US Army Corps
of Engineers
Louisville District

DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

FOR
INDIANAPOLIS NORTH FLOOD DAMAGE REDUCTION
INDIANAPOLIS, INDIANA

Prepared by
U.S. Army Corps of Engineers
Louisville District

June 2012

Draft Supplemental Environmental Statement for Indianapolis North Flood Damage Reduction, Indianapolis, Indiana

U.S. Army Corps of Engineers, Louisville District

Abstract: The US Army Corps of Engineers (USACE), Louisville District, has prepared a Draft Supplemental Environmental Impact Statement (DSEIS) to the Indianapolis Flood Damage Reduction Study analyzing flood damage reduction measures to a realignment of the South Warfleigh Section, more specifically the floodwall portion of Phase 3B. The Corps has also evaluated proposed additional tree clearing in Phases 3A and 3C on the riverside of levee. Evaluation of realignment of the floodwall portion of Phase 3B consisted of three alternatives – Rocky Ripple, 56th Street and Westfield Boulevard. Additionally, two variations of Westfield Boulevard were evaluated – Canal Gated Structure Relocation and Full Length Removable Wall. A tree clearing variance was considered in Phases 3A and 3C to a distance of 20 feet from levee crown more or less to the toe of the levee. The Proposed Action is to clear the levee plus 15 feet riverward from toe of levee, a total distance of about 35 to 40 ft. As a result of the DSEIS evaluation, the Westfield Boulevard alternative was identified as most economically and environmentally feasible alternative and that tree clearing 15 feet from toe of levee would be required to meet current levee safety standards. The DSEIS also discusses mitigation needs for project impacts.

Public Comment: The public is invited to review and provide comment on contents of the DSEIS. The DSEIS may be viewed at Indianapolis Public Library, Central Library, 40 E. St. Clair St., or at http://bit.ly/indynorth Requests for an individual printed copy or CD of the DSEIS should be made to the e-mail address provided below.

Comments and questions should be directed to:

COLONEL LUKE T. LEONARD
DISTRICT COMMANDER
US ARMY CORPS OF ENGINEERS, LOUISVILLE DISTRICT
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Comments will also be accepted through e-mail at:
Michael.Turner@usace.army.mil . The period for public comment on the DSEIS will end with the close of business on Monday, August 13, 2012.

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FOR
INDIANAPOLIS NORTH FLOOD DAMAGE REDUCTION

INDIANAPOLIS, INDIANA

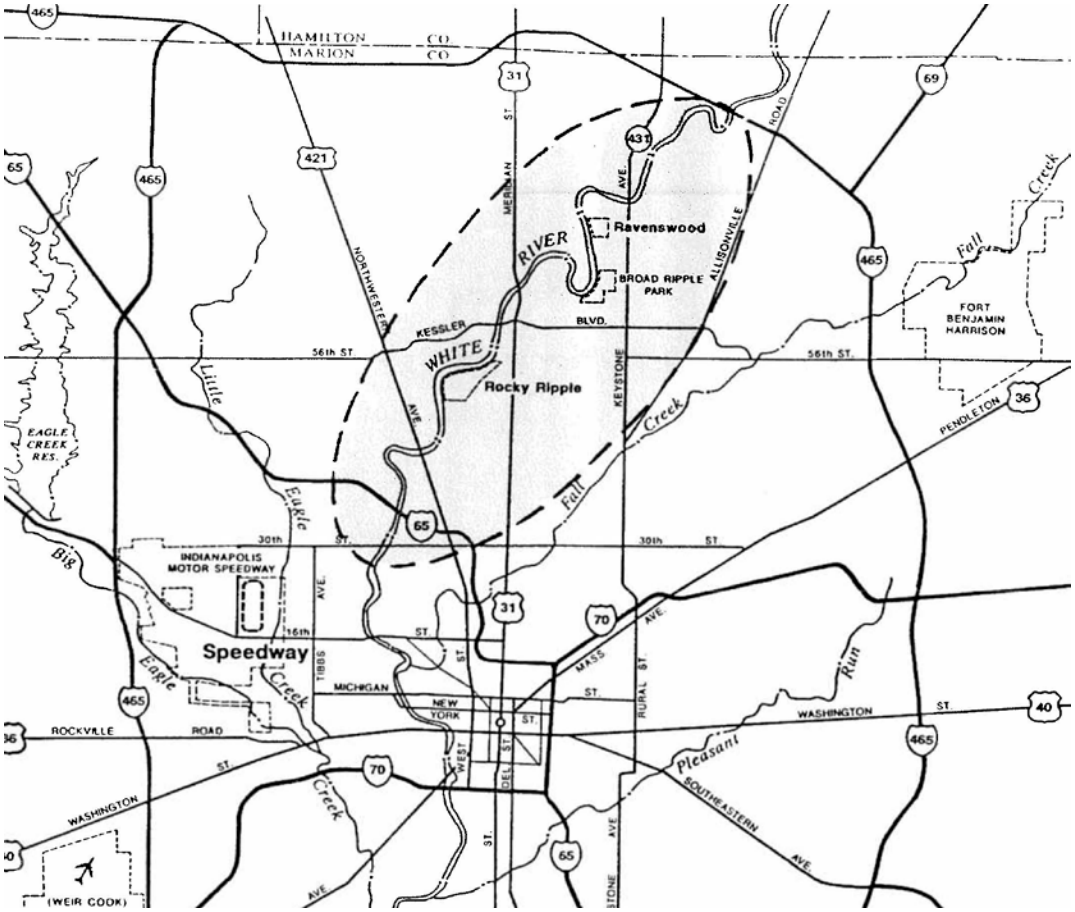
1.0 SUMMARY

The US Army Corps of Engineers, Louisville District (Corps), under authority of the Flood Control Act (FCA) of 1936 as amended by the FCA of 1946, prepared a General Reevaluation Report (GRR) and Environmental Impact Statement (EIS) in 1996, entitled Indianapolis North Flood Damage Reduction Study. The Record of Decision (ROD) was signed on September 8, 1997. A Project Cooperation Agreement was executed between the City of Indianapolis, the cost sharing sponsor, and Department of the Army on December 7, 2000.

The Indianapolis North Flood Damage Reduction Study analyzed flood damage reduction measures to address flooding problems along the White River in northern Indianapolis, Marion County, Indiana. See Figure 1 for the study area and location. The study evaluated the feasibility of constructing flood damage reduction measures along seven stream reaches within the study area – Rocky Ripple, South Warfleigh, Warfleigh, Monon-Broad Ripple, Ravenswood, RWR-10, and 79th and Haverstick. Through the study process it was determined that flood damage reduction measures were not feasible for the Ravenswood, RWR-10, and 79th and Haverstick reaches along the White River. In addition, the Town of Rocky Ripple, Indiana did not support the project during formulation of the study and withdrew from the project because of the impact to real estate and the environment. As a result, the project recommended by the study and ultimately approved for implementation involved a plan to construct a combination of earthen levees and floodwalls to protect the communities of Monon-Broad Ripple, Warfleigh and South Warfleigh, but not the Town of Rocky Ripple.

The recommended plan in the 1996 EIS included construction of 2,315 linear feet (LF) (0.44 miles) of levee and 13,172 LF (2.5 miles) of floodwall. The recommended plan would provide protection to approximately 1,500 properties, 83% of which are residential. The project would provide a minimum level of flood protection to an annual 0.35 percent chance of exceedance (300-year level of flood protection). The plan included approximately 29 acres of reforestation and/or wetland plantings to mitigate for ten acres of impacts to the environment due to project construction. The recommended plan also called for acquisition of hardware, software, and precipitation gauges for the City's Flood Warning Preparedness Plan.

Figure 1: Vicinity Map and Project Study Area



The entire project alignment was divided into three sections or phases (Phase 3A, 3B & 3C) due to funding constraints and real estate acquisition (Figure 2). Phase 3A, the Warfleigh Section, consists of 7,600 LF of floodwall/levee on the existing Warfleigh levee. This section was constructed between September 2002 and July 2004. Phase 3C, the Monon-Broad Ripple Section, included construction of approximately 4800 LF of floodwall and earthen levee from North College Avenue to high ground just upstream of the intake of the Citizens Water Canal. The Broad Ripple portion of this section extends approximately 1,500 feet from College Avenue, along the south side of 67th Street, to the existing Monon East Levee. The Monon portion of this section then extends approximately 800 LF across the existing levee and ties into the road embankment of Westfield Boulevard. From the southeast side of Westfield Boulevard, the project then parallels Westfield Boulevard and White River for a distance of approximately 2500 LF to high ground near the intake structure of the Citizens Water Canal. Phase 3B, the South Warfleigh Section, involves construction of floodwall and earthen levee,

Figure 2. White River – Indianapolis Flood Damage Reduction Project

along the east bank of the White River, from Kessler Boulevard to termination on high ground at the downstream end of the project. The section of Phase 3B from Kessler Boulevard to and through the Riviera Club is addressed in the 1996 EIS for the project, and its construction does not preclude implementation of the alternative alignments described herein. The Corps will award a contract to construct the remainder of the Phase 3B alignment, i.e, the Proposed Alternative, after completion of public and agency review process and completion of a Record of Decision (ROD) in compliance with the National Environmental Policy Act (NEPA) and receipt of additional project funds.

In January 2011 an Environmental Assessment (EA) was prepared to evaluate current conditions and potential impacts associated with changes in project features, realignment and mitigation measures different from those described in the 1996 GRR and EIS. The EA was circulated for agency and public review between February 1 and April 4, 2011. The Corps received numerous comments regarding aesthetics of the proposed floodwall and public accessibility to the Citizens Water Canal and requests for a reevaluation of flood protection to the Rocky Ripple community. As a result of the public interest in this proposed project the Louisville District made the decision to prepare this Draft Supplemental Environmental Impact Statement (DSEIS) which addresses these concerns and others.

This DSEIS has been prepared to evaluate alternatives to and impacts from the proposed modifications to project features, realignment of the South Warfleigh Section, and proposed additional tree clearing in sections 3A and 3C. This DSEIS also addresses the need to acquire different environmental mitigation site(s) than those described in the 1996 EIS recommended plan, and additional mitigation requirements as a result of the aforementioned changes. This DSEIS is prepared pursuant to the National Environmental Policy Act (NEPA), CEQ regulations (40 C.F.R. §§ 1500-1517), and the Corps implementing regulation, Procedures for Implementing NEPA, ER 200-2-2, 1988. Much of the information used to prepare this DSEIS is available in the 1996 EIS; therefore the 1996 EIS is incorporated by reference.

2.0 PURPOSE AND NEED FOR ACTION

Flooding problems on the White River in North Indianapolis have been studied at various stages since the flood of record in 1913. Other significant flood events occurred in 1937, 1943, 1957, and 1958 (USACE 1996). Numerous sections of levees have been constructed by government and private entities; these levees have provided varying levels of protection. The purpose of the Indianapolis North Flood Damage Reduction Project is to provide the affected area protection at a minimum level of an annual 0.35 percent chance of being exceeded; this is commonly referred to as the 300-year level of protection.

Changes to the South Warfleigh Section of the project were prompted by technical issues. The Corps determined that the downstream end of the floodwall needed to be extended, beyond the southern limits of the Riviera Club property, to terminate at a higher existing ground elevation in order to provide 300-year level of protection. The existing ground elevation at that location is lower than the elevation required for the project's 300-year level of protection. Construction of a 6-inch to 24-inch high wall, adjacent to the canal towpath, that would terminate along the towpath embankment at high ground in the vicinity of the Butler University athletic fields was investigated. After extensive review of geotechnical conditions, the Corps determined the towpath alignment was not technically and economically feasible. Therefore, the Corps is now proposing an alternate alignment to terminate the downstream end of the floodwall.

As another matter, there are existing trees along the previously-constructed Phases 3A and 3C sections of the project which do not meet current levee safety standards. The Corps is therefore proposing tree clearing to meet levee safety criteria for technical certification of the project. Certification is required by Federal Emergency Management Agency for its issuance of a Letter of Map Revision (LOMR) to modify Flood Insurance Rate Maps through the National Flood Insurance Program. Certification and map revision could result in reduction and/or elimination of flood insurance cost for property owners protected by the project.

Mitigation of project impacts also remains to be completed. The revisions in the proposed project described herein are expected to require additional mitigation in addition to that already agreed upon in the previous NEPA document. Any additional requirements will be determined in coordination and/or consultation with the appropriate state and federal agencies. All mitigation action and/or activities will take place within Indianapolis and as close to the area of impact as possible.

3.0 ALTERNATIVES INCLUDING PROPOSED ACTION

3.1 Phase 3B Realignment – Riviera Club Property Southward to Butler University

3.1.1 No Action

The basic alternative to any proposed plan is the No Action alternative. Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 GRR and EIS. The recommended plan of the GRR showed termination of the floodwall and levee alignment at the southern end of the Riviera Club property. However, the existing ground elevation at that location is lower than the elevation required to provide the project's 300-year level of protection. As a result, the downstream end of the project alignment, as shown in the GRR, would not provide the full flood risk management benefits of the recommended plan. Therefore, the No Action alternative was eliminated from further consideration.

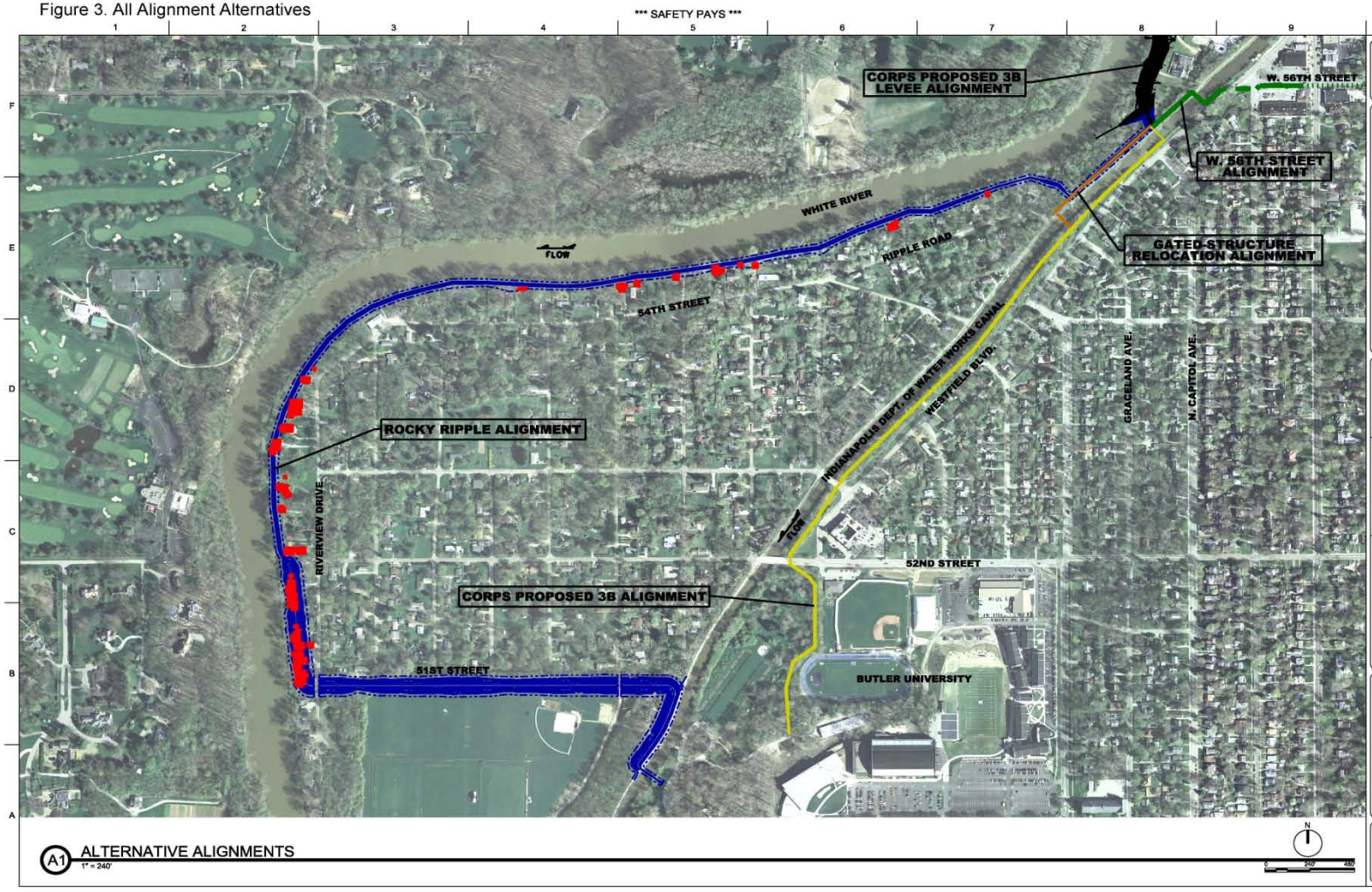
3.1.2 Alternative Designs

This section evaluates various alternative alignments to complete the downstream end of the proposed floodwall for the Indianapolis North Flood Damage Reduction Project. Figure 3, All Alignment Alternatives, shows an overall site plan of all alignment alternatives evaluated in this DSEIS. Individual figures of each alternative follow later. Concept-level costs of the alternatives as developed by the Louisville District, Corps of Engineers, are listed in Table 1 as follows.

