



**DEPARTMENT OF THE ARMY**  
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE  
CORPS OF ENGINEERS  
P.O. BOX 59  
LOUISVILLE, KENTUCKY 40201-0059

<http://www.lrl.usace.army.mil/>

February 1, 2011

Planning, Programs and  
Project Management Division  
Environmental Resources Section

Dear Reader:

The Louisville District, U.S. Army Corps of Engineers has prepared an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) evaluating potential impacts associated with proposed changes to the existing Indianapolis, White River (North), IN Flood Damage Reduction Project, specifically Phase 3B and Environmental Mitigation. A copy of the EA and unsigned FONSI is provided herein.

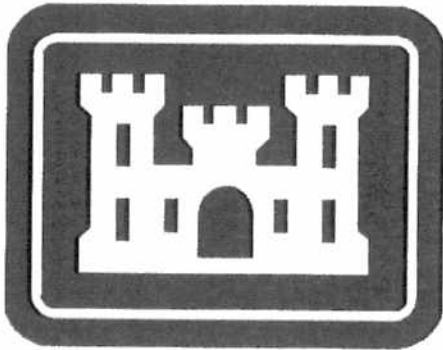
In accordance with the provisions of the National Environmental Policy Act (NEPA) your review of this EA and any comments are hereby solicited. Regulations provide for a 30-day period for the public, agency and governmental officials, and others to offer comments to the Louisville District regarding this document. You may send a written response to Wm. Michael Turner, CELRL-PM-P-E (Room 708), U.S. Army Corps of Engineers, P.O. Box 59, Louisville, KY 40201-0059. You may also submit comments via e-mail to [michael.turner@usace.army.mil](mailto:michael.turner@usace.army.mil) or by calling the undersigned at (502) 315-6900.

Any comments received in response to this mailing will be considered in the decision to sign a Finding of No Significant Impact or to prepare an Environmental Impact Statement. All comments will be retained in the project files. This comment