosystem and minor, short term impacts to fish and wildlife and the habitats upon which they depend. In addition, the project action would result in minor, long term impacts associated with the loss of agricultural cropland. In addition, the project would result in beneficial impacts to wetlands by the enhancement of 4.3 acres of farmed wetlands during borrow excavation operations. Approximately 3.4 acres of agricultural land would be returned to the floodplain riverward of the levee setback, which would provide increased fish and wildlife habitat, and increased water conveyance. Overall, the minor construction-related impacts would be greatly offset by restoring the flood risk management capability and its associated social and economic benefits of the existing levee system. In addition, these projects would not result in an addition to flood heights or a reduced flood plain area but are merely a form of maintenance to that which had previously existed. Thus, no significant cumulative impacts associated with the proposed rehabilitation of the existing levee system have been identified.

Section 13: MITIGATION MEASURES

Identification of borrow sites was completed in accordance with the Standard Operating Procedures (SOP) developed through coordination with the U.S. Fish and Wildlife Service and the Missouri Department of Conservation for the Selection of Borrow Sites Missouri River and Tributaries 1995 Levee Repair. Although setback construction would result in the removal of some small willow and cottonwood saplings (<9 inches diameter breast height), the SOP states

that the clearing of successional woody vegetation and excavation which removes accumulated silt and expands existing wetlands and scour holes are considered beneficial and will enhance the overall function and value of the aquatic ecosystem. Beneficial impacts to the aquatic ecosystem would occur as a result of the recommended plan by enhancing 4.3 acres of farmed wetlands, and the return of 6.2 acres of agricultural land to the floodplain riverside of the levee setback. About 0.2 acres of farmed wetland would be impacted due to the landward levee setback. Since the proposed borrow activity in the farmed wetlands has been designed to enhance the functions and values of the aquatic ecosystem and the levee setback would provide about 6.2 acres of additional floodplain habitat, no compensatory mitigation is proposed.

Section 14: COMPLIANCE WITH ENVIRONMENTAL QUALITY STATUTES

Compliance with Designated Environmental Quality Statutes that have not been specifically addressed earlier in this report is covered in Table 1.

Section 15: CONCLUSION & RECOMMENDATION

The flood risk management level achieved by the recommended plan would be the same as the original pre-flood levees. The proposed action would involve restoring agricultural levees damaged during the May 2007 flood to their pre-protection levels. This project would result in short-term, minor adverse impacts to the aquatic ecosystem due to disturbance and 0.2 acres of farmed wetland impacted by the landward levee setback, and a long-term, minor impact to agriculture. The benefits to the aquatic ecosystem include wetland enhancement due to the excavation of silt and agricultural runoff from 4.3 acres of farmed wetland and a return of 6.2 acres of agricultural land to the floodplain, which would provide fish and wildlife habitat and increased water conveyance. The proposed action would have no impact to sites listed on or eligible for inclusion on the National Register of Historic Places or threatened and endangered species. Overall, the minor impacts associated with this project are outweighed by the long-term social and economic benefits.

Section 16: PREPARERS

This EA and the associated draft FONSI were prepared by Mr. Matthew D. Vandenberg and Ms. Lekesha Reynolds (Environmental Resources Specialists), with relevant sections prepared by Mr. Timothy Meade (Archeological and Historical Resources). The address of the preparers is: U.S. Army Corps of Engineers, Kansas City, District; PM-RP, Room 843, 601 E. 12th St, Kansas City, MO 64106.

Table 1
Compliance of Preferred Alternative with Environmental Protection
Statutes and Other Environmental Requirements