Table 1. Concept Level Cost Estimates

Alternative	Estimated Cost (dollars)
Rocky Ripple Alignment	$50,300,000
W. 56th Street Alignment	$14,300,000
Westfield Boulevard Alignment (Proposed Action)	$14,400,000
Westfield Blvd Variation – Canal Gated Structure Relocation	$16,500,000
Westfield Blvd Variation – Full Length Removable Wall	$15,300,000

Figure 3. All Alignment Alternatives



3.1.3 Rocky Ripple Alternative

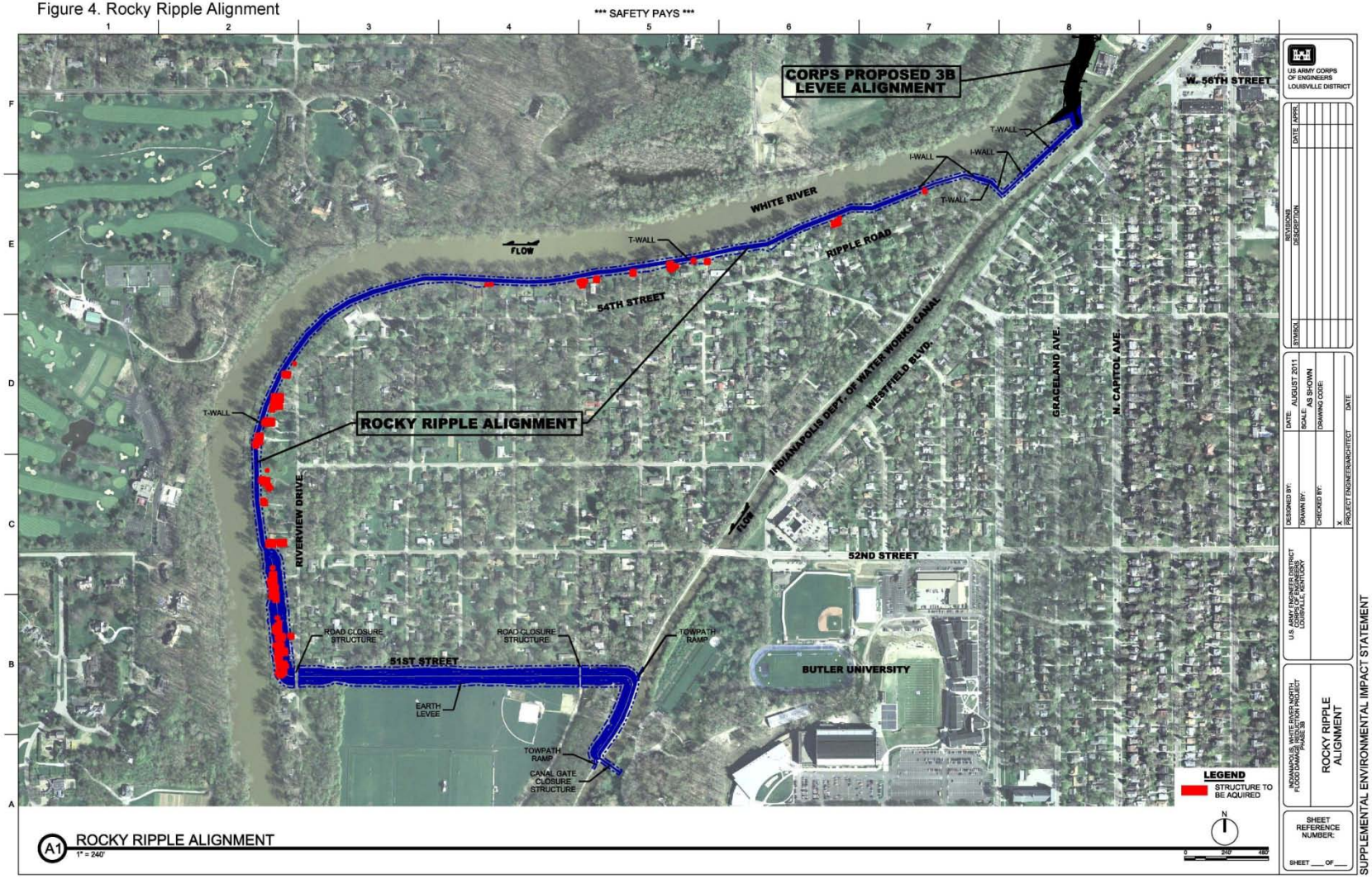
Since preparation of the September 1996 GRR and EIS for the Indianapolis North Flood Damage Reduction Study and as a result of the flooding from Hurricane Katrina in New Orleans, Louisiana, the Corps of Engineers revised its design standards for construction of floodwalls. As a result, previous Rocky Ripple alignments, as shown in draft versions of the GRR, are no longer applicable as the Corps cannot cost share construction that does not meet current design standards.

With consideration to current design standards, several levee/floodwall alignments could be evaluated for providing flood risk management to the Town of Rocky Ripple. Further study would be required to develop an optimum design. The recommended plan of the 1996 GRR for the White River, Indianapolis North Flood Damage Reduction Project provides flood risk management to a 300-year flood event (0.35 percent annual chance) for the northern Indianapolis communities of South Warfleigh, Warfleigh and Monon-Broad Ripple. If the Town of Rocky Ripple were added to the Indianapolis North Project, its section of floodwall and levee would become an integral part of the entire project alignment. As a result, a Rocky Ripple alternative must also provide flood risk management for a 300-year flood event, and cannot be treated as a separable flood protection area. For this proposed Rocky Ripple alternative, the Corps of Engineers developed an alignment that would minimize the footprint of real estate acquisition and demolition of structures for construction of a floodwall. This alternative would require construction of the following features:

- Approximately 9,335 total LF of floodwall and earthen levee (I-wall - 560 LF, T-wall - 5,575 LF and levee - 3,200 LF)
- Gated-structure across Citizens Water Canal
- 5 gatewell structures (4 storm sewer and one sanitary)
- 5 closure gates (2 roadway and 3 pedestrian)
- 1 pumping station

As shown in Figure 4, the Rocky Ripple alignment would begin at the southern end of the Riviera Club property and then parallel the northwest side of the Citizens Water Canal for a distance of 470 LF. This section would be constructed with 310 LF of concrete T-wall and 160 LF of steel sheet pile I-wall, with decorative concrete cap. The T- and I-walls would average 9'-6" and 6'-0" high, respectively. An underground 72" reinforced concrete pipe runs generally parallel to the canal in this area. The distance between the pipe and earthen mound of the towpath is about 50 LF. Due to close proximity of the existing pipe to the canal, it would be necessary to install temporary shoring to construct the T-wall section between the pipe and canal towpath. There are also poor soil materials and areas of previously deposited

Figure 4. Rocky Ripple Alignment



construction debris along the 470 LF section which could affect design and construction of T-wall and I-walls. It may be necessary to drive steel H-piles to support the base of the T-wall and increase the embedment length of the steel sheet piling for the I-wall.

In order to control underseepage during a flood event, a perforated "toe drain" would be installed along the base of the floodwall, towards the landward side of the structure. For technical reasons, it would be necessary to install the toe drain at a lower elevation than the water surface of the canal. As a result, the perforated pipe could cause water to drain from the canal and, over time, cause a breach through the earthen embankment of towpath. To prevent a breach, it would be necessary to drive approximately 500 LF of steel sheet piling to cut-off the flow path between the canal and toe drain of the floodwall.

Following the 470 LF section that parallels the canal, the remaining floodwall then turns northeast, following a path along the White River, turning and running along the north side of the Butler University ball fields, crossing the canal and tying into high ground at Butler University campus. This section contains 400 LF of I-wall at an average maximum height of 6'0", 5,265 LF of T-wall at an average height of 12'-0", and 3,200 LF of earthen levee at an average height of 12'-0". Areas in close proximity to the White River would require rip rap protection for the stream bank and toe drains, as necessary. Soils for the earthen levee would be obtained from an off-site borrow area.

The U.S. Army Corps of Engineers' design criteria in Engineer Technical Letter (ETL) 1110-2-571, Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures, dated 10 April 2009, requires removal of all structures, trees and other deep-rooted vegetation within 15 feet of a floodwall or toe of an earthen levee. This would require fee acquisition of residential properties and removal of 43 structures (shown in red on Figures 3 and 4), including 22 houses, to construct the alignment within the minimum real estate "footprint." The Rocky Ripple alternative would provide much greater flood risk management for the remaining 300 households in the community. However, the loss of residential properties would reduce tax revenues and likely change the social makeup of the Town.

Approximately 14.5 acres of trees and other vegetation would need to be cleared to construct the levee/floodwall and meet Corps clear zone requirements. As part of this alternative, mitigation measures to offset the effects of the floodwall construction were estimated at a 2:1 replacement ratio or 29 acres needed for mitigation. This ratio was used as the habitat lost is a wooded neighborhood, not an unbroken strip of bottomland hardwoods as found upstream of Rocky Ripple which might require a higher mitigation ratio.

There is no sanitary sewer system within the Town of Rocky Ripple. Its residents therefore rely upon septic systems. Construction would require partial or complete removal of approximately 50 residential lateral fields. Sanitary sewer would need to be provided to properties where space is insufficient for the relocation of lateral fields. The sewer system

would entail installation of a package treatment plant and approximately 5,600 LF of 8-inch sewer pipe or connection to the City of Indianapolis sanitary sewers system.

As part of its planning process for conducting studies of new projects, the Corps of Engineers must determine if a proposed project meets Federal interest and policy, is economically supportable, and meets current environmental planning objectives. For evaluation of the Rocky Ripple alternative, the Corps developed a concept-level economic analysis to determine if that plan would be economically supportable. The total estimated cost is $50,300,000. The estimated incremental cost of the Rocky Ripple alternative is approximately $35,900,000. The incremental amount includes the estimated cost of the Rocky Ripple section minus the estimated cost of the proposed action – the Westfield Boulevard alignment. No official benefit/cost (b/c) analysis was conducted because preliminary analysis showed the b/c ratio of the Rocky Ripple alternative to be less than 1:1. This estimate contains construction and real estate costs, relocation assistance for residents, demolition of structures, utility relocations, environmental mitigation, removal and disposal of existing Rocky Ripple Levee, borrow material for new levee, additional engineering and design, and construction management.

In addition, proceeding with the Rocky Ripple alternative would require the preparation of another GRR. This study process would require approximately a 3-year long effort, Washington D.C- level approval, and likely additional Congressional authorization.

3.1.4 56th Street Alignment Alternative

The 56th Street alternative would consist of construction of approximately 1,100 LF of floodwall between the southern end of the Riviera Club property and high ground along W. 56th Street (Figure 5, page 17). The floodwall would range from 5 to 8 feet in height. This alternative would require construction of a gated structure across the Citizens Water Canal at a location approximately 312 feet northwest of the intersection of W. Westfield Boulevard and N. Capitol Avenue. From the gated structure, a floodwall would follow an alignment along the south side of W. 56th Street and terminate at high ground approximately 150 feet east of N. Illinois Street. This concept would require construction of the following features:

- Approximately 392 LF of concrete T-wall
- Approximately 376 LF of steel sheet pile I-wall with decorative concrete facing
- Approximately 226 LF of removable floodwall
- Gated-structure across Citizens Water Canal
- 3 gatewell structures

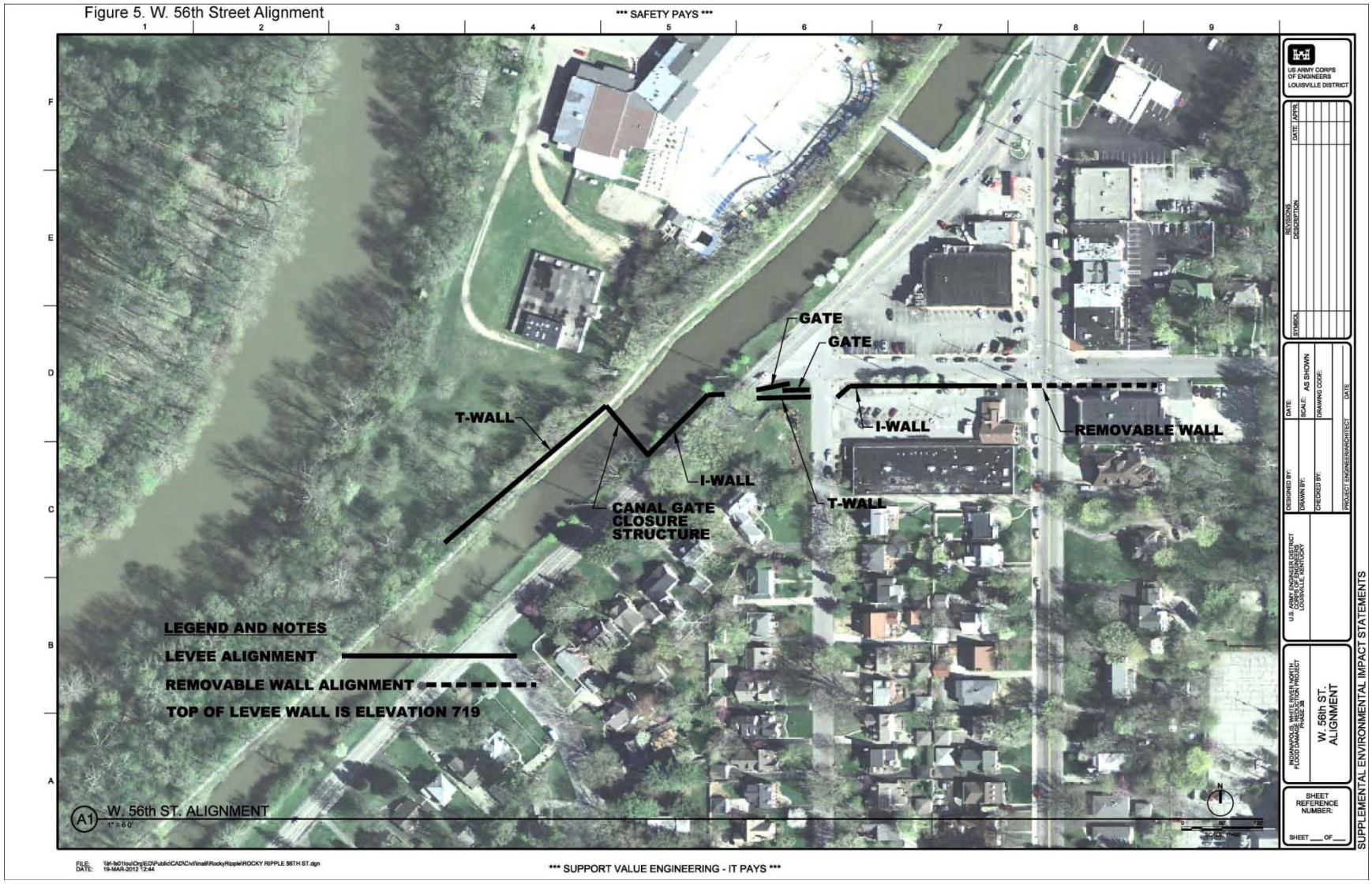
- 3 closure gates (2 roadway and 1 pedestrian)
- 1 pumping station

As previously indicated for the Rocky Ripple alternative, the earthen mound of the canal towpath was constructed with poor soil materials. As a result, it is expected that it will be necessary to drive steel H-piles to support the base of the T-wall along that section of the 56th Street alignment concept. In addition, it would likely be necessary to drive approximately 350 LF of steel sheet piling to cut-off the flow path, through the earthen mound, between the canal and toe drain of the floodwall.

Based upon a concept-level estimate, the cost of the W. 56th Street alignment would be $14,300,000 or about $100,000 less than the estimate for the Westfield Boulevard alignment (proposed action) described below. Although shorter in length, the W. 56th Street alignment would require construction of the large closure gates, H-piles for T-wall foundation and sheet pile cut-off wall, and relocation of several existing utilities. Those efforts would add significant costs to that concept. In addition, the W. 56th Street alignment would not provide flood risk management for structures to the southeast of W. Westfield Boulevard and N. Capitol Avenue as are included in the proposed action. As a result, the Westfield Boulevard alignment (proposed action) would provide greater flood risk management benefits for residents of the Butler-Tarkington neighborhood.

In addition, proceeding with the W. 56th Street alternative would require the preparation of another GRR as fewer residences and businesses would be protected than authorized in the original GRR. This study process would require approximately a 3-year long effort, Washington D.C- level approval, and likely additional Congressional authorization.

Figure 5. W. 56th Street Alignment



3.1.5 Westfield Boulevard Alignment (Proposed Action)

The Westfield Boulevard Alignment alternative (Figure 6) is the Proposed Action. It consists of construction of approximately 4,200 LF of steel sheet pile I-wall, with a decorative concrete cap. The wall would begin at the south end of the Riviera Club property, crossing the canal with a gated structure at a distance of approximately 60 feet northwest of the intersection of W. Westfield Boulevard and N. Capitol Avenue (Figures 7 and 8) to its termination site on Butler University property. Private property would need to be acquired at the Riviera Club and Butler University for this alternative. The proposed floodwall would be at its highest along approximately 300 LF of floodwall to the immediate southwest of the canal gated-structure. Along Westfield Boulevard and the Citizens Water Canal to Butler University, the height of the floodwall would vary from zero to 6.5 feet.

In response to an Environmental Assessment circulated for agency and public review between February 1 and April 4, 2011, the Corps of Engineers received numerous comments regarding the aesthetics of the proposed floodwall and public accessibility to the Citizens Water Canal. The proposed W. Westfield Boulevard alignment has been modified to address those concerns while providing flood protection when completed.

In order to limit the height of the permanent, the Corps would construct a partial height wall with removable panels that would be installed prior to significant flood events. This concept would require construction of a foundation and a knee wall along a 700 LF section immediately southwest of the canal gated-structure floodwall. The knee wall would be constructed to a height that would allow certification by the Levee Safety Officer (LSO) allowing for possible revision of FEMA flood mapping for the protected area. Height of the knee wall is estimated at 4 ft more or less. The concrete knee wall would be constructed using commercial form liners to create a simulated stone wall or other decorative appearance. During flood events, the upper section would be erected by installing lightweight, removable columns (posts) and panels to the 300-year flood event (Figure 9), or lower elevation, as required by predicted flood levels. During periods when the removable floodwall is not installed (Figure 10), the recesses of the posts would be covered with securely attached aluminum plates to prevent accumulation of debris and other materials. The City of Indianapolis would be responsible for the storage, installation and maintenance of removable wall, just as it is responsible for all operation and maintenance of the completed project. Failure to install the removable sections properly or in a timely manner is an added risk factor not found with the previously recommended solid wall.

To prevent back flow through existing sewers during significant flooding events, the Corps would construct gatewell structures that contain sluice gates. One structure would be located along the floodwall alignment at a distance of approximately 80 feet to the northeast of the intersection of Graceland Avenue and Westfield Boulevard. The other structure would be constructed along W. 52nd Street, approximately 100 feet east of the Indianapolis Citizens Water Canal.

Figure 6. Westfield Boulevard Alignment (Proposed Action)

Figure 7. Rendering of Proposed Canal Gated Structure, looking southwest or downstream

Rendering provided by Indianapolis Department of Public Works

Figure 8. Rendering of Proposed Canal Gated Structure looking northwest to river

Rendering provided by Indianapolis Department of Public Works

Figure 9. Rendering of proposed floodwall with removable panels installed IDPW

Figure 10. Rendering of proposed floodwall without panels IDPW

To prevent back flow through existing sewers during significant flooding events, the Corps would construct gatewell structures that contain sluice gates. One structure would be located along the floodwall alignment at a distance of approximately 80 feet to the northeast of the intersection of Graceland Avenue and Westfield Boulevard. The other structure would be constructed along W. 52nd Street, approximately 100 feet east of the Indianapolis Citizens Water Canal.

The footprint for construction of the floodwall realignment section would require clearing and grubbing of trees and other deep-rooted vegetation, to a distance of 15 feet from both sides of the floodwall, as necessary to attain a positive Levee System Evaluation (LSE) by a Levee Safety Officer (LSO) per Corps of Engineers' regulation. Upon completion of all levee and floodwall construction, Federal Emergency Management Agency (FEMA) could then issue a Letter of Map Revision (LOMR) to modify the Flood Insurance Rate Map (FIRM) for properties protected by the Indianapolis North White River Flood Reduction Project. The total estimated cost of this proposed action is $14.4 million.

Two modifications or variations of the Proposed Action were evaluated.

(1) Canal Gated Structure Relocation Alternative (Figure 11) - The Canal Gated Structure Relocation Alternative would include a gated structure crossing the canal near the intersection of W. Westfield Boulevard and Graceland Avenue. This alternative would require construction of approximately 340 LF of steel sheet pile I-wall (with concrete facing) and 430 LF of concrete T-wall along the northwest side of the canal. At the gated structure at Graceland Avenue, the alignment follows that of the Westfield Boulevard (Proposed Action) alignment with termination of the floodwall at high ground on Butler University property.

The soils that form the mound of the canal tow path are poorly compacted and not suitable for levee construction. Design and construction of the T-wall adjacent to the canal tow path would be challenging and costly primarily due to its proximity to the canal and the need to avoid the possibility of breeching same. The estimated cost of this variation is approximately $2,100,000 more than the estimate for the Westfield Boulevard (Proposed Action) alternative and, therefore, this variation was eliminated from further consideration.

(2) Full Length Removable Wall Alternative – This alternative follows the same alignment as the W. Westfield Boulevard Alignment (Proposed Action), but consists of a fully removable wall along the entire 3,100-foot proposed section that begins southwest of the gated structure identified in Figure 6, page 19. Westfield Boulevard Alignment (proposed action) that runs parallel to the Citizens Water Canal. The foundation of the removable wall would be at the same elevation as the existing ground surface. Minor grading would be required to transition the ground to the design elevation of the wall's foundation. The upper section would be erected by

Figure 11. Canal Gated Structure Relocation Alternative

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installing lightweight, removable columns (posts) and panels to the 300-year flood event, or lower elevation, as required by predicted flood levels. The vertical posts would be installed within recesses in the wall foundation. When not in use, the recesses would be covered with securely attached aluminum plates to prevent accumulation of debris and other materials. A full length removable wall would increase the cost of the Proposed Action by approximately $900,000. This additional cost is not in the Federal interest and is not eligible for cost sharing nor does it provide protection that would be certifiable by the LSO. Therefore this variation or alternative was eliminated from further consideration.

The Westfield Boulevard Alignment would not entail any irreversible and irretrievable commitments of resources.

3.2 Vegetation Alternatives

3.2.1 No Action

The No Action alternative would leave existing conditions as they are – no additional tree clearing. As vegetation currently exists, the entire length of Phase 3A (approximately 7600 feet) and 700 feet of Phase 3C does not comply with USACE vegetation clearance limits as per ETL 1110-2-571, Engineering and Design: Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures, dated 10 April 2009. This is the latest version of USACE vegetation standards that have been in effect since 1971. All sections not yet built will be constructed in accordance with vegetation clearing requirements in the current ETL. If there is no vegetation clearance on this project, it will not be given a positive LSE by the Corps LSO at end of construction of the entire project. Therefore, property behind the levee area would not be shown as flood protected area on the Federal Insurance Rate Map and would not be included in the National Flood Insurance Program (NFIP), subjecting property owners to flood insurance requirements. Also, if there is no clearing, this project would not be eligible for inclusion in USACE Rehabilitation and Inspection Program (RIP). In accordance with Public Law 84-99, Flood Control and Coastal Emergency Act, and provisions of Engineering Regulation 500-1-1, Emergency Employment of Army and Other Resources – Civil Emergency Management Program, dated 30 September 2001, projects that are not part of this program are not eligible to receive federal funding assistance for damage sustained during a flood event.

3.2.2 Vegetation Variance 20 feet from Levee Crown

For Phase 3A, a vegetation variance request, as described and provided for in the ETL, was considered for the entire length of the phase, which is approximately 7600 LF. As the project is currently constructed, vegetation has only been cleared a distance of 5’ from the face of the I-wall. Vegetation would be cleared to a distance of 20 feet from I-wall face. The variance

would allow existing vegetation to remain outside a distance of 20 feet measured horizontally in the direction of the river from the riverside face of the I-wall, or measured from the riverside edge of the levee crown (for portions of the phase which consist of levee only). The vegetation variance proposed for Phase 3C only applies to approximately 700 LF of earthen levee that is adjacent to the Reserve at Broad Ripple condominiums. Currently, vegetation has been cleared to an average distance of ten feet riverward of the edge of the levee crown. Vegetation would be cleared out to a distance of 20 feet from the edge of the levee crown. The variance would allow existing vegetation to remain outside a distance of 20 feet measured horizontally in the direction of the river from the riverside edge of the levee crown.

To establish the limits of tree removal, the Corps of Engineers performed stability analyses of the floodwall and earthen levee embankments, assuming a large hole were to develop by an uprooted tree. The modeling of the uprooting of a tree during or after a flood event required an estimate of the root ball that was displaced. Reconnaissance of the project area during and after significant flow events indicated trees that uprooted in the riverbank or levee toe primarily removed soil no more than five feet from the trunk, and no deeper than 4 feet beneath the ground surface. It was also noted that the resulting hole quickly filled in with depositing sands and sediments. To maintain the integrity of the levee, the sponsor would be required to access these areas and make repairs to the loss of the tree(s) by benching and backfilling the areas where fallen trees have removed portions of the levee material.

On January 30, 2012, Louisville District staff met with Corps of Engineers headquarters staff to conduct an on-site inspection and review of the two phases where vegetation is in question. As per the previously referenced ETL, a vegetation variance can be considered if one of the following applies:

a. Comply with applicable law concerning the environment, cultural or historic preservation;
b. Protect the right of Tribal Nations, pursuant to treaty, statute, or Executive Order;
c. Address a unique environmental consideration; and/or
d. Prior vegetation agreement in place.

Even if one of the above criteria is met, life safety is still paramount and the vegetation variance must assure that the structural integrity and functionality of the levee are retained. The levee must still be accessible for maintenance, periodic inspection, monitoring during flood events, and access to perform flood-fighting if required.

Through careful review of the Corps Vegetation Policy Guidance and the meeting and discussions with USACE Headquarters staff, Phases 3A and 3C do not meet the first three criteria. The fourth, though a reason, is a highly unlikely justification for this project. The Corps has not granted vegetation variance to date based on the preliminary plans in a Feasibility Report (i.e., GRR). The application process, analysis and review time will be both lengthy and costly. The analysis, reports, meetings, and reviews are estimated to cost at least $100,000 to $150,000. All costs associated with the vegetation variance would be cost shared

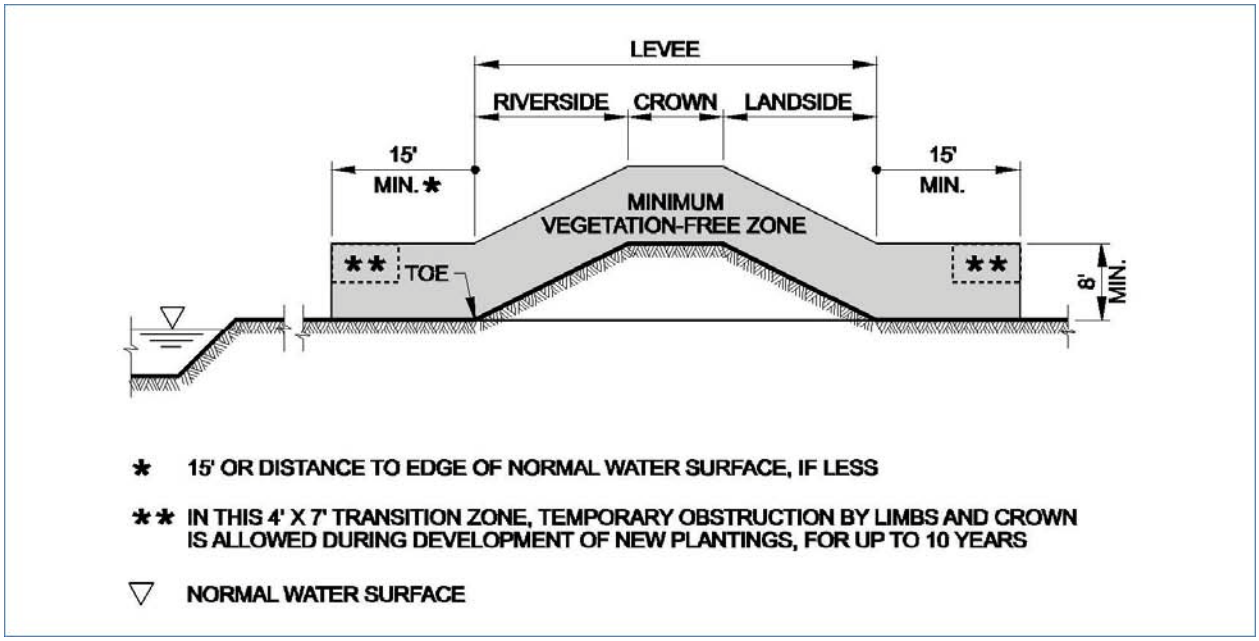
by the City of Indianapolis. The Louisville District can apply under the fourth item for a variance but, based on discussion and meetings with USACE Headquarters staff it is highly unlikely to be granted.

3.2.3 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Action)

Phases 3A and 3C will be cleared 15 ft from toe as required to meet current guidance or about 35 to 40 feet from the floodwall and/or crown of levee. In three locations along Phase 3A the clearing will go to the river's edge for about 15% of the total length, i.e., approximately 1,140 lineal feet. These areas will be protected with erosion control blankets and the ends of the blankets will be anchored in trenches in the riverbank. An undetermined number of trees may also have to be removed along 67th Street, also part of Phase 3C, as some are located too close to the floodwall. The total clearing required to comply with the ETL is estimated as 6.4 acres for Phase 3A and 0.3 acres for Phase 3C. All of the area to be cleared is mature bottomland hardwoods. The ETL also recommends the removal of all roots 0.5 in or greater in diameter. This will be accomplished along both the sloping face of the levee and the more level floodplain. Aerial views of Phases 3A and 3C and areas to be cleared are shown in the Appendices.

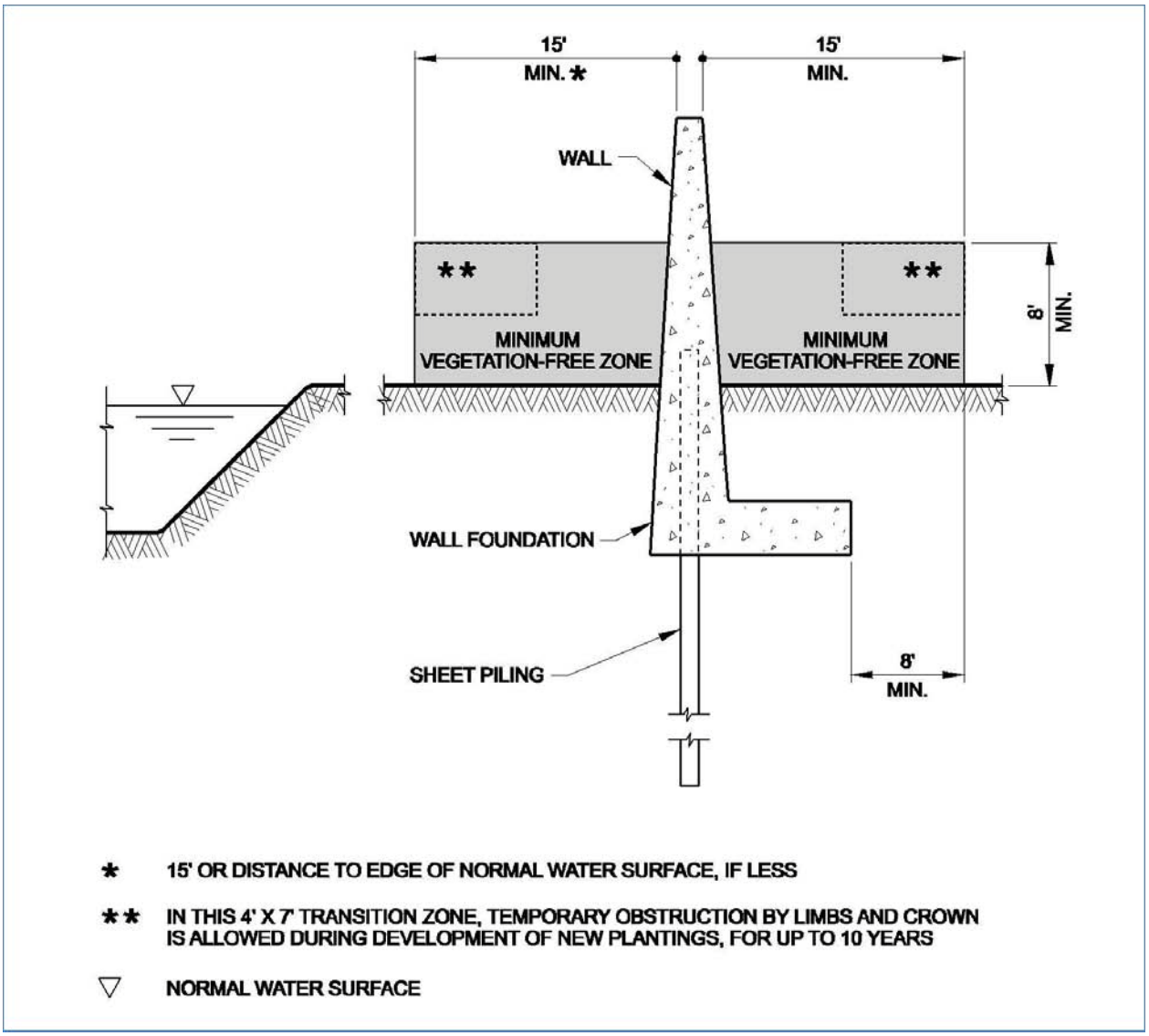
In accordance with ETL 1110-2-571 clearance to 15 feet out from toe of levee is preferred (See Figures 12 and 13 for illustration of clearing limits) and is current Corps policy regarding such. This alternative, i.e., Vegetation Clearing (Proposed Action), would meet all USACE requirements for clearing limits for levee projects and therefore allow project inclusion into the USACE RIP program. It should also meet all technical requirements for issuance of a LOMR by FEMA.

Figure 12. Levee - Minimum Vegetation Free Zone



Note: Illustration from Chapter 6, Engineering Technical Letter (ETL) 1110-2-571, "Guidelines for landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures," dated 10 April 2009.

Figure 13. I Wall - Minimum Vegetation Free Zone



Note: Illustration from Chapter 6, Engineering Technical Letter (ETL) 1110-2-571, "Guidelines for landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures," dated 10 April 2009.

4.0 ENVIRONMENTAL MITIGATION

The recommended plan of the GRR indicated the Corps of Engineers and its local sponsor, the City of Indianapolis, would implement environmental mitigation for the entire project at two locations within the City of Indianapolis. One mitigation area involved the planting of 14 acres of trees on an existing open grass field along the west bank of the White River in downtown Indianapolis between the Indianapolis Zoo and Riley Park. The other mitigation site entailed the planting of aquatic wetland species in a 15-acre shallow lake named Lake Sullivan. This site is located along N White River Parkway and W Drive near Interstate 65.

Since preparation of the GRR and EIS, Indy Parks Greenways prepared a Master Plan which included future development of the west bank of White River involving construction of a trail from the Indianapolis Zoo to 10th Street, riverbank improvements and bridge improvements. The trail would cross property designated for the downtown mitigation site. Indianapolis Parks Greenways personnel indicated the site would be planted with ornamental trees and shrubs to allow a view of the river and downtown area from the greenways trail. Since mitigation requires a forested area for wildlife habitat, the Corps of Engineers agreed to cancel use of the downtown site for environmental mitigation.

For several years, the shallow-water Lake Sullivan encountered a significant siltation problem that was greatly reducing the size and depth of the lake. The City of Indianapolis decided to drain Lake Sullivan and allow the natural flow of a creek across the property. Because of the changed site conditions, the Corps of Engineers was unable to plant the aquatic species for mitigation purposes.

Both of these mitigation sites are now eliminated from further evaluation.

Corps of Engineers' regulations permits acquisition and increased management of lands such as bottomland hardwood forests to mitigate for the loss of biological productivity as a result of a Corps project. The local sponsor, the City of Indianapolis, is required to provide all real estate associated with a project including mitigation lands and will acquire suitable property in agreement with the Corps and, most desirably, within the White River watershed to fully compensate for the loss of habitat associated with construction of the Indianapolis White River (North) Flood Damage Reduction Project. The fair market value and related cost of any property acquisition would be credited towards the City's cost share of the project. The property would be purchased in fee and contain deed restrictions to designate its use for wildlife habitat and mitigation. Indianapolis Parks and Recreation would manage and maintain the property for such use.

The proposed vegetation clearing will result in the conversion of an additional 6.4 acres along Phase 3A and 0.3 acres along Phase 3C from mature riparian forest to an open short grass landscape. The completion of Phase 3B from Kessler Boulevard to the southern end of the Riviera Club and adjacent to the Citizens Water Canal will require the removal of 6.84 acres of riparian woodlands, or 5.34 more than were estimated previously. While the loss of 1.5

acres of these woodlands was included in the development of the previous mitigation requirements (described in the first paragraph of this section), the sixteen years that have passed since the first EIS have allowed for further growth of the trees and increased habitat value for wildlife. The Corps will consult with other state and federal agencies to determine additional mitigation needed for the project. The final mitigation acreage required is expected to be substantially more than the previously identified 29 acres, more likely in the range of 90 to 150 acres. The status of these consultations between the Corps, local sponsor, and resource agencies will be further described in the Final Supplemental Environmental Impact Statement (FSEIS).

Aerial views of completed Phases 3A and 3C and areas to be cleared for the Kessler Boulevard to Riviera Club segment of Phase 3B are shown in the Appendices. Three views are shown; 1) segment before clearing, 2) design and construction plan overlain on aerial photographs and 3) segment after clearing and/or construction is complete.