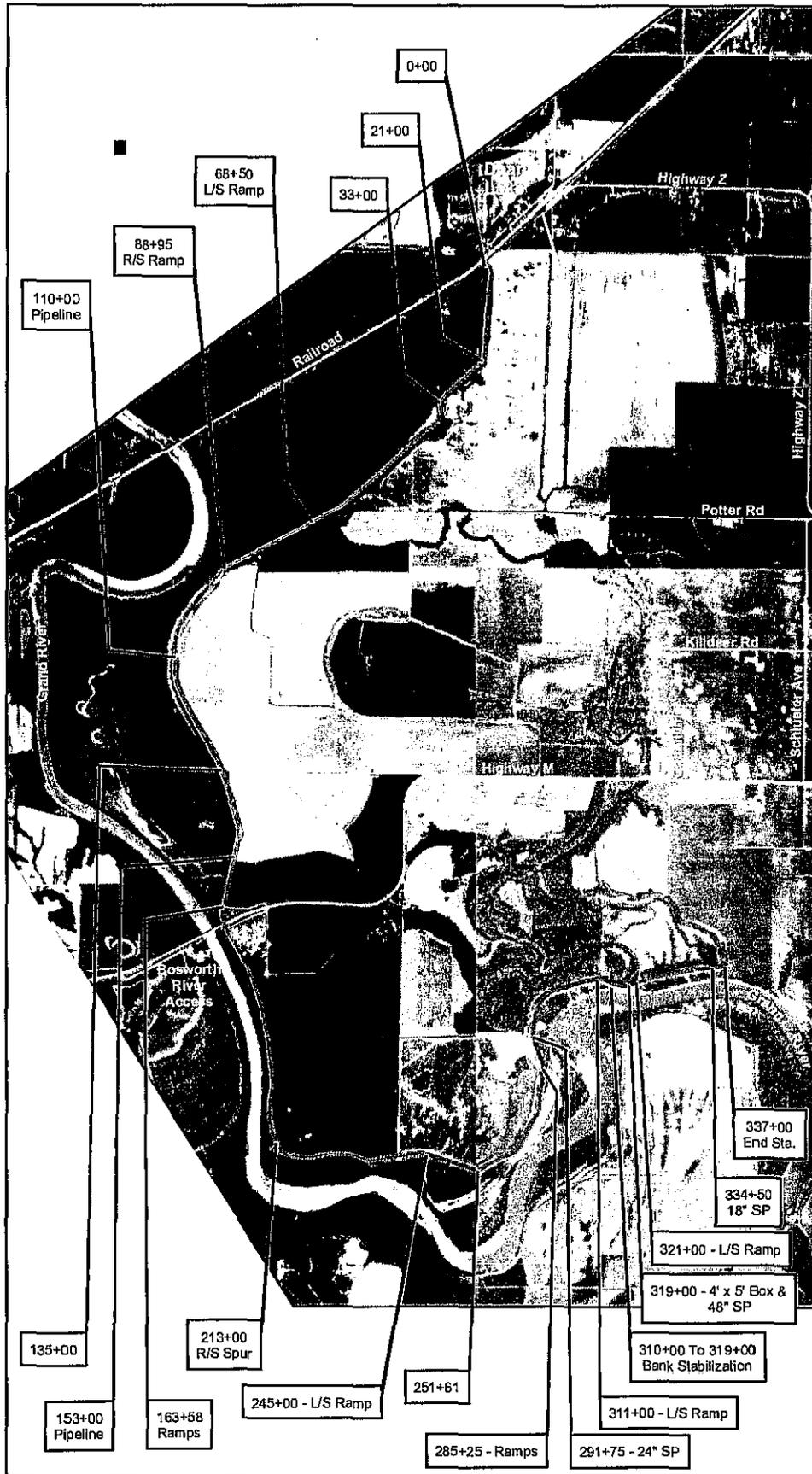
| Federal Polices | Compliance |
|---|-------------------|
| Archeological Resources Protection Act, 16 U.S.C. 470, et seq. | Full Compliance |
| Clean Air Act, as amended, 42 U.S. C. 7401-7671g, et seq. | Full Compliance |
| Clean Water Act (Federal Water Pollution Control Act), 33 U.S.C. 1251, et seq. | Full Compliance |
| Coastal Zone Management Act, 16 U.S.C. 1451, et seq. | Not Applicable |
| Endangered Species Act, 16 U.S.C. 1531, et seq. | Full Compliance |
| Estuary Protection Act, 16 U.S.C. 1221, et seq. | Not Applicable |
| Federal Water Project Recreation Act, 16 U.S.C. 4601-12, et seq. | Full Compliance |
| Fish and Wildlife Coordination Act, 16 U.S.C. 661, et seq. | Full Compliance |
| Land and Water Conservation Fund Act, 16 U.S.C. 4601-4, et seq. | Not Applicable |
| Marine Protection Research and Sanctuary Act, 33 U.S.C. 1401, et seq. | Not Applicable |
| National Environmental Policy Act, 42 U.S.C. 4321, et seq. | Full Compliance |
| National Historic Preservation Act of 1966, as amended, 16 U.S.C. 470a, et seq. | Full Compliance |
| Rivers and Harbors Act, 33 U.S.C. 403, et seq. | Full Compliance |
| Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq. | Full Compliance |
| Wild and Scenic River Act, 16 U.S.C. 1271, et seq. | Not Applicable |
| Farmland Protection Policy Act, 7 U.S.C. 4201, et. seq. | Full Compliance |
| Protection & Enhancement of the Cultural Environment (Executive Order 11593) | Full Compliance |
| Floodplain Management (Executive Order 11988) | Full Compliance |
| Protection of Wetlands (Executive Order 11990) | Full Compliance |
| Environmental Justice (Executive Order 12898) | Full Compliance |

NOTES:

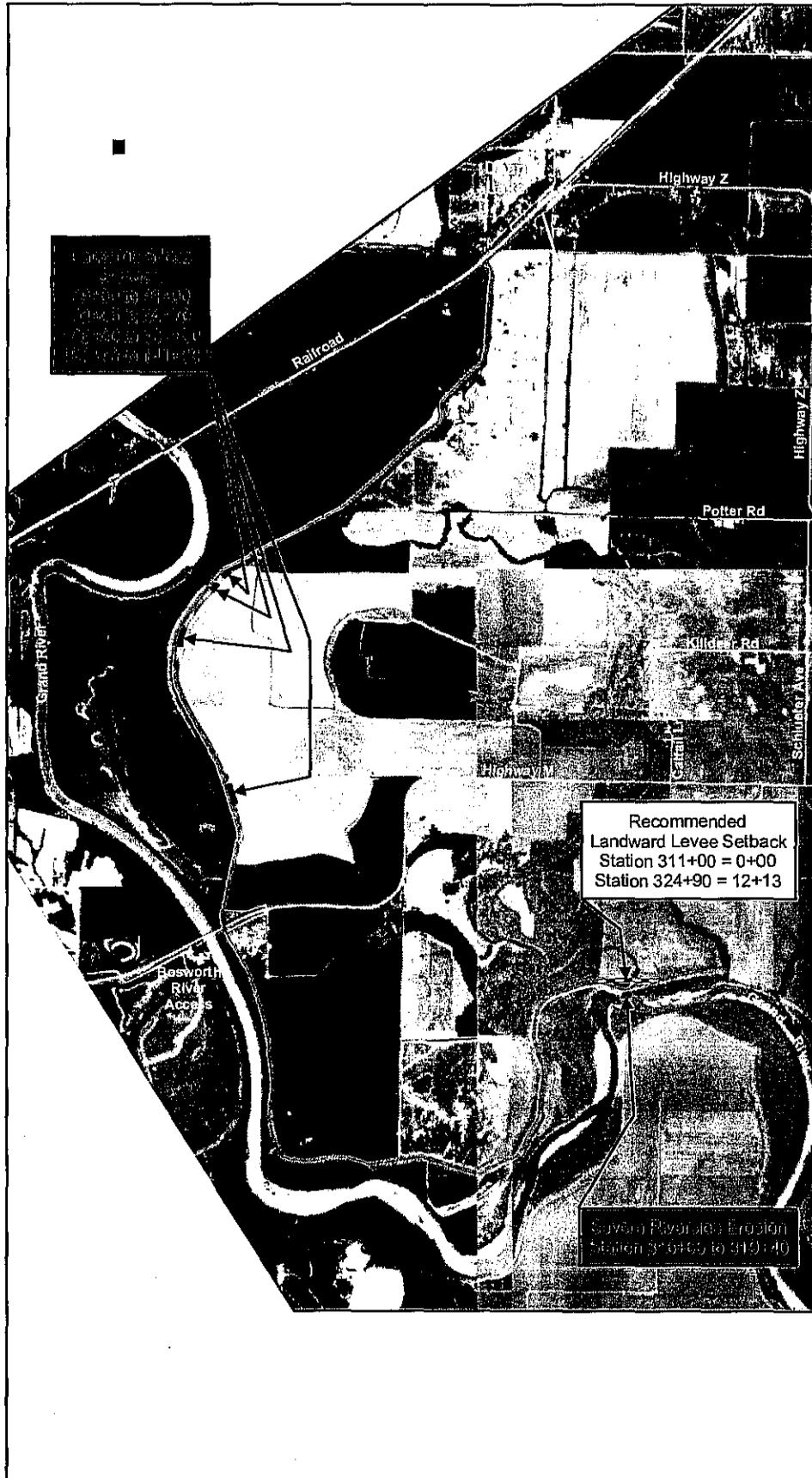
- a. Full compliance. Having met all requirements of the statute for the current stage of planning (either preauthorization or postauthorization).
- b. Partial compliance. Not having met some of the requirements that normally are met in the current stage of planning.
- c. Noncompliance. Violation of a requirement of the statute.
- d. Not applicable. No requirements for the statute required; compliance for the current stage of planning.