5.0 AFFECTED ENVIRONMENT

5.1 Physiography, Topography, Geology, Soils, and Climate

The proposed project area is located within central Indiana and the Eastern Corn Belt Plains Eco-region (USGS 1998). Specifically, the area is within the sub-region 55b or the Loamy, High Lime Till Plains. This area is characterized with level to rolling glacial till plains and low gradient streams. Other landforms within this sub-region include end moraines and glacial outwash landforms. Elevations vary between 500 and 1500 feet. Soils in this region developed from loamy, limy, glacial depositions of Wisconsinan age (USGS 1998). Soils within the study area are of the Genesee-Sloan association. They are characterized as deep well drained and very poorly drained, nearly level soils formed in loamy alluvium. Along the floodplains of the White River, Genesee series are well-drained soils (USACE 1996). Outside of the metropolitan area, soils are suited for beech, oak-sugar maple, and elm-ash swamp forests; much of the land base is used for corn, soybean, and livestock production. This region receives between 36 and 43 inches of annual rainfall. Temperatures range from lows in the 20^{o} Fahrenheit (F) during January to highs near 90^{o}F in July (USGS 1998).

5.2 Floodplains

The topography of the White River floodplain varies from broad, flat uplands in the upstream part of the basin, to high hills with uneven ridges and canyon-like gorges, to flat-bottom valleys in the central section, and finally to wide meandering floodplain bottom-lands in the lower section.

The floodplain with the project study area and along the right descending bank is almost completely developed except for the band of bottomland hardwoods along the river and the small wooded or grassy areas in the vicinity of the Friedman Park, Riviera Club and Butler University. Most of this area is fairly level with small hills offering some topographic variation. The floodplain along opposite side of the river or left descending bank is much more wooded and housing densities are much less; however much of this area is at higher elevation and is not within the area to be protected by the project.

5.3 Water Quality

The White River, which flows through the Indianapolis White River North Phase 3B project site, is a tributary to the Wabash River with the confluence occurring in southwestern Indiana adjacent to the city of Mt. Carmel, Illinois. The White River basin encompasses 13,249 square miles and lies entirely within the state of Indiana and extends upstream generally in a north-eastwardly direction to its headwaters along the Ohio border. Major tributaries to the White River are the East fork White River, the Eel River, and the Fall Creek. The East Fork White River with a drainage area of 5,746 square miles is by the far the largest contributor to flows. There

are no impoundments on the White River itself, although impoundments do exist on some tributaries. The project area includes the White River and the adjacent Indianapolis Department of Water Works canal, a.k.a., Citizens Water Canal, from Kessler Boulevard, mile 240.8 downstream to Butler University near mile 239.3. The drainage area of the White River at this site is about 1265 square miles. Major tributary sub-basins of the White River in Marion County, and their respective drainage areas, are: Williams Creek (22.2 square miles); Crooked Creek (20.1 square miles); Fall Creek (318 square miles); Eagle Creek (210 square miles); Pogues Run (9 square miles); Pleasant Run (21 square miles); Lick Creek(26 square miles); and Little Buck Creek (17 square miles). None of these streams enter White River in the Indianapolis White River North project area.

In the 2008 303(d) Report published by the Indiana Department of Environmental Management (IDEM), the White River within Marion County is reported as impaired due to mercury and PCB contamination in fish tissue. This listing continued in the 2010 IDEM 303(d) listing of impaired waters.

In addition to the White River, the Indianapolis Citizens Water Canal is located within the proposed project area. The canal, which is fed by the White River and eventually flows back to the White River in downtown Indianapolis, is used by the city for a source of municipal water supply. No other tributaries of the White River are within the proposed project area for Phase 3B. The average depth of the canal is three feet in the upper section near the city's water intake and may reach four feet in the concrete-lined sections further downstream and within downtown Indianapolis (Hagan 2008). The canal has been dredged in the past to maintain water depths and remove siltation.

IDEM has historical water quality data for the canal dating back to 1991. Dissolved oxygen (DO) levels have ranged from 16.6 milligrams per liter (mg/l) in January 1992 to a minimum of 5.5 mg/l in August 2002. Table 2, following page, shows additional trend data for other water quality parameters measured in the canal. During the period of collection between March 1991 and December 2008, dissolved oxygen levels remained above the state minimum 4.0 mg/l requirement. Measured pH levels have also stayed within the accepted range of 6 to 9. None of the recorded water temperatures exceeded allowable state levels for that month (Bell 2009; Indiana Administrative Code 2009).

Table 2. State Water Quality Data for Citizens Water Canal, 1991-2008. (Source: Bell, 2009)

Parameter	Average	Maximum	Minimum	Mode
Dissolved Oxygen (mg/l)	9.8	16.6 (1/1992)	5.5 (8/2002)	9.9
Water Temp (^{0}C)	14.1	30.02 (7/1991)	0.1 (2/2007)	23.5
pH	7.99	8.6 (3/2001)	6.98(4/1992)	8.1
Specific Conductivity (uS/cm)	731.73	1240 (11/1999)	305 (6/2002)	527

5.4 Aquatic Resources

5.4.1 Fish

White River varies between 150 to 200 feet in width through the proposed project area. The river's fishery is diverse; common game fish include largemouth (*Micropterus salmoides*), smallmouth (*M. dolomieu*) and spotted bass *(M. punctulatus*), white and black crappie (*Pomoxis annularis, P. nigromaculatus*), rock bass (*Ambloplites rupestris*), and a variety of sunfish (*Lepomis* spp). Other common fish species include yellow and black bullhead (*Ameiurus natalis, A. melas*), channel catfish (*Ictalurus punctatus*), stonerollers (*Campostoma* spp), shiners (*Notropis* spp), gizzard shad (*Dorosoma cepedianum*) silverjaw minnow (*Ericymba buccata*), grass pickerel (*Esox americanus*), and carp (*Cyprinus carpio*) (USACE 1996). As reported in historic documentation (USFWS 1992, 1995) and previous correspondence with US Fish and Wildlife Service (USFWS), the river provides a diversity of habitat to enhance the fishery—a forested riparian corridor, primarily intact though narrow in some locations; detritus and temperature regulation within the stream; undercut banks; and pool-riffle sequences). USFWS has described the White River as a "high quality fishery."

Fish community assessments completed in September 1996 by IDEM in the Rocky Ripple area of the White River show the total Index of Biological Integrity (IBI) score to be 48. This would classify the fish assemblage as "good", meaning there is decreased species richness, specifically of intolerant species; however, sensitive species are present in the assemblage. Twenty-one different species were represented in the assessment; sunfish represented sixty

percent of the total catch. The Qualitative Habitat Evaluation Index (QHEI), which determines the available habitat for potential biological community structure rated this site 84 out of a possible 100. The higher the score represents more diversity and better quality of habitat that is available. IDEM has determined through years of data collection that a rating below 51 represents poor habitat, which could have a negative effect on biological communities (Sobat 2009).

The Citizens Water Canal is approximately 50 feet wide through the proposed project area. Algae and other aquatic vegetation are prevalent in the canal waters; however, with the limited shading and depth, the limited aquatic vegetation is likely a limiting factor for fish and macroinvertebrates use of the waters. There are no fish consumption advisories for the Citizens Water Canal (Stahl 2009).

5.4.2 Benthic Invertebrates

Benthic invertebrates are bottom dwelling organisms that are relatively sedentary and reflect the physical and chemical characteristics of their environment. The invertebrates thus reflect the overall ecological integrity and are indicative of environmental conditions of the waters. They serve as an important forage base for fish and other fauna.

The 2008 303(d) Report listed the White River's biotic community as impaired (IDEM 2008). However, there appears to be a sufficient benthic community to support the river's fishery. There are no impairments listed for the Citizens Water Canal.

5.5 WETLANDS

The1996 EIS reported one potentially jurisdictional wetland within the entire area previously studied. This site was located near the south end of the Rocky Ripple levee alternative but outside the proposed project area. Telephone conversation, on August 11, 2011, with the U.S. Fish and Wildlife Service, Bloomington Field Office, Bloomington, Indiana, reports no known wetlands currently existing in that area. The National Wetland Inventory map depicts a linear wetland area on the east side of the White River located between north of Kessler Boulevard and north of the Riviera Club, where the river meanders to the west, away from the canal. No new wetlands have been identified.

Compliance with Section 404 of the Clean Water Act is required for discharges of dredged or fill material into the waters of the United States, including adjacent wetlands. A 404(b)(1) evaluation was completed for the entire levee project with the 1996 EIS.

5.6 TERRESTRIAL RESOURCES

Although the proposed project is located in an urban area, forested habitat remains, especially in proximity to the White River. All of the riparian forest between the levee and the river at Phases 3A and 3C is mature with many trees ranging from 60 ft to 80 ft in height or more and from 12 in to greater than 36 in dbh (diameter @ breast height) depending upon the species. Much of the portion of Phase 3B from Kessler Boulevard to the Citizens Water Canal is also covered in mature woods while the remaining area of the Phase 3B, the Proposed Action, or other alternatives considered is more broken habitat, i.e., large trees and shrubs separated by buildings, roads and lawns.

Common tree species in the area include cottonwood (*Populus deltoides*), black willow (*Salix nigra*), sycamore (*Plantanus occidentalis*), silver maple (*Acer saccharinum*), cottonwood (*Populus deltoides*), oaks (*Quercus* spp), box elder (*Acer negundo*), black locust (*Robinia pseudoacacia*), black walnut (*Juglans nigra*), buckeye (*Aesculus* spp.) and ash (*Fraxinus* spp). Two non-natives, bush honeysuckle (*Lonicera* spp.) and wintercreeper (*Euonymus fortunei*) dominate the densely vegetated shrub and groundcover layers respectively while another invasive non-native, Tree of Heaven (*Ailanthus* altissima), is common along the edges of wooded areas. Sumac (*Rhus* spp.) and poison ivy (*Toxicodendron radicans*) are the two most common native species in the shrub layer. Poison ivy may occur as a shrub, vine or groundcover which helps it survive even with the dominance of non-native species in these vegetative layers.

Common wildlife species include opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), fox and gray squirrels (*Sciurus niger, S. carolinensis*), white-tailed deer (*Odocoileus virginianus*), bats and various other small mammals, reptiles, and amphibians. The relatively intact tree canopy within the riparian zone, though narrow, provides suitable habitat for a variety of bats and songbirds especially neotropical migrants or songbirds. Great blue herons and migratory waterfowl are frequently seen in and along the river.

5.7 THREATENED AND ENDANGERED SPECIES

The U.S. Fish and Wildlife Service reports one endangered species, the Indiana bat (*Myotis sodalis*), as occurring in Marion County and likely to occur within the proposed project area. Indiana bats hibernate in caves in winter, and then disperse to reproduce and forage in spring and summer, in relatively undisturbed forested areas usually associated with water resources. Recent research has shown that they will inhabit fragmented landscapes with adequate forest for roosting and foraging. Young are raised in nursery colony roosts in trees, typically near drainage ways in undeveloped areas (letter dated Feb 24, 2011).

The USFWS Indiana Bat Recovery Plan (2007) provides a summary of characteristics of typical habitat for a summer maternity colony den tree or primary roost. Individual Indiana bats have been found roosting in a large number of types of trees and situations, but it is

possible to summarize the essential characteristics of a typical primary roost. A typical primary roost is located under exfoliating bark of a dead ash, elm, hickory, maple, oak, or poplar, although any tree that retains large, thick slabs of peeling bark probably is suitable. Average diameter of maternity roost trees is 45 cm (18 in) and average diameter of roosts used by adult males is 33 cm (13 in). Height of the tree (snag) is greater than 3 m (10 ft), but height of the roosting tree is not as important as height relative to surrounding trees and the position of the snag relative to other trees, because relative height and position affect the amount of solar exposure. Primary roosts usually receive direct sunlight for more than half the day. Access to the roost site is unimpeded by vines or small branches. The tree is typically within canopy gaps in a forest, in a fence line, or along a wooded edge. Primary roosts usually are not found in the middle of extensive open fields but often are within 15 m (50 ft) of a forest edge. Primary roosts usually are in trees that are in early-to-mid stages of decay.

There are numerous trees fitting the characteristics for primary roost sites for the endangered Indiana bat along the White River including the proposed project area. There are current records of the Indiana bat within a few miles of the proposed project area. It is very likely that the Indiana bat uses the riparian woodlands within the area covered by the three phases of the Indianapolis North Flood Damage Reduction Project as summer habitat.

5.8 RECREATION

White River and Citizens Water Canal provide a variety of recreation opportunities within the proposed project area. A towpath trail adjacent to the canal provides walking, jogging, and biking opportunities. The Riviera Club property, which includes a section of the Phase 3B alignment, also provides recreational opportunities to area residents, but requires a paid membership. The clubs amenities include tennis courts, swimming pool, picnic shelters and tables, playgrounds, horseshoe pits, outdoor basketball court, fitness center, gymnasium, and ballroom. In the most downstream section of the proposed project, Butler University has athletic fields and gardens that provide recreation opportunities for university staff, students and visitors.

5.9 CULTURAL RESOURCES

The Louisville District, the City of Indianapolis, and Indiana's Department of Natural Resources, Division of Historic Preservation and Archaeology (DHPA) have had many consultations regarding the Indianapolis North Flood Damage Reduction Study and its effect to historic properties and/or cultural resources. In 1994, Dr. Bob Jeske and Mr. Larry Stillwell of Indiana University-Purdue University at Fort Wayne conducted an investigation focused on archaeological resources identifying eight archaeological sites predominately in the South Warfleigh and Rocky Ripple alignments. In October 2008 consultation for the Phase 3B alignment was initiated with no cultural resources identified. By letter dated November 20, 2008, the Indiana State Historic Preservation Officer (IN SHPO) and the DHPA recommended a

reconnaissance level archaeological survey to determine Phase 3B alignment's potential effects to previously unidentified archaeological resources and an established area of potential effect. Several historic structures and properties were reported, including the Hinkle Fieldhouse at Butler University, Butler University Historic District, and a single family dwelling at 337 Ripple Avenue.

A visual site reconnaissance of Phase 3B realignment and alternatives was undertaken on March 4, 2009 to access potential effects to above-ground historic properties in response to the earlier mentioned letter, dated November 20, 2008, from DHPA. Effects to historic properties include the 19th century Citizens Water Canal and towpath and various properties related to Butler University, specifically the Historic District and Butler/Hinkle Fieldhouse.

A Phase I archaeological survey of the Phase 3B realignment and alternatives was conducted in April of 2009. Approximately 1310.6 meters (4300 feet) were examined as a part of the investigation resulting in the discovery of two previously unrecorded archaeological sites. Significant soil disturbance was also noted along the Citizens Water Canal towpath, likely related to its construction. No archaeological resources were identified on the Butler University property (Snell and Snyder 2009).

5.10 HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE

No hazardous substance concerns were identified during a site investigation of the areas that would be impacted from construction of the Phase3B realignment, nor any of the tree clearing alternatives. There was no evidence of drums, lagoons, or any other buried waste, including underground storage tanks. No soil disturbances or stressed vegetation were observed. Additionally, no electrical equipment that may contain polychlorinated biphenyls (PCBs) was identified during the field reviews.

The Environmental Protection Agency (EPA) Envirofacts database was searched to identify and evaluate, to the extent possible, whether current and/or past activities on or near the study area represent any concern. Query results for the proposed project area showed no facilities reported.

5.11 SOCIOECONOMIC

Ninety one percent of the population of Marion County, Indiana lives within the Indianapolis metropolitan area. Both the county and city experienced a population growth between 2000 and 2006; however, the rate of growth (0.5/0.6% respectively) has not been as high as the 3.8% for the state (US Census Bureau 2008). Population statistics are shown in Table 3. Economic figures for city, county, and state residents are shown in Table 4. Both Marion County and Indianapolis median income ranks less than the state average. The percent below poverty level for Indianapolis is slightly higher than the state average; Marion

County is 3% higher. The most prominent industry in both Indianapolis and Marion County for employment is education, healthcare, and social assistance services; manufacturing ranks second for both areas. For Marion County, the third leading employment industry is wholesale trade; for Indianapolis this supplier is professional, scientific, and management and administrative and waste management services. This variance is likely due to city government and universities/higher learning institutions. The Indianapolis North Flood Damage Reduction project area is primarily single family residential with some commercial uses. Public areas, including public schools, Butler University and a greenway are also in the areas.

Table 3. Population Data for the Project Area

	2006 Population Est (% change from 2000)	Persons per sq mi (2000)
Indiana	6,313,520 (+3.8)	169.5
Marion County	865,504 (+0.6)	2172.9
Indianapolis	785,597 (+0.5)	2163.0
Data obtained from US Census Bureau website		

Table 4. Economic Data for the Project Area

	Median Household Income (2004)	Persons Below Poverty Level (%)
Indiana	$43,217	11.1 (2004)
Marion County	$42,702	14.1 (2004)
Indianapolis	$40,051	11.9 (1999)
Data obtained from US Census Bureau website		

5.12 LAND USE/AESTHETICS

The existing land use within the proposed project area is mostly residential with some commercial areas scattered throughout. Butler University, schools and a public greenway are also within the proposed project area. There are existing utilities (overhead power lines and underground water, gas and sanitary sewer pipes) within the right of way along Westfield Blvd and throughout the residential communities. There is a vehicle and/or pedestrian path along the northwest side of the canal. The floodplain along the river and between Phases 3A and 3C is heavily wooded with mature bottomland hardwoods such as silver maple, cottonwood, and sycamore among others. The river and woods provide shade and a relaxing setting for hiking, boating and watching wildlife especially birding.

5.13 TRANSPORTATION

Primary roads within the proposed project corridor include Kessler Boulevard, which provides access across the White River, 52nd and 53rd Streets, and the canal, and Westfield Boulevard., which parallels the canal. There are also numerous residential streets and corridors within the proposed project area.

5.14 AIR QUALITY

In compliance with Clean Air Act (CAA), as amended, the US Environmental Protection Agency (EPA) has promulgated ambient air quality standards and regulations. National Ambient Air Quality Standards (NAAQS) were enacted for protection of public health and welfare. To date, EPA has issued NAAQS for the following criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO2), particulate matter 10 micron (PM10), particulate matter 2.5 micron (Fine Particles), ozone (O3), nitrogen dioxide (NO2), and lead (Pb). Areas below standards are "attainment," while those that equal or exceed standards are "non-attainment."

Air quality standards are set at levels to protect public health. Monitoring is conducted to assure compliance of those standards. The City of Indianapolis measures gaseous pollutants (CO, O3, SO2) 24 hours a day, 7 days a week. Particulate type of pollutants (Fine Particles, PM10, Pb) are collected over a 24 hour period and measured once every day (Fine Particles) to every 6th day (PM10 and Pb) (Indianapolis Department of Public Works [IDPW] 2009).