APPENDIX I – PROJECT MAPS

*Garden of Eden Drainage District – Section 2 (Item 139S2)
P.L. 84-99 Levee Rehabilitation Project
Chariton County, Missouri
March 2008*



ATTACHMENT B - 1



ATTACHMENT D - 1



Recommended
Landward Levee Setback
Station 311+00 = 0+00
Station 324+90 = 12+13

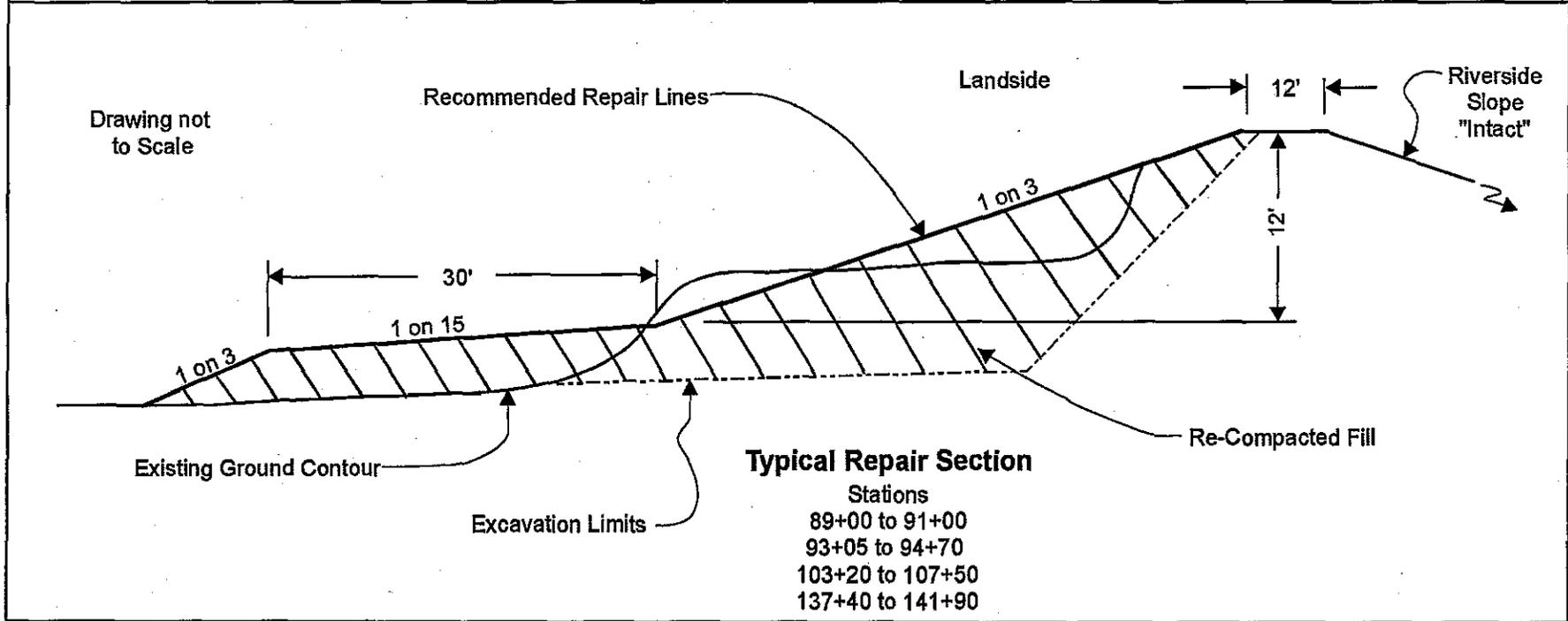
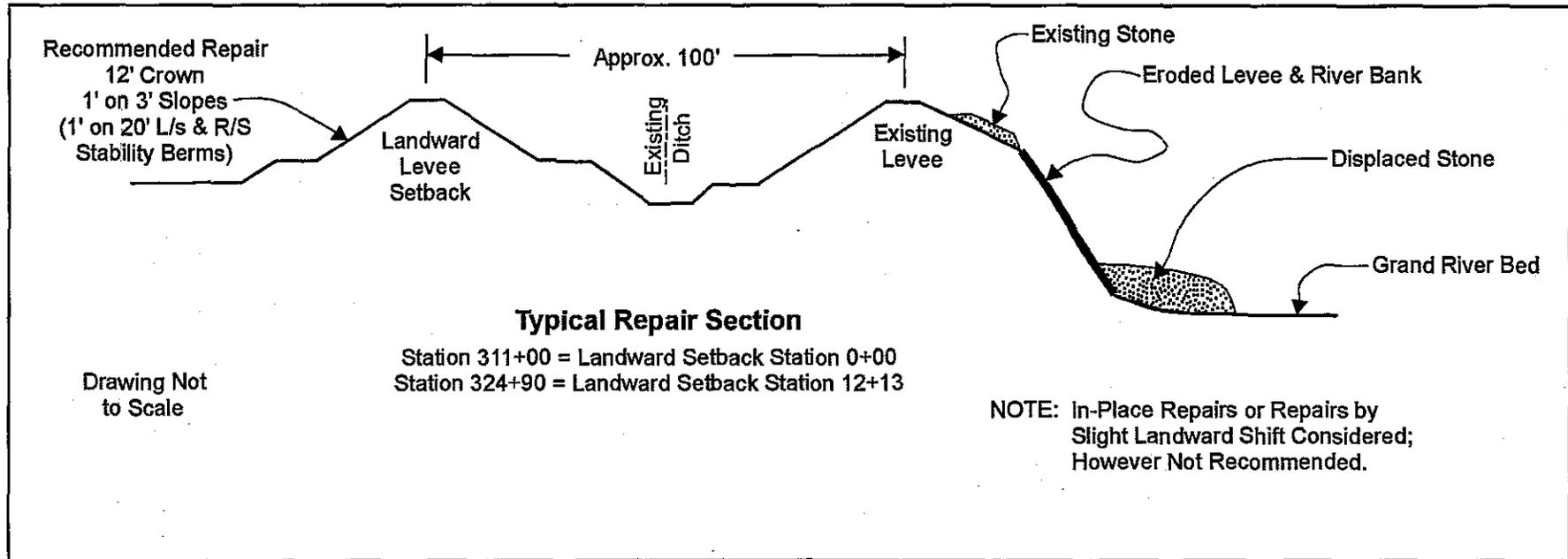
Severe Riverside Erosion
Station 310+00 to 319+00