Air Quality Index (AQI) is a national standard for reporting air quality. Air quality is determined by measuring 4 pollutants: carbon monoxide, sulfur dioxide, fine particulates and ozone. AQI translates each pollutant measurement to a common index, where a score of 100 equals the federally established limit. An AQI score from 1 to 50 is good quality; 51 to 100 is moderate quality; and 101 to 150 are unhealthy for sensitive groups (IDPW 2009).

According to Indiana Ozone Nonattainment Design, as of May 8, 2008, Marion County was an attainment area, meaning that concentrations of one or more criteria pollutants did not exceed Federal air quality standards, and had a maintenance plan in place. (IDEM 2009). However, in 2008, EPA revised the criteria for ozone by lowering the threshold. With this change, Marion County is now a nonattainment area. Monitored ozone concentrations have trended downward in Marion County since 2002 and the state expects this trend to continue with the adoption of new federal and state regulations. Based on its historical monitoring, Indiana has requested that EPA re-designate Marion County as an attainment area and classify as a maintenance area for the revised ozone standard, meaning a maintenance plan will be implemented (IDEM 2009).

Currently Marion County has a Lead (Pb) Maintenance Plan for implementation upon approval. The County's Fine Particles rating is non attainment based on 2005-2007 data; however the rating is within attainment limits for 2006-2008 data (IDEM 2009).

6.0 ENVIRONMENTAL CONSEQUENCES

Impacts for the Proposed Actions, Alternatives, and No Action Alternatives are discussed and illustrate the different consequences of the alternatives.

6.1 PHYSIOGRAPHY, TOPOGRAPHY, GEOLOGY, SOILS, AND CLIMATE

6.1.1 Westfield Boulevard Alignment (Proposed Action) - Including Variations

There would be no significant impacts to physiography, topography, geology, soils, or climate resulting from the Proposed Action. Changes in features to levee type would not have a significant impact to physiography, topography, geology, soils, or climate.

Prior to construction, soil tests would be conducted to ensure existing soils are suitable for erecting floodwalls. The floodwalls would be driven into the existing ground line to an adequate depth for stability, typically a minimum ratio of 2:1 below ground to above ground height. If additional soil is necessary to build up the existing ground line, material would be brought onsite from previously tested excavation/borrow areas, and sloped to grade as necessary. Any ongoing erosion or deposition of soils due to the White River exceeding its banks would continue.

6.1.2 Rocky Ripple Alternative

Neither change in levee type (aka feature) nor alternative alignments would have any significant impacts to physiography, topography, geology, soils, or climate.

6.1.3 56th Street Alignment Alternative

Neither change in levee type (aka feature) nor alternative alignments would have any significant impacts to physiography, topography, geology, soils, or climate.

6.1.4 No Action

There would be no significant impacts to physiography, topography, geology, soils, or climate. Soil necessary to build up the existing ground line would be brought onsite from previously tested excavation/borrow areas, and sloped to grade as necessary. There could be some sediment and erosion but would be limited in time and extent.

6.1.5 Vegetation Variance 20 Feet from Levee Crown

This action would clear trees and other vegetation out 20 feet from the crown of the levee. The area cleared would be replaced with grasses. Tree and vegetation removal would result in no significant changes to topography, geology, soils, or climate as a result of this action.

6.1.6 Vegetation Clearing 15-20 Feet from Toe of Levee (Proposed Action)

This action would clear trees and other vegetation on the levee's slopes and 15 to 20 feet from toe of the levee. Approximately 1,140 lineal feet of the 7,600 ft length of Phase 3 would be cleared and grubbed to the river's edge. The cleared areas would be replaced with grasses. This clearing would not change the topography, geology, soils, or climate of the area.

6.1.7 No Action (Vegetation)

The existing trees would remain. Additional tree clearing would not take place. This alternative would not change the topography, geology, soils, or climate of the area.

6.2 FLOODPLAINS

No Action regarding the Phase 3B alignment would allow a portion of Indianapolis to remain in the floodplain and provide flood storage albeit in a heavily developed area. Completion of the project under any alternative would reduce floodplain area available for flood storage. Construction of the Rocky Ripple Alternative would have the greatest impact in reducing the floodplain while construction of the 56th Street Alignment Alternative would have the least among those alternatives considered in this DSEIS. No Action would also allow the trees that would otherwise be cleared along Phases 3A and 3C to remain in place. The presence of these trees within the outer portion of the vegetation free zone decreases the flow of the White River near the I-Wall during any potential high water events based on the assumptions of Manning's Equation, an empirical formula used by Corps hydrologists and engineers for calculating open channel flow driven by gravity. Reducing river velocities near the I-Wall eases the potential effects of scour and wave-wash along the levee and floodwall. The proposed tree removal would not otherwise impact the floodplain.

6.3 WATER QUALITY

6.3.1 Westfield Boulevard Alignment (Proposed Action)

Temporary impacts would occur during the construction of the floodwalls. Installation of the gated structure across and within the canal would require dewatering the crossing site and

diverting canal waters around the construction site. Upon project completion, the gated structure would remain open and only be used in flooding situations; therefore, there would be no permanent impacts to water quality. This source for Indianapolis' water supply would continue to be available with no impacts from implementation of the proposed project.

Additional potential impacts to water quality could occur from constructing the floodwall along the alignment paralleling the canal. This could include possible sedimentation and erosion associated with land clearing activities. In addition to potential temporary runoff and sedimentation, there is potential for water quality impacts due to some loss of shade for the waterway. Removed vegetation would be replaced with grasses adjacent to the floodwall while deep-rooted vegetation would be permitted only between the limits of the easement and canal and/or in accordance with the ETL.

Water quality of the canal is not likely to be impacted and is expected to remain within acceptable state levels for DO, pH and temperature. Impacts possible from sedimentation and erosion would be limited in time and extent. Implementation of Best Management Practices (BMPs) would further reduce any impacts to water quality. A list of BMPS that would be implemented for the proposed action alternative is included in the Appendices.

6.3.2 Rocky Ripple Alternative

The Rocky Ripple Alternative begins at the Indianapolis Department of Waterworks Canal, aka, Citizens Water Canal, and runs parallel and adjacent to the White River around the Town of Rocky Ripple and ties into high ground near the end of Ripple Road at the canal. Impacts possible from sedimentation and erosion would be limited in time and extent. Water quality of the White River and the canal would not be permanently impacted and would be expected to remain within acceptable state levels for DO, pH and temperature. This alternative alignment would have the same impacts to water quality as the proposed action.

6.3.3 56th Street Alignment Alternative

The 56th Street Alignment Alternative would include a gated structure about 312 feet northwest of the intersection of W. Westfield Boulevard and N. Capitol Avenue across the canal. Construction would involve dewatering the crossing site and diverting canal waters around the site. Upon project completion, the gated structure would remain open and only be closed during flooding situations; therefore, there would be no permanent impacts to water quality. Some suspension of sediments present in the canal is expected during construction but would be limited in time and extent. Water quality of the White River and the canal would not be permanently impacted and would be expected to remain within acceptable state levels for DO, pH and temperature.

6.3.4 No Action

Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. The same water bodies would be impacted as those of the proposed action. Impacts possible from sedimentation and erosion would be limited in time and extent. Water quality of the White River and the canal would not be permanently impacted and would be expected to remain within acceptable state levels for DO, pH and temperature.

6.3.5 Vegetation Variance 20 feet from Levee Crown

This alternative would not impact water quality. All vegetation that would be removed would be replaced with grasses. Impacts possible from sediment and erosion would be limited in time and extent.

6.3.6 Vegetation Clearing 15- 20 Feet from Toe of Levee (Proposed Action)

Vegetation clearing of trees and shrubs necessary to meet requirements for levee certification would be replaced with grasses. Impacts possible from sediment and erosion would be limited in time and extent.

6.3.7 No Action (Vegetation)

No clearing and grubbing of trees, shrubs and other woody vegetation would have no impact on water quality.

6.4 AQUATIC RESOURCES

6.4.1 Westfield Boulevard Alignment (Proposed Action)

The primary concern would be due to possible erosion and sedimentation during construction. However, as previously stated these would be temporary.

The use of the canal by fish and other aquatic species appears to be limited due to the abundance of algae and other aquatic vegetation and uniformly shallow depth of the waterway. The canal has been dredged to remove silt and maintain water depths. Aquatic fauna would be removed from the construction footprint at the canal crossing of the gate structure as this work would occur in the dry canal bed. However, aquatic fauna is low in number of individuals and species; therefore potential impacts are expected to be minimal. Re-colonization of the dewatered area would occur soon after temporary dewatering

structures are removed once the gate structure is completed. Potential impacts from the proposed action would not significantly impact the limited aquatic resources.

Access to the canal would be impeded by the erected floodwall; however the existing Westfield Boulevard already serves as an impediment. The floodwall could prevent some reptile and amphibian losses due to road kill by preventing them from moving across Westfield Boulevard.

6.4.2 Rocky Ripple Alternative

The Rocky Ripple Alternative begins at the Indianapolis Citizens Water Canal and runs parallel and adjacent to the White River around the Town of Rocky Ripple and ties into high ground near the end of Ripple Road at the canal. Impacts are possible from sedimentation and erosion but would be limited in time and extent. Aquatic fauna would be removed from the construction footprint at the canal crossing of the gate structure as this work would occur in the dry canal bed. However, aquatic fauna is low in number of individuals and species; therefore potential impacts are expected to be minimal. Re-colonization of the dewatered area would occur soon after temporary dewatering structures are removed once the gate structure is completed. Potential impacts from the proposed action would not significantly impact the limited aquatic resources.

6.4.3 56th Street Alignment Alternative

Aquatic fauna would be removed from the construction footprint at the canal crossing for construction of the gate structure as this work would occur in the dry canal bed. However, aquatic fauna is low in number of individuals and species; therefore potential impacts are expected to be minimal. Re-colonization of the dewatered area would occur soon after temporary dewatering structures are removed once the gate structure is completed. Potential impacts from this alternative would not significantly impact the limited aquatic resources.

6.4.4 No Action

Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. The primary concern would be due to possible erosion and sedimentation during construction. However, as previously stated these would be temporary.

The same water bodies would be impacted as those of the proposed action. Use of canal aquatic species is limited due to abundance of algae and other aquatic vegetation and shallow depth of waterway. Once construction is complete, preconstruction conditions will return.

6.4.5 Vegetation Variance 20 feet from Levee Crown

The proposed vegetation clearing variance would result in the conversion of approximately 6.4 acres along Phase 3A and 0.3 acres along Phase 3C from mature riparian forest to an open short grass landscape. The completion of Phase 3B from Kessler Boulevard through the Riviera Club will require removal of an additional 6.84 acres of mostly mature riparian or bottomland woodlands. As this section (Phase 3B) has not been constructed, no vegetation variance was considered as it will be built to current standards. This will require clearing 5.34 more acres for construction. While some loss of bottomland hardwoods was included in development of the previously identified mitigation requirements (29 acres), the sixteen years that have passed since the 1996 EIS have allowed for further growth of trees and increased habitat value for wildlife which will be considered in determining final mitigation requirements. Also the clearing and grubbing of trees and other woody vegetation would reduce the riparian forest contribution of detritus to the aquatic ecosystem; however the acreage is so small relative to the contributions of detrital materials from elsewhere in the drainage basin as to have no measurable effect on aquatic resources.

6.4.6 Vegetation Clearing 15- 20 Feet from Toe of Levee (Proposed Action)

The proposed vegetation clearing will result in the conversion of an additional 6.4 acres along Phase 3A and 0.3 acres along Phase 3 from mature riparian forest to an open short grass landscape. The completion of Phase 3B from Kessler Boulevard to the Riviera Club will require the removal additional acres of riparian woodlands. As this area (Phase 3B) has not been constructed, it will be built to current standards. While the loss of these woodlands were included in the development of the previous mitigation requirements (29 acres), the sixteen years that have passed since the first EIS have allowed for further growth of the trees and increased habitat value for wildlife which will be considered in determining final mitigation requirements. Also clearing and grubbing of trees and other woody vegetation would reduce the riparian forest contribution of detritus to the aquatic ecosystem; however the acreage is so small relative to the contributions of detrital materials from elsewhere in the drainage basin as to have no measurable effect on aquatic resources.

6.4.7 No Action (Vegetation)

No clearing and grubbing of trees, shrubs and other woody vegetation would have no impact on aquatic resources.

6.5 WETLANDS

NWI maps show a wetland area designated along the east side of the White River, north of the Riviera Club. This area would not be impacted by the Proposed Action nor the Rocky Ripple, 56th Street Alignment or the No Action alternatives.

6.5.1 Vegetation Variance 20 feet from Levee Crown

There are no wetlands located in this area; therefore, the clearing and grubbing of trees, shrubs and other woody vegetation would have no impact to wetlands.

6.5.2 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Action)

There are no wetlands located in this area; therefore, the clearing and grubbing of trees, shrubs and other woody vegetation would have no impact to wetlands.

6.5.3 No Action (Vegetation)

No clearing and grubbing of trees, shrubs and other woody vegetation would have no impact on wetlands.

6.5 TERRESTRIAL RESOURCES

6.5.1 Westfield Boulevard Alignment (Proposed Action)

The proposed project area is primarily a maintained right-of-way between Westfield Boulevard and the canal. The uppermost end of the Proposed Action, in the vicinity of Capitol Avenue, where the floodwall would cross the canal, a 30-35 foot area between the waterway and roadway is maintained as mowed grass with minimal trees. Moving downstream along the canal and Westfield Blvd from Capitol Avenue to 52nd Street the project area is more heavily vegetated. Bush honeysuckle and Tree-of-Heaven, two non-native invasive species, are very pervasive in this area. At the downstream end of the Proposed Action, between 52nd Street and termination on Butler University, the alignment would follow an open area maintained in grasses and avoid the established boundary line of trees. The final 200 to 400 feet moving upslope to tie to high ground would require removal of some trees and shrubs for the construction footprint.

The largest expanse of trees and shrubs in the area of the Proposed Action is on Butler University property. The proposed floodwall route through this area would skirt the edge of the tree line and then follow an existing path to high ground. The remaining area along W.

Westfield Boulevard has minimal habitat present due to the dominance of invasive non-native species, the urbanized setting and limited area width between Westfield Boulevard and the canal. All disturbed areas will be replanted with species appropriate to their location following completion of construction. Although disturbance would be minimized to the greatest extent possible, it is anticipated that some wildlife will be lost due to construction activities or movement of wildlife, such as opossums and raccoons, across highways.

The total estimated area to be cleared of vegetation for the Proposed Action is less than one acre. This loss of terrestrial wildlife habitat will be considered in the determination of mitigation for the entire project.

6.5.2 Rocky Ripple Alternative

The Rocky Ripple Alternative alignment would require clearing of approximately 14.5 acres of trees and other vegetation in order to meet USACE design criteria clear zone requirements which would have an effect on terrestrial and aquatic species. Mitigation of this loss of habitat would be required, most likely at a two-to-one replacement radio.

6.5.3 56th Street Alignment Alternative

The 56th Street Alignment Alternative area is primarily a maintained right-of-way along the south side of W. 56th Street and southeast of Westfield Boulevard. This alternative alignment crosses the canal and runs down the northwest side of the canal for a few hundred feet. Alignment near the gated structure will require moving a few trees in a residential area. The portion of the floodwall that runs along the northwest side of the canal will require some tree removal as well. As the tree removal will be in a residential area and small in numbers, there will be minimal impact to wildlife.

6.5.4 No Action

Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. Under this alternative, the area is primarily a maintained right-of-way between Canal Boulevard and the canal. In the most downstream end, the floodwall crosses the canal at 52nd Street and terminates on Butler University property, with the alignment following an open area maintained in grasses and avoiding the established boundary line of trees. The final 200 to 400 feet moving upslope to tie to high ground would require removal of some trees and shrubs for the construction footprint.

Although disturbance would be minimized to the greatest extent possible, it is anticipated that some wildlife will be lost due to construction activities or movement of wildlife, such as opossums and raccoons, across highways.

6.5.5 Vegetation Variance 20 feet from Levee Crown

The Proposed Action for Phase 3B would be built according to current Corps standards for levees and floodwalls, i.e., ETL 1110-2-571, as discussed previously. There would be no need for a vegetation variance. Therefore this alternative would have no impact to terrestrial resources. A vegetation variance for completed Phases 3A and 3C would preserve about 3.2 acres of mature riparian woodlands along the river.

6.5.6 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Action)

The proposed vegetation clearing will result in the conversion of an additional 6.4 acres along Phase 3A and 0.3 acres along Phase 3 from mature riparian forest to an open short grass landscape. The completion of Phase 3B from Kessler Boulevard to the Riviera Club will require the removal of almost 7 acres of riparian woodlands. As this area (Phase 3B) has not been constructed, it will be built to current standards for levees and floodwalls, i.e., ETL 1110-2-571, as discussed previously. Loss of about 1.5 acres of riparian woodlands was included in development of previous mitigation requirements (29 acres). In addition to increased clearing required to meet vegetation standards for the current design, the sixteen years that have passed since the first EIS have allowed for further growth of trees and increased habitat values for wildlife which will also be considered in determining final mitigation requirements.

6.5.7 No Action (Vegetation)

No clearing and grubbing of trees, shrubs and other woody vegetation along Phase 3A and 3C would have no impact on terrestrial resources. This alternative would preserve about 6.7 acres of mature riparian woodlands along the river side of the completed sections. Clearing and grubbing for construction of Phase 3B is necessary to construct flood protection to the current standards.

6.6 THREATENED AND ENDANGERED SPECIES

6.6.1 Westfield Boulevard Alignment (Proposed Action)

With completion of the proposed project, there would be loss of potential summer habitat for the Indiana bat. Destruction of larger, mature trees that could serve as roosting habitat is unavoidable due to the limited area between the river and the developed areas to be protected. The USFWS commented in previous correspondence (USACE 1996) that the agency would not expect significant impacts to endangered species if the felling of trees >3" dbh was avoided from 1 April through 30 September. The Corps will abide by this restriction. Further, mitigation lands will provide replacement habitat further minimizing any impact to the Indiana

bat. These lands will be permanently protected for use by the Indiana bat and other wildlife species. Therefore, while the proposed realignment is likely to affect the Indiana bat, it is not likely to jeopardize the continued existence of Indiana bat.

The project's May 30, 2001, "Certificate of Approval, Construction in a Floodway" permit number FW-19540 from the Indiana Department of Natural Resources, contains a Special Condition that any trees suitable for Indiana bat roosting (greater than 14 inches in dbh, living or dead, with loose or hanging bark) not be cut from April 15 through September 15. The Corps will abide by the more restrictive of the two conditions, i.e., no cutting between April 1 and September 30 of any calendar year, unless otherwise permitted by the agencies involved.

6.6.2 Rocky Ripple Alternative

The Rocky Ripple Alternative would eliminate approximately 14.5 additional acres of trees. As with the proposed action, some loss of mature trees that could serve as roosting habitat is unavoidable. Any felling of trees >3" dbh would be avoided from 1 April through 30 September. Further, mitigation measures to offset the effects of the floodwall construction would occur at an estimated two-to-one ratio for habitat replacement This additional 29 acres would be added to the other 29 acres needed to protect at least 58 acres for use by the Indiana bat and other wildlife. The same tree cutting requirement as discussed previously would also apply to this alternative.

6.6.3 56th Street Alignment Alternative

The 56th Street Alignment Alternative area is primarily a maintained right-of-way along the south side of W. 56th Street and southeast of Westfield Boulevard. This alternative alignment crosses the canal and runs down the northwest side of the canal for a few hundred feet. Alignment near the gated structure will require moving a few trees in a residential area. The portion of the floodwall that runs along the northwest side of the canal will require some tree removal as well. The few scattered trees will be removed from the area impacted by this alternative do not offer much potential habitat for the bat. Further any tree clearing will be conducted from October 1 through March 30 when the bats are unlikely to be present. There will be no impacts to the Indiana Bat from this alternative.

6.6.4 No Action

Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. Under this alternative, there would be loss of some potential summer habitat for the Indiana bat. Destruction of larger, mature trees that could serve as roosting habitat is unavoidable. The USFWS commented in previous correspondence (USACE 1996) that the agency would not expect significant impacts to endangered species if

the felling of trees >3" dbh was avoided from 1 April through 30 September. The Corps would abide by this restriction. Further, mitigation lands would provide replacement habitat further minimizing any impact to the Indiana bat.

The project's May 30, 2001, "Certificate of Approval, Construction in a Floodway" permit number FW-19540 from the Indiana Department of Natural Resources, contains a Special Condition that any trees suitable for Indiana bat roosting (greater than 14 inches in dbh, living or dead, with loose or hanging bark) not be cut from April 15 through September 15. The Corps will abide by the more restrictive of the two conditions, i.e., no cutting between April 1 and September 30 of any calendar year, unless otherwise permitted by the agencies involved.

6.6.5 Vegetation Variance 20 feet from Levee Crown

The Proposed Action for Phase 3B would be built according to current Corps standards for levees and floodwalls, i.e., ETL 1110-2-571, as discussed previously. There would be no need for a vegetation variance. Therefore this alternative would have no impact to endangered species. A vegetation variance for completed Phases 3A and 3C would preserve about 3.2 acres of mature riparian woodlands along the river, i.e., an area with significant potential as summer habitat for the endangered Indiana bat.

6.6.6 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Action)

The proposed vegetation clearing will result in the conversion of an additional 6.4 acres along Phase 3A and 0.3 acres along Phase 3 from mature riparian forest to an open short grass landscape. This clearing will result in the loss of at least 6.7 acres of mature riparian woodlands with multiple possible den trees suitable for maternity colonies of Indiana bats and their young. While no field surveys have been conducted in this area, the riparian woodlands exhibit significant potential as summer habitat for the endangered Indiana bat.

The completion of Phase 3B from Kessler Boulevard through the Riviera Club will require the removal additional acres of riparian woodlands. It will be built according to current Corps standards for levees and floodwalls, i.e., ETL 1110-2-571, as discussed previously. In addition to increased clearing required to meet vegetation standards for the current design, the sixteen years that have passed since the first EIS have allowed for further growth of trees and increased habitat values for wildlife which will also be considered in determining final mitigation requirements.

The potential for direct impact to the Indiana bat will be avoided by the Corps as no tree will be cut between April 1 and September 30 of any calendar year.

While the loss of such mature riparian woodlands is not of benefit to the Indiana bat, especially at a local level, the potential loss is insignificant when considered at a landscape scale. Summer habitat exists across all or portions of as many as 27 states in the eastern U.S. Other threats, especially White Nose Syndrome, are decimating bat populations. The loss of habitat associated with construction of the Proposed Actions (Westfield Boulevard Alignment and Vegetation Clearing) or, for that matter any alternative, may impact but is not likely to jeopardize the continued existence of the Indiana bat.

6.6.7 No Action (Vegetation)

No clearing and grubbing of trees, shrubs and other woody vegetation along Phase 3A and 3C would have no impact on endangered species. This alternative would preserve about 6.7 acres of mature riparian woodlands along the river side of the completed sections. Clearing and grubbing for construction of Phase 3B is necessary to construct flood protection to the current standards. The impact of this clearing would be largely avoided by clearing trees only when the Indiana bat is not present, i.e., October 1 to March 30 of any twelve month period.

6.7 RECREATION

6.7.1 Westfield Boulevard Alignment (Proposed Action)

The proposed project could interrupt, but would not permanently impact, the greenways or public recreation in the area. A section of the greenway along the canal would be, as necessary, temporarily closed or rerouted while the crossing of the waterway was constructed. Use of the greenway would be restored upon completion of the work.

Construction activities may briefly impact use of the Butler University track. However, this impact would be temporary and minimal as this area is the downstream terminus of Phase 3B and construction will be ending at this point. Impacts to the Riviera Club are expected to be minimal as only the western end of the tennis courts are near the proposed project area.

6.7.2 Rocky Ripple Alternative

The Rocky Ripple Alternative turns northeast near Ripple Road, following a path along the White River, turning and running along the north side of the Butler University ball fields, crossing the canal and tying into high ground at Butler University campus. Areas in close proximity to the White River would require rip rap protection for the stream bank and toe drains as necessary. Soils for the earthen levee would be obtained from an off-site borrow area.

The proposed project would interrupt, but would not permanently impact, access to the White River or the greenway in the area. A section of the greenway along the canal would be, as necessary, temporarily closed or rerouted while the crossing of the waterway was constructed. Use of the greenway would be restored upon completion of the work.

6.7.3 56th Street Alignment Alternative

Impacts of the 56th Street Alignment Alternative to Recreation would be minimal. With the exception to the temporary closure and rerouting of a section of the greenway along the canal while the waterway was constructed, there are no other recreation resources in the area. Use of the greenway would be restored upon completion of the work.

6.7.4 No Action

Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. The floodwall route would be located on the northwest side of the Citizens Water Canal instead of southeast; therefore, impacts of this action would be similar to that of the proposed action except that the temporary closure of public access during construction would be longer.

6.7.5 Vegetation Variance 20 feet from Levee Crown

This alternative would consist of tree and other deep rooted vegetation removal 20 feet from the levee crown. This alternative would have little impact on recreation resources other than loss of shading along the existing trail and possibly temporary closure during vegetation removal activities.

6.7.6 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Action)

This alternative would consist of tree and other deep rooted vegetation removal 15 feet from the levee crown. This alternative would have little impact on recreation resources other than loss of shading along the existing trail and possibly temporary closure during vegetation removal activities.

6.7.7 No Action (Vegetation)

No clearing and grubbing of trees, shrubs and other woody vegetation along Phase 3A and 3C would have no impact on recreation. This alternative would preserve about 6.7 acres of mature riparian woodlands along the river side of the completed sections that provide shade

and wind protection for pedestrians walking along the levee. Clearing and grubbing for construction of Phase 3B is necessary to construct flood protection to the current standards.

6.8 CULTURAL RESOURCES

6.8.1 Westfield Boulevard Alignment (Proposed Action)

The primary cultural resource affected by this alignment is the 19th century Citizens Water Canal and its two restored historic walking bridges. The canal extends five miles in length from the canal's headwater in Broad Ripple to its south terminus at 30th Street. This historic property was determined eligible on March 28, 2011 for the National Register of Historic Places (NRHP) by the Keeper of the Register and is currently used for recreational purposes.

Two archaeological sites are also located within this alignment, identified as Sites 12Ma947 and 12Ma948. Site 12Ma947 is a prehistoric isolated find dating to the Late Woodland period. The only artifact recovered from the site was a prehistoric ceramic rim sherd, located in a disturbed soil stratum. Site 12Ma948 is a historic wall feature made of cut limestone, concrete and wood. It is located on the eastern cut bank of the Citizens Water Canal and likely dates to the early twentieth century. The wall may be a remnant park feature (Walkway, landing, or overlook) related to either the canal or Fairview Park.

Sites 12Ma947 and 12Ma948 do not meet the criteria of significance set forth by the National Park Service and Secretary of Interior (36 CFR part 60) and thus are not eligible for listing on the NRHP.

Additional historic properties affected by this alignment are the Hinkle Field House at Butler University and the Butler University Historic District. The Riviera Club, located between the White River and Indianapolis Citizens Water Canal, is a cultural resource within the project area and was considered eligible for listing in the NRHP but a formal nomination was never completed or approved.

The Corps of Engineers and the City of Indianapolis in consultation with the Indiana State Historic Preservation Officer (IN SHPO) would work toward avoiding any effects to these historic properties or mitigating any unavoidable effects by way of a Memorandum of Agreement. Any documentation would be submitted to the IN SHPO, the National Park Service, the Advisory Council on Historic Preservation (ACHP) and other consulting parties for review and comment.

Inadvertent discoveries during construction would be addressed in accordance with project's plans and specifications. This would include ceasing all work in the area of discovery and appropriate notification, assessment, and consultation.

6.8.2 Rocky Ripple Alternative

Several cultural resources would be affected by this alternative. Eight archaeological sites are located within its limits, six of which are recommended for a Phase II Archaeological Testing of Significance. Approximately 43 standing structures, including 22 residences, will also be demolished by this alignment. A historic structures inventory and assessment would be required of these properties.

Other significant historic properties that would be affected by this alternative include the 19th century Citizens Water Canal, Hinkel Field House at Butler University, and the Butler University Historic District. The Riviera Club, located between the White River and the Citizens Water Canal, is a cultural resource within this alignment and was considered, at one time, for listing in the NRHP. A formal nomination was never completed or approved by the IN SHPO.

The Corps of Engineers and the City of Indianapolis in consultation with the IN SHPO would work toward avoiding any effects to these historic properties or mitigating any unavoidable effects by way of a Memorandum of Agreement. Any documentation would be submitted to the IN SHPO, the National Park Service, the Advisory Council on Historic Preservation (ACHP) and other consulting parties for review and comment.

Inadvertent discoveries during construction would be addressed in accordance with project's plans and specifications. This would include ceasing all work in the area of discovery and appropriate notification, assessment, and consultation.

6.8.3 56th Street Alignment Alternative

Currently, only one known cultural resource will be affected by this alignment – the 19th century Citizens Water Canal. Consultation on this historic property would work toward either avoiding an adverse effect and/or mitigating them through the signature of a Memorandum of Agreement (MOA). The MOA would identify steps or actions to be taken to mitigate any impacts. Any documentation will be submitted to the Indiana SHPO and consulting parties for review and comment.

6.8.4 No Action

The primary historic property affected by the no action alternative is the towpath of the 19th century Citizens Water Canal. Two other historic structures are recorded adjacent to the alternative: a 1925 Dormer-front bungalow at 337 Ripple Avenue (ISSI #: 05976) and a 1911 Spanish Colonial Craftsmen at 341 Ripple Avenue (The Karstadt House, ISSI #: 05977). Both structures were evaluated as "Notable" and additional research may reveal them to be eligible for listing to the NRHP.

6.8.5 Vegetation Variance 20 feet from Levee Crown

No significant resources were identified as part of the 1996 EIS. Moreover, the proposed variance does not represent a significant change to the design from the original GRR. Consultation under Section 106 of the NHPA would be required to address issues of potentially effected cultural resources and historic properties by this variance. However, the Corps believes that there will be no effect to historic properties by this change.

6.8.6 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Alternative)

No significant resources were identified as part of the 1996 EIS. Moreover, the proposed alternative does not represent a significant change to the design from the original GRR. Consultation under Section 106 of the NHPA would be required to address issues of potentially effected cultural resources and historic properties by this clearing. However, the Corps believes that there will be no effect to historic properties by this change.

6.8.7 No Action (Vegetation)

No clearing and grubbing of trees, shrubs and other woody vegetation along Phase 3A and 3C would have no impact on cultural resources. This alternative would preserve about 6.7 acres of mature riparian woodlands along the river side of the completed sections. Clearing and grubbing for construction of Phase 3B is necessary to construct flood protection to the current standards.

6.9 HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE

A visual site inspection was conducted of the proposed project area and all alternatives. In addition a database search was conducted. There are no environmental concerns regarding hazardous materials identified within the proposed project area including all alternatives. No impact involving hazardous, toxic, and/or radiological waste is expected. Any inadvertent discovery or release of such materials during construction of any kind would be handled in accordance with applicable local, state and federal laws and regulations.

6.10 SOCIOECONOMIC

6.10.1 Westfield Boulevard Alignment (Proposed Action) – Including Variations

With implementation of the proposed project, reoccurrence of flood damages would be relieved. This would result in tremendous savings to the City of Indianapolis and individual

property owners. Property owners would also benefit from improved property values. Similarly, the city would realize benefits from an increased tax base. Construction activities would also provide a source of jobs to local residents, thereby providing some temporary benefits to the local economy.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, was signed on February 11, 1994. The order requires Federal agencies to promote "nondiscrimination in Federal programs substantially affecting human health and the environment." In response to this direction, Federal Agencies must identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

The final step in the environmental justice evaluation process is to evaluate the impact of the proposed project on the population and to ascertain whether target populations are effected more adversely than are other residents. The conclusion is that low-income or minority populations would not be disproportionately affected by the proposal. With completion of the entire White River (North) Flood Damage Reduction Project, all properties and individuals within the project area would receive protection. Similarly, routing of the proposed floodwall alignment would not disproportionately or adversely affect minority or low income populations.

6.10.2 Rocky Ripple Alternative

The Rocky Ripple Alternative would require fee acquisition of residential properties and removal of 43 structures, including 22 houses, to construct the alignment within the minimum real estate "footprint." Population declined from 712 people in the 2000 census to 606 in the 2010 census in 322 households. The loss of 22 households would result in the loss of an estimated 42 residents. Construction of this alternative would greatly reduce the quantity and frequency of property damage and loss due to flooding for the remaining 300 households. However, the loss of residential properties and their residents would reduce tax revenues and likely change the social makeup of the Town. Further, even if this alternative could be built without an additional GRR or Congressional authorization, the Rocky Ripple Alternative would cost an estimated $35,900,000 more than the Proposed Action, aka, Westfield Boulevard Alignment or the equivalent of almost $120,000 per household.

6.10.3 56th Street Alignment Alternative

The 56th Street Alignment Alternative would relieve flood damage reoccurrence to the areas north of the Riviera Club. Improved property values in the flood protected area would be expected. Temporary job benefits to the local economy and an increase in tax base would also result. However, property south of the Riviera Club and southeast of the canal would not

be protected from flood damage reoccurrence as what the proposed action would provide. Property owners could expect to continue to purchase flood insurance.

6.10.4 No Action

Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. The floodwall route would be located on the northwest side of the Citizens Water Canal instead of southeast; therefore, impacts of this action would be similar to that of the proposed action as described in 6.10.1.

6.10.5 Vegetation Variance 20 feet from Levee Crown

The entire length of Phase 3A (approximately 7600 feet) and 700f t of Phase 3C does not comply with USACE vegetation clearance limits as per ETL 1110-2-571 dated 10 April 2009. This ETL is the latest version of the USACE vegetation standards that have been in effect and virtually unaltered since 1971. All sections not yet built will be constructed in accordance with the vegetation clearing requirements in the ETL. If there is no vegetation clearance on this project, it will not be given a positive LSE by a LSO per Corps of Engineers regulation. As such, the project would not be included in the National Flood Insurance Program (NFIP). Therefore, the property behind the levee area would not be shown as a flood protected area on the Federal Insurance Rate Map and would not be included in the National Flood Insurance Program, subjecting property owners to more costly flood insurance requirements. Also, if there is no clearing, then this project would not be eligible for inclusion in the USACE Rehabilitation and Inspection Program (RIP). In accordance with Public Law (PL) 84-99 and provisions of Engineering Regulation 500-1-1, projects that are not a part of this program are not eligible to receive federal funding assistance for damage sustained during a flood event. Therefore the vegetation variance was eliminated as it will not meet the requirements of the ETL or PL 84-99.

6.10.6 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Alternative)

This alternative, i.e., Vegetation Clearing Proposed Action, would meet all USACE requirements for clearing limits for levee projects and therefore allow project inclusion into the USACE RIP program. It should also meet all technical requirements for issuance of a LOMR by FEMA. Implementation of this alternative would be expected to result in some change in insurance cost, i.e., a decrease, for effected property owners.

6.10.7 No Action (Vegetation)

The No Action alternative would leave existing conditions as they are – no additional tree clearing. Failure to clear trees, shrubs and woody vegetation, including roots, from the prescribed area on and adjacent to the flood protection project would have the same result as that described in Section 6.10.5.

6.11 LAND USE / AESTHETICS

6.11.1 Westfield Boulevard Alignment (Proposed Action) – Including Variations

The proposed project would change the aesthetics of the area by removal of some trees and other vegetation and installation of a concrete structure. The amount of vegetation to be removed would be limited to the greatest extent possible. The cap and facing of the floodwall would be designed to minimize negative aesthetic impacts by designing the floodwall with a facing or texture similar to native stone and/or colored to blend with the surrounding topography. Portions of the floodwall along Westfield Boulevard would be removable allowing for continued viewing of the Citizens Water Canal during most of any year.

6.11.2 Rocky Ripple Alternative

This alternative would change the aesthetics of the area by removal of some 14.5 acres of trees and other vegetation and installation of a concrete structure. The amount of vegetation removed would be limited to the greatest extent possible. Real estate acquisition and demolition of 43 structures (90 parcels with 22 residences) would be required to implement this alternative. The heavily wooded community would have a grassed flood protection project surrounding it cutting off all river views.

6.11.3 56th Street Alignment Alternative

The 56th Street Alignment Alternative would relieve flood damage reoccurrence to the areas north of the Riviera Club. Improved land use/aesthetics values in the flood protected area would result.

6.11.4 No Action

Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. The floodwall route would be located on the northwest side of the Citizens Water Canal instead of southeast; therefore, impacts of this action would be similar to that of the proposed action.