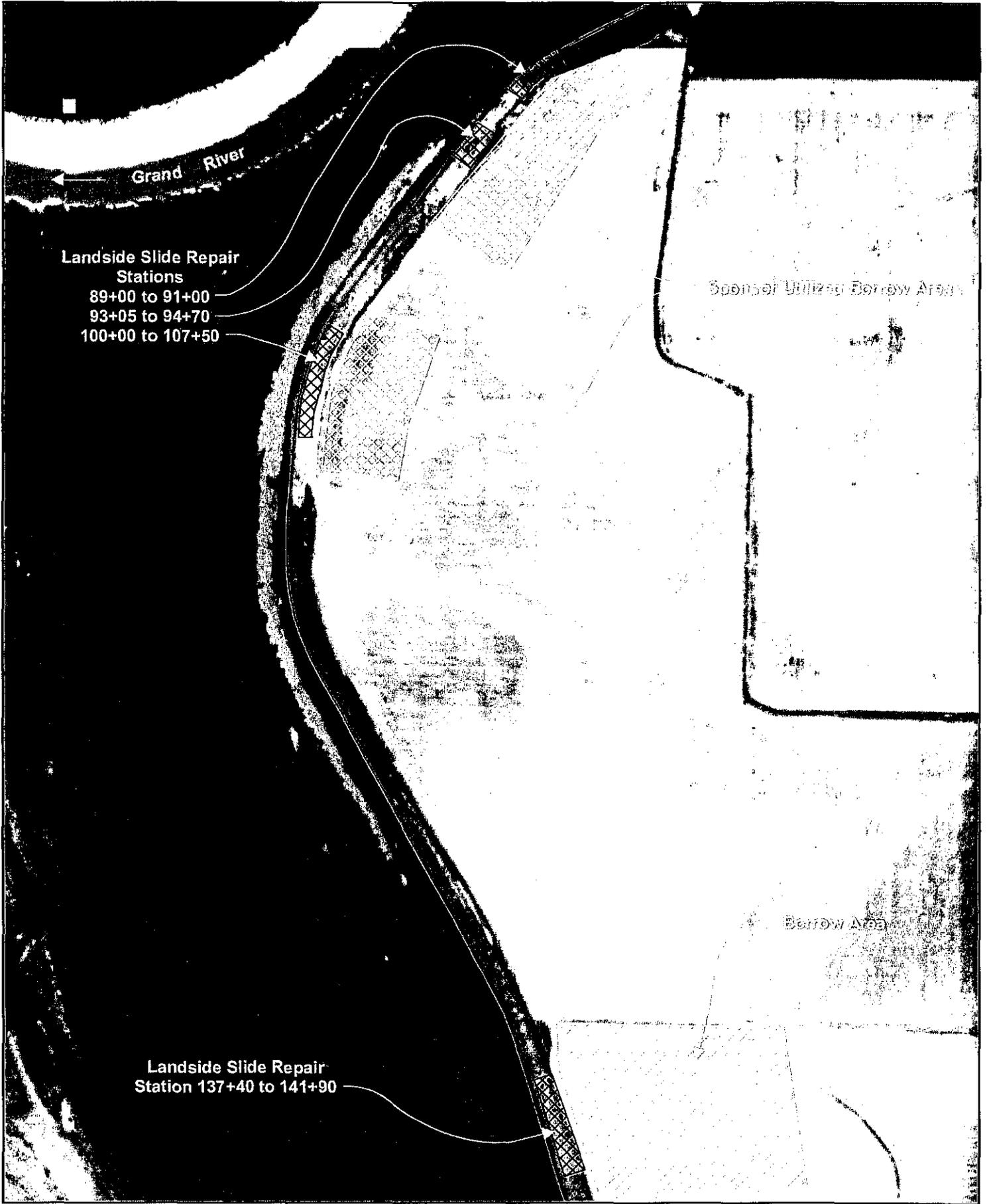
311+00
L/S Ramp

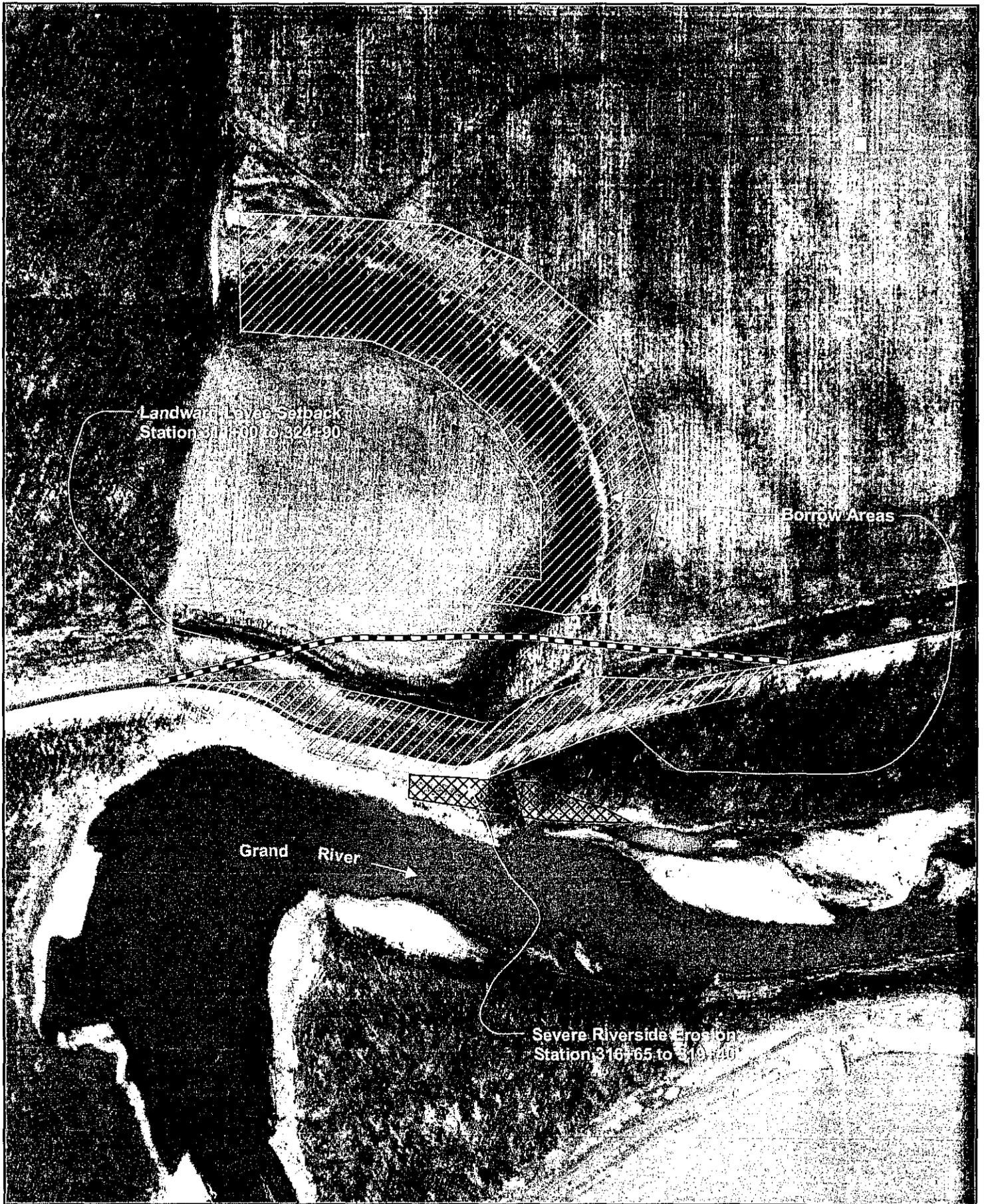
310+00 to 319+00
Bank Stabilization

319+00
4' x 5' Conc. Box
and 48" SP

321+00
L/S Ramp







APPENDIX I – PROJECT MAPS

*Garden of Eden Drainage District – Section 2 (Item 139S2)
P.L. 84-99 Levee Rehabilitation Project
Chariton County, Missouri
March 2008*



Matt Blunt, Governor • Doyle Childers, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

November 26, 2007

Timothy Meade
 Corps of Engineers, Kansas City District
 700 Federal Building
 Kansas City, Missouri 64106-2896

Re: Emergency Repairs, Garden of Eden Levee Section 2 (COE) Chariton County, Missouri

Dear Mr. Meade:

Thank you for submitting information on the above referenced project for our review pursuant to Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which requires identification and evaluation of cultural resources.

We have reviewed the information provided concerning emergency repairs to the Garden of Eden Levee Section 2. Based on this review we concur with your recommendation that that the project is in areas of low potential as recently accreted land, or areas of previous disturbance and that there will be **no historic properties affected**, with the condition that construction and borrowing activities will avoid previously recorded site 23CH322, which is to be avoided by project activities. We have no objection to the initiation of project activities.

Please be advised that, should project plans change, information documenting the revisions should be submitted to this office for further review. In the event that cultural materials are encountered during project activities, all construction should be halted, and this office notified as soon as possible in order to determine the appropriate course of action.

If you have any questions, please write Judith Deel at State Historic Preservation Office, P.O. Box 176, Jefferson City, Missouri 65102 or call 573/751-7862. Please be sure to include the SHPO Log Number (002-CH-08) on all future correspondence or inquiries relating to this project.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

A handwritten signature in black ink, appearing to read "Mark A. Miles".

Mark A. Miles
 Director and Deputy
 State Historic Preservation Officer

MAM:jd