6.11.5 Vegetation Variance 20 feet from Levee Crown

This alternative would consist of tree and other deep rooted vegetation removal 20 feet from the levee crown. This alternative would impact on land use through the loss of woodlands. It would have some impact on aesthetics through loss of shading along completed Phase 3A and 3C.

6.11.6 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Action)

This alternative would consist of tree and other deep rooted vegetation removal 15 feet from the toe of the levee. This alternative would impact land use through the conversion of riparian woodlands to mowed grasslands. It would have some impact on aesthetics through loss of shading along completed Phase 3A and 3C.

6.11.7 No Action (Vegetation)

The No Action alternative would leave the existing conditions as they are – no additional tree clearing. There would be no impact to either land use or aesthetics.

6.12 TRANSPORTATION

6.12.1 Westfield Boulevard Alignment (Proposed Action) – Including Variations

Activities associated with construction of the floodwall would require temporary alterations to traffic patterns. Upon completion, traffic patterns would return to previous conditions. As the majority of the construction activities would take place in a high traffic urban area, necessary precautions would be taken to limit interference with automobiles and pedestrians. All traffic and road alterations would be coordinated with local officials. Local media sources would also be informed of necessary alterations to further minimize impacts.

6.12.2 Rocky Ripple Alternative

Activities associated with construction of the floodwall would require temporary alterations to traffic patterns. Upon completion, traffic patterns would return to previous conditions. All traffic and road alterations would be coordinated with local officials. Local media sources would also be informed of necessary alterations to further minimize impacts.

6.12.3 56th Street Alignment Alternative

Activities associated with construction of this alternative would require temporary alterations to traffic patterns in the immediate vicinity. Upon completion, traffic patterns would return to previous conditions. All traffic and road alterations would be coordinated with local officials. Local media sources would also be informed of necessary alterations.

6.12.2 No Action

No Action continues acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. This alternatives impact would be similar to that of the proposed action.

6.12.5 Vegetation Variance 20 feet from Levee Crown

Clearing of vegetation would have almost no impact to transportation. There would be a small temporary increase in local traffic generated by workers and equipment needed to conduct any clearing.

6.12.6 Vegetation Clearing 15 Feet from Toe of Levee (Proposed Action)

Clearing of vegetation would have almost no impact to transportation. There would be a small temporary increase in local traffic generated by workers and equipment needed to conduct any clearing.

6.12.7 No Action (Vegetation)

The No Action alternative would leave the existing conditions as they are – no additional tree clearing. There would be no impact to transportation.

6.13 AIR QUALITY

6.13.1 Westfield Boulevard Alignment (Proposed Action) – Including Variations

Air quality impacts associated with the construction of the proposed project would be from operation of construction equipment and associated construction vehicles. Emissions from gasoline and diesel-operated machines are expected to be minimal. Fugitive dust emissions resulting from excavation, grading and other construction activities are also expected to be minor. Potential construction air impacts are considered insignificant because of the relatively

small magnitude of the expected impacts and the temporary nature of the construction activities. Construction would be conducted in accordance with state and/or local regulations to minimize fugitive dust emissions and to remove mud and soil tracked onto adjacent roadways. Construction activities would not significantly impact air quality indices for Marion County. Air quality impacts would be minor and temporary. Implementation of Best Management Practices (BMPs) would further reduce any impacts to air quality. A list of BMPS to be implemented for the proposed action is included in the Appendices.

6.13.2 Rocky Ripple Alternative

The Rocky Ripple Alternative would impact the same area's air quality as that of the proposed action. Impacts would be the same as the proposed action.

6.13.3 56th Street Alignment Alternative

The 56th Street Alignment Alternative would impact the same area's air quality as that of proposed action. Impacts would be the same as the proposed action but on at a lesser degree.

6.13.4 No Action

Adoption of this alternative continues the acceptance of the plan as evaluated and approved in the 1996 EIS and GRR. This alternatives impact would be similar to that of the proposed action.

6.13.5 Vegetation Variance 20 feet from Levee Crown (Phase 3A & 3C)

Air quality impacts would be minor and temporary. Operation of trucks, chain saws and other needed equipment would be the primary sources of additional pollutants.

6.13.6 Vegetation Clearing 15 Feet from Toe of Levee (Phase 3A & 3C)

Air quality impacts would be minor and temporary. Operation of trucks, chain saws and other needed equipment would be the primary sources of additional pollutants.

6.13.7 No Action (Vegetation)

The No Action alternative would leave the existing conditions as they are – no additional tree clearing. There would be no impact to air quality.

7.0 CUMULATIVE IMPACTS

Cumulative impacts result from incremental impact of the proposed action when added to those of other past, present and reasonably foreseeable future actions. Geographical boundaries for this discussion of cumulative impacts are the White River watershed. Temporal boundaries established span from the 19th century when Citizens Water Canal was built to fifty years future projection. Previous subject headings, e.g., Air Quality, Transportation or Wetlands, not discussed herein were considered to have very little or no cumulative impacts.

7.1 Past and Present Actions

Although sandy, shallow conditions of White River prevented it from serving as a major navigable waterway, Indianapolis has served as a transportation hub with railroad connections to Chicago, Louisville, Cincinnati, Detroit, Cleveland, and St. Louis. The city's population began to grow rapidly throughout the first half of the 20th century and remains the state's largest city as well as its capital. Urbanization followed during the second half of the century with Indianapolis, Muncie, and Anderson being primary cities of development (USGS 2001).

Three-fourths of the White River Basin's population is concentrated in the northern section. Outside Indianapolis, land use continues to be primarily agriculture; corn and soybean account for seventy-eight percent of all crop production (USGS 2001).

Significant floods such as those experienced in 1913, 1937, 1943, 1957, and 1958 caused severe economic losses for the area, both in agricultural crops and damages to homes and businesses. Agricultural lands may have continued to be used, but it is likely that damages to areas within cities discouraged use and growth.

Revitalization of the downtown area of Indianapolis began in the 1990s after years of urban decay. Today, numerous improvement projects are ongoing to continue developing the city's future; these projects include a new international airport terminal, upgrading interstates, and expanding hotels, restaurants, and convention centers.

In addition to revitalization of downtown areas, water quality of the White River has improved. Municipal and industrial wastewater treatment and control facilities have been upgraded, expanded, and improved. With this improved water quality, there has been increased public awareness and public use of the resource. The river provides a diverse fishery. Immediate and future concerns for the water and watershed include non-point source pollution (Friends of White River 2008). Flood damage reduction projects such as levees and floodwalls have reduced negative impacts to agriculture and residential properties and commercial facilities. This has encouraged use and expansion in previously flood prone areas.

The Citizens Water Canal is a section of the intended Indiana Central Canal that was begun in 1837 with the intention of connecting the Wabash and Erie Canal to the Ohio River. Canal

building stopped in 1839 due to financial difficulties. Only eight miles of the Indianapolis section were completed and twenty-four miles partially built; this section parallels the White River. In the last half of the 19th Century, various water companies used the canal to power water systems. In 1904 the Indiana Department of Waterworks used the canal as a purification system. In 1976 the Company sold the land to the City of Indianapolis. In 1971 the canal was designated by the American Water Association as an American Water Landmark.

A section of canal outside the project area and located in downtown Indianapolis, runs through White River State Park, an urban cultural state park. Restoration of this area was undertaken in the 1980s and centered on the canal. This section has undergone major renovations to improve aesthetics and is now the focal point of many downtown area events (Hagan 2008). The canal towpath is also part of Indianapolis Greenways Plan and is used by walkers, joggers, and cyclists (Greenways 2009). The canal has been historically dredged to maintain depths for water withdrawal for water supply (Hagan 2008).

7.2 Reasonably Foreseeable Future Actions

Population centers within the White River watershed are not expected to change significantly. Similarly, the major land use outside the population centers is expected to continue for agricultural production. Urban sprawl will result in loss of agricultural lands. Erosion from residential developments and pesticide residue from residential and agricultural use are likely to continue as major contributors of non-point source (NPS) pollution. Therefore, NPS pollution will likely continue as one of the leading impacts to water quality and implementation of this project would cause no cumulative effect on this water resource.

Growth and revitalization of downtown areas, such as Indianapolis, are expected to continue as interest in redevelopment of these areas for residential, commercial, and recreational uses continues to grow. Redevelopment and revitalization is reflected in the Greenways Foundation's Master Plan that includes continued improvements to the canal towpath and tying these improvements to community access plans as well as linking the greenways to museums, universities, and other public facilities (Greenways 2008).

Temporary impacts from dredging of Citizens Water Canal are expected to continue in order for the canal to provide a source for the city's municipal water supply.

7.3 Cumulative Effects on Resources

7.3.1 Flooding

A direct result of implementation of a proposed project is that the quantity and frequency of property damage and loss due to flooding would be greatly reduced. From a cumulative

effects perspective, the result would be far fewer instances of flood damages throughout northern Indianapolis, resulting in monetary savings to residents, businesses and governments. In addition, improvements in "quality of life" factors related to reduced flood induced disruptions would be seen, such as pride in property ownership and community development, increased property value, and reduced fear of flood damage.

7.3.2 Land Use Changes

As mentioned earlier (Section 6.11), little land use changes are expected. Urban encroachment into agricultural areas would be the greatest change. Downtown areas are already developed; therefore changes there could include rezoning of existing areas. With measures to protect lands from flooding, more pressure to develop floodplain lands could happen outside the current proposed project area. However, it would be the responsibility of the city to ensure that any future development complied with appropriate FEMA regulations and guidance. Therefore, future development is most likely to be in the form of redevelopment of previously used properties.

7.3.3 Terrestrial Resources

Implementation of the proposed project added to past development, would have a minimal cumulative impact to terrestrial resources as the habitat directly impacted is limited to a narrow band along the White River. The proposed project will require the clearing of about 4.5 acres more than previously estimated along Section 3B in order to meet current levee and floodwall design and construction requirements; however these impacts can and will be mitigated. If changes to use of floodplain areas increases due to reduced flooding from construction of the proposed project, loss of terrestrial resources could occur. Floodplains provide terrestrial and riparian habitat for a variety of wildlife. Development of these areas could further limit habitat availability within a metropolitan area. Loss of large tracts or pockets of vegetated floodplain would cause the greatest impact.

7.3.4 Aquatic Resources and Water Quality

Positive cumulative effects would result from the alleviation of flooding of developed neighborhoods and the reduction of pollutants returning to the canal and river from those neighborhoods following such an event. Continued dredging of the canal by the city would cause temporary impacts to aquatic resources and water quality. NPS pollution will continue to be a water quality concern regardless of the implementation of the proposed project.

7.3.5 Recreation

Cumulative effects of completion of the project may include the loss of some members only recreational opportunities at the Riviera Club as two tennis courts, two shelters and associated picnic tables, and several areas of playground equipment will either be relocated or removed. The opportunity for walking along the crown of the levee, even if officially discouraged, will present itself to those who desire to do so. The completed Phase 3A is frequently used by walkers and joggers as it provides maintained access along the wooded river's edge while Phase 3C gets little such use as it adjoins other existing development providing better pathways for such activities.

7.3.6 Cultural Resources

Currently, no adverse effects to historic properties have been identified for the proposed undertaking. As such, the impact of the proposed project, when added to the other past, present and reasonably foreseeable future actions, is collectively insignificant.

7.3.7 Socioeconomics

With this proposed project, reoccurrence of flood damages would be reduced. Relieved incidents of flooding would mean monetary savings to residences, businesses and governments. Positive cumulative impacts would result in revitalization of the area would provide economic and social benefits.

7.3.8 Summary

Based on a review of the information presented above, as well as the data collected within the watershed over the past, the levee, if conducted in accordance with all applicable state and Federal regulations, should not contribute to or result in cumulative significant adverse impacts to the aquatic or human environment in the watershed. The cumulative effects of implementing this proposed action would prove beneficial. Similarly, with proper maintenance and regulation, effects of these benefits would be visible both now and into the future for the local area, as well as the White River watershed.

8.0 MITIGATION

Mitigation for environmental impacts includes three phases: avoidance, minimization, and compensatory mitigation. For the proposed project, environmental impacts have been avoided and minimized to the greatest extent possible along the entire route. The remaining unavoidable impacts will be mitigated at a site or sites to be determined. The primary purpose of mitigation will be the preservation and/or restoration of riparian woodlands and their benefits to wildlife resources.

The non-federal sponsor of any Corps of Engineers civil works project is required to supply all necessary real estate. As such Indianapolis will have to acquire the needed mitigation lands and implement any natural resource management practices on them as may be required after completion of coordination with the state and federal resource agencies. Mitigation lands are normally acquired as near the project as possible preferably within the same drainage basin. The Corps of Engineers anticipates that substantially more than the original mitigation need of 29 acres will be required. It is more likely that mitigation of project impacts, primarily those related to additional clearing of bottomland hardwoods, will require between 90 and 150 acres in total. Management practices can influence the final total of mitigation lands to be acquired. Indianapolis will be responsible for acquisition, restoration, protection and management of the mitigation lands. Additional details will be provided in the FSEIS following coordination and/or consultation with other state and federal resource agencies.

9.0 AGENCY COORDINATION AND ENVIRONMENTAL COMPLIANCE

Preparation of the DSEIS includes public notification in the Federal Register of the availability of the DSEIS and the opportunity for agency and public review and comment prior to agency decision making. This DSEIS is being circulated to members of the public, elected officials and local, state, and Federal governmental agencies with jurisdiction by law or special expertise for a 45-day review/comment period. Following this review period the Corps will prepare a FSEIS updating the DSEIS and/or responding publically to those comment received on the DSEIS. A 30 day review period will follow the public release of the FSEIS offering all reviewers a second opportunity to comment on the Proposed Action and/or FSEIS. Following this second review period the Corps will consider all comments and issue a Record of Decision (ROD) explaining its final decision as to the Proposed Action. The signing of a ROD will complete the Corps compliance with the National Environmental Policy Act.

The present state of compliance with environmental laws and regulations required for the Proposed Action is described below and summarized in Table 5, page 71.

9.1 CLEAN WATER ACT

9.1.1 Section 404

Compliance with Section 404 of the Clean Water Act is required for discharges of dredged or fill material into the waters of the United States, including adjacent wetlands. A 404(b)(1) evaluation was completed for the entire levee project with the 1996 EIS.

9.1.2 Section 401 Water Quality Certification

State Water Quality Certification pursuant to Section 401 of the Clean Water Act is required from Indiana Department of Environmental Management for any activity that may result in a discharge into waters of the State. This certification will be obtained prior to but no earlier than one year before the initiation of construction.

9.1.3 National Pollutant Discharge Elimination System (NPDES)

A National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharge is required when construction or land disturbance exceeds one acre. This certification will be obtained prior to but no earlier than one year before the initiation of construction.

9.2 FLOODPLAIN MANAGEMENT

Executive Order (EO) 11988 (May 24, 1977) outlines the responsibilities of Federal agencies in the role of floodplain management. In accordance with this EO, the Corps is required to evaluate the potential effects of actions on floodplains, and does not undertake actions that directly induce growth in the floodplain, unless no practical alternative exists. Construction of structures and facilities on floodplains must incorporate flood proofing and other accepted flood protection measures. Agencies must attach appropriate use restrictions to property proposed for lease, easement, right-of-way, or disposal to non-Federal public or private parties.

The Proposed Action would serve to reduce the damaging effects of flooding; it would not be directly encouraging growth within the floodplain especially as the protected area is already fully developed. The City of Indianapolis participates in the FEMA program and therefore regulates development within the floodplains. Any necessary local or state permits would be acquired prior to starting construction.

9.3 FISH AND WILDLIFE COORDINATION ACT

The Corps is required to coordinate water resource project proposals with the USFWS and Indiana Department of Natural Resources, Division of Fish and Wildlife under the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). Coordination was initiated with a request for their review and comment on the DSEIS.

9.4 ENDANGERED SPECIES ACT

The Endangered Species Act (ESA) requires the determination of possible effects on or degradation of habitat critical to federally listed endangered or threatened species. Based on information available from the state and federal agencies and their comments to the 1996 EIS, there is one listed species within the proposed project area, the Indiana bat. Due to the unavoidable removal of trees within the footprint of the project, potential habitat for the endangered Indiana bat will be lost. Mitigation lands and plantings will preserve current habitat and provide future habitat for the bat and other species. Therefore, while the proposed actions are likely to affect the Indiana bat, they are not likely to jeopardize the continued existence of this species.

9.5 NATIONAL HISTORIC PRESERVATION ACT

Section 106 of National Historic Preservation Act of 1966 requires that Federal agencies take into account the effects of its undertakings on historic properties included in or eligible for listing in the National Register of Historic Places. The Section 106 process, implemented by

regulations of the Advisory Council on Historic Preservation (ACHP) at 36CFR800 require agencies to define a project's "area of potential effects," identify historic properties within that area that may be directly or indirectly affected by the proposed project, assess the potential for adverse effects, resolve those adverse effects, and provide ACHP a reasonable opportunity to comment on the undertaking. The Corps is currently working with the State Historic Preservation Office and the ACHP to resolve remaining Section 106 issues.

9.6 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, was signed on February 11, 1994. The order requires Federal agencies to promote "nondiscrimination in Federal programs substantially affecting human health and the environment." In response to this direction, Federal Agencies must identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations.

The final step in the environmental justice evaluation process is to evaluate the impact of the proposed project on the population and to ascertain whether target populations are affected more adversely than are other residents. The conclusion is that low-income or minority populations would not be disproportionately affected by the proposal. With completion of the entire White River (North) Flood Damage Reduction Project, all properties and individuals within the project area would receive protection. Similarly, routing of the proposed floodwall alignment would not disproportionately or adversely affect minority or low income populations.

9.7 CLEAN AIR ACT

The EPA defines ambient air in CFR 40, Part 50, as "that portion of the atmosphere, external to buildings, to which the general public has access." The CAA and CAAA require the Corps to comply with all applicable parts of these acts and applicable standards. The proposed project area is currently in non-attainment for ozone; however IDEM has petitioned EPA for a reconsideration of Marion County to attainment with a maintenance plan classification. The Corps' Proposed Action would not cause additional impacts to the status of this area and would comply with the CAA Conformity Rule.

9.8 OTHER STATE AND LOCAL APPROVALS

Local approval may be required for proposed work within the floodway. This requirement will be met as necessary.

9.9 SUMMARY

Compliance status with the previously described laws and other laws that are commonly considered prior to the construction of projects by the Corps of Engineers is documented in Table 5 as follows.

Table 5: Federal Act/Executive Order Compliance

Act/Executive Order	Status	Compliance
Wetlands (EO 11990)		N/A
Prime/Unique Farmlands		N/A
Floodplain Management (EO 11988)	No affect	C
Clean Water Act		
Section 404		C
Section 401	To Be Obtained	C
NPDES	To Be Obtained	C
Fish and Wildlife Coordination Act	In Progress	C
Endangered Species Act	In Progress	C
National Historic Preservation Act	In Progress	C
Environmental Justice (EO 12898)	Completed	C
Clean Air Act	No affect	C
Comprehensive Environmental Response Compensation and Liability Act (CERCLA)		N/A
Resource Conservation and Recovery Act (RCRA)		N/A
Wild and Scenic Rivers Act		N/A
Other:		
Local approval for work within floodway		As Necessary
N/A—not applicable C--Compliant		

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11.0 LIST OF PREPARERS

The following Louisville District, U.S. Army Corps of Engineers personnel prepared portions of and/or reviewed this draft SEIS:

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Cultural Resources Coordination

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Project Background and Alternatives Development

Mike Turner, Ecologist, 36 years experience
NEPA Document Preparation and Circulation, Impacts Descriptions

12.0 INDEX

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APPENDICES

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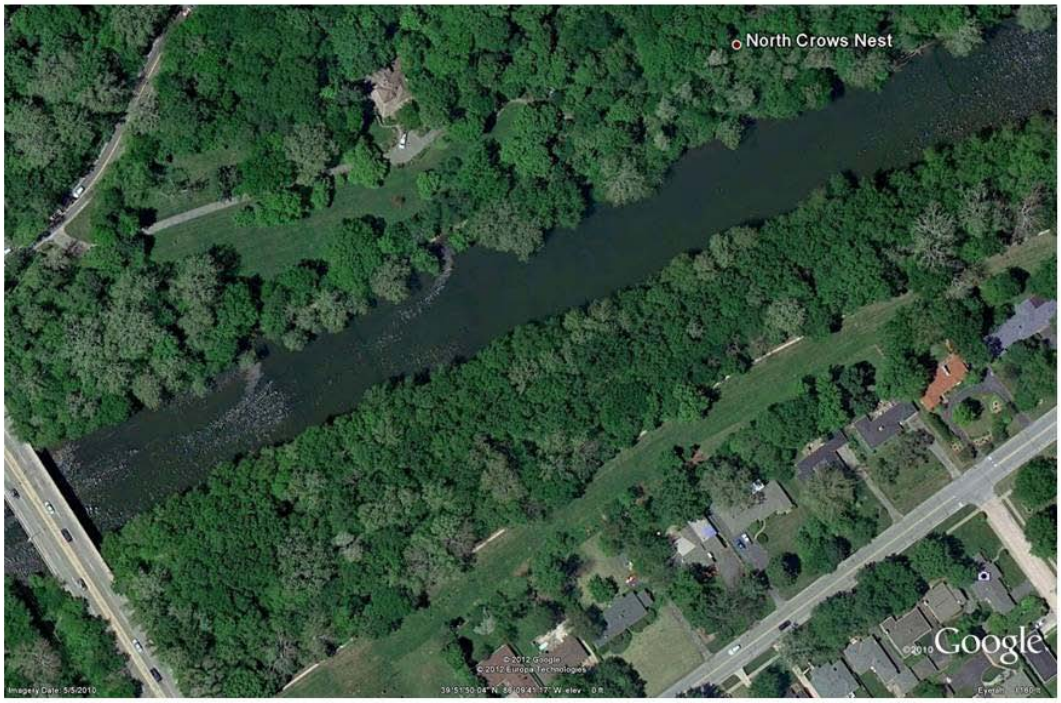
Vegetation Clearing
(Proposed Action)

Indy 3A



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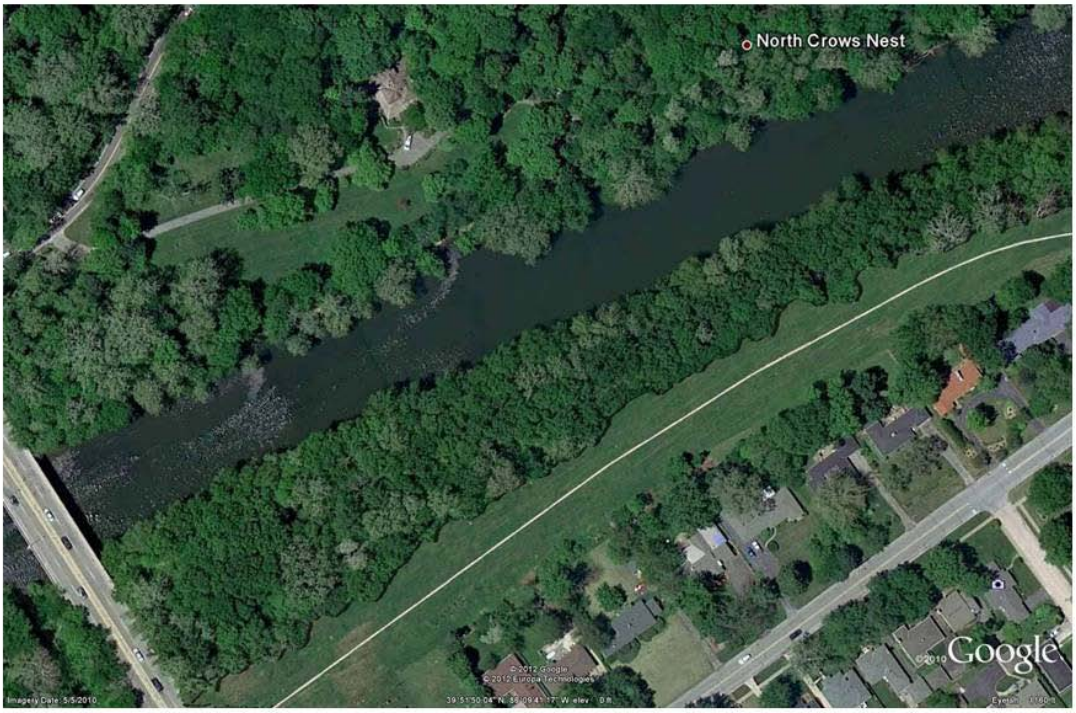

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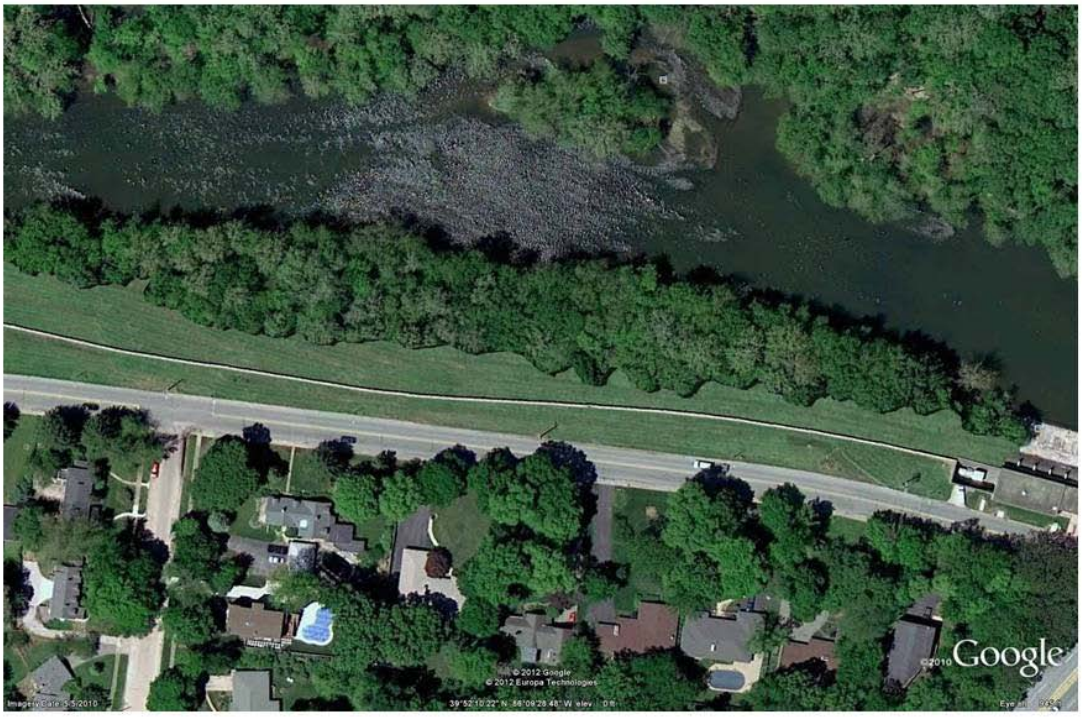

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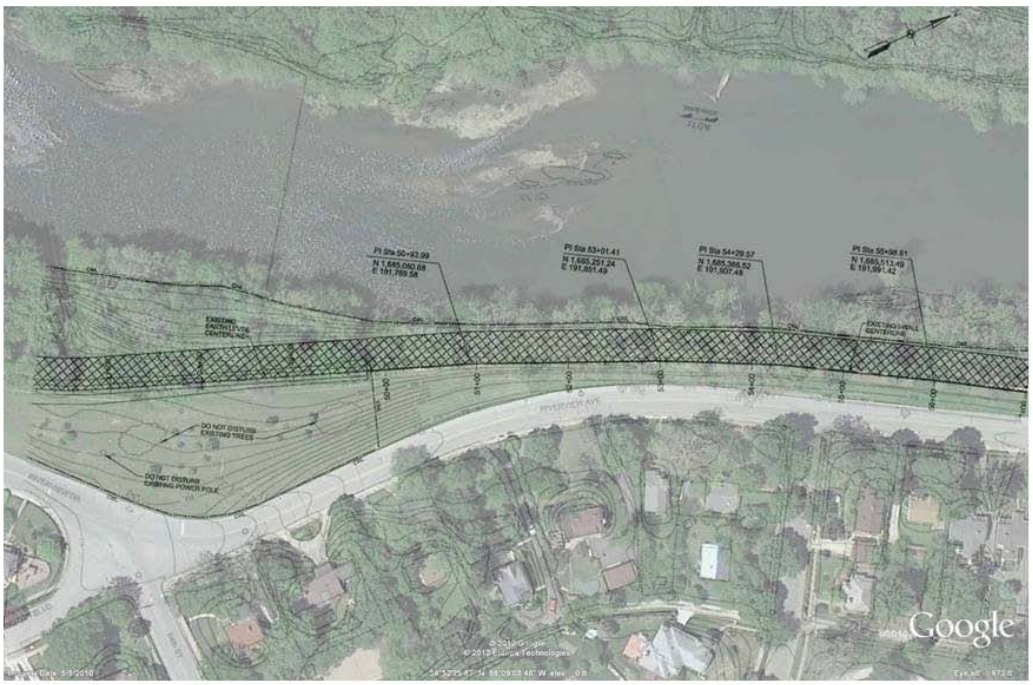

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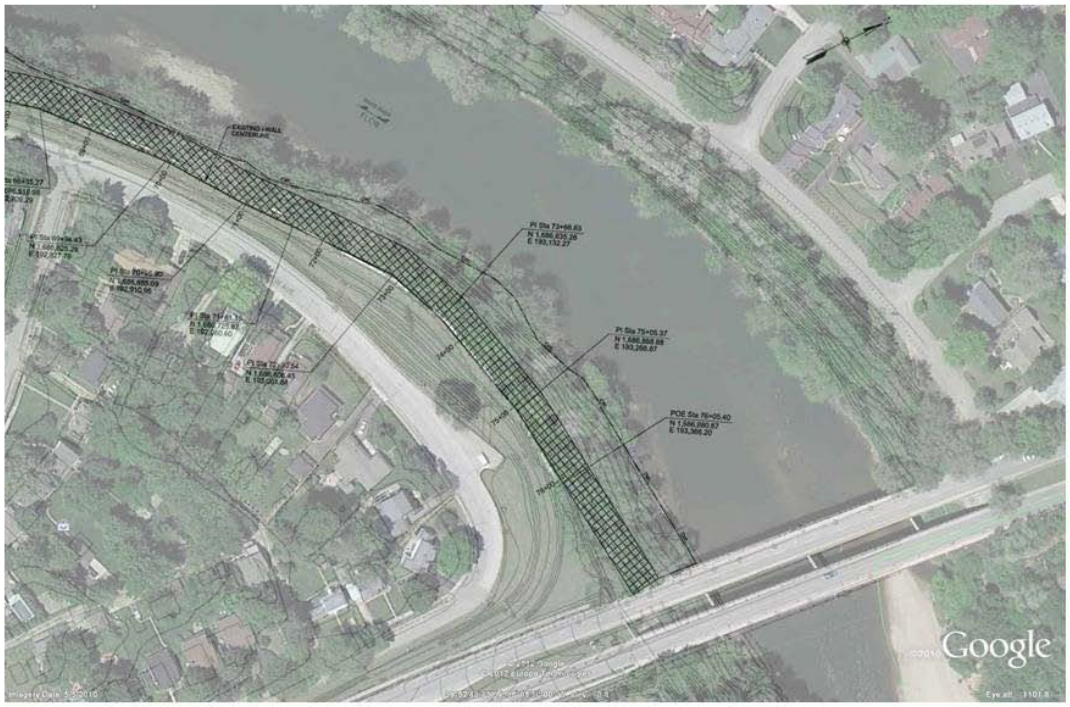

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Sheet BC103- Before

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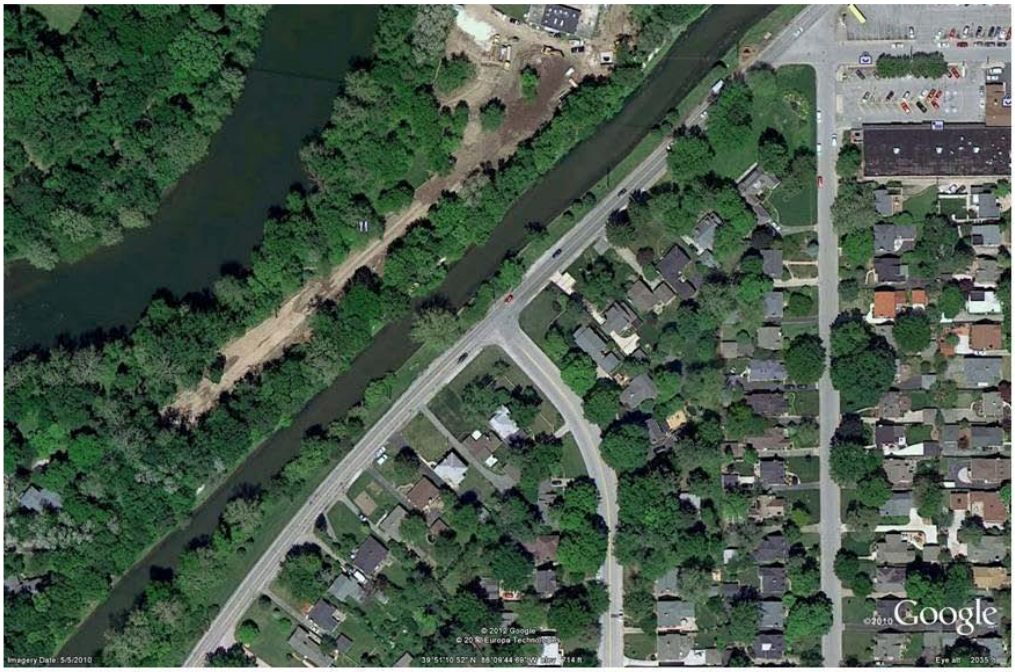

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Indy 3C

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Before

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BEST MANAGEMENT PRACTICES (BMP)

The following specific BMPs are examples that would be incorporated for implementing the proposed action.

1. Vegetative Practices:

Straw, mulch or other suitable material placed on disturbed areas to reduce runoff and erosion.

Temporary vegetation established to reduce stormwater runoff velocity and sheet flow.

Permanent vegetation such as trees, shrubs, grasses planted on exposed areas for final permanent stabilization where possible.

A protective blanket or soil stabilization mat used to assist in establishment of temporary or permanent vegetation.

2. Structural Practices:

Check dams installed to minimize erosion rates by reducing the velocity of storm water in areas of concentrated flow, and to capture larger soil particles.

A stone-stabilized pad located at any point where traffic leaves a construction site to a public roadway.

Silt fence used as a temporary sediment barrier to prevent sediment from leaving construction site and entering natural drainage ways.

IMPLEMENTATION MEASURES

The following commitments are made regarding the proposed project implementation measures:

Contaminated soils and waste, if encountered, would be disposed of at an approved landfill in accordance with State of Indiana regulations and specific landfill requirements.

Disturbed soil would be stabilized as quickly as practicable.

During construction, housekeeping steps would be implemented to minimize fugitive dust emissions, to remove mud and soil tracked onto adjacent roadways, and to control runoff contamination.

A Sediment and Erosion Control Plan would be prepared and implemented in accordance with State of Indiana regulations.

Necessary permits and approvals would be received and implemented in accordance with regulations.

Mature trees would be preserved to the greatest extent possible within the project footprint for protection of potential Indiana bat habitat. All felling of timber will occur when bats are not present unless otherwise approved by the US Fish and Wildlife Service.

If construction plans and specifications result in significant changes from those outlined in the Environmental Impact Statement, the NEPA process would be revisited.

DISPOSAL AREAS

The following commitments for the Disposal Area are made:

Excavated materials and debris would be properly disposed of in accordance with state and local law, regulations, and permit requirements.

Housekeeping steps would be implemented to minimize fugitive dust emissions and to remove mud and soil tracked onto adjacent roadways.

EQUIPMENT STAGING AREAS

Equipment Staging Areas would most likely be previously disturbed areas such as gravel or asphalt lots or vacant residential lots; such sites would be the preferred locations.

The following commitments for the Equipment Staging Areas are made:

A BMP Plan for activities at the Equipment Staging Areas would be prepared and implemented.

The areas would be kept clean and any hazardous materials used to support the proposed project would be contained.

Housekeeping steps would be implemented to minimize fugitive dust emissions and to remove mud and soil tracked onto adjacent roadways.

MITIGATION

Mitigation for environmental impacts includes three phases: avoidance, minimization, and compensatory mitigation. For the proposed project, environmental impacts have been avoided and minimized to the greatest extent possible along the entire route. The remaining unavoidable impacts will be mitigated at a site or sites to be determined. The primary purpose of mitigation will be the preservation and/or restoration of riparian woodlands and associated wildlife habitats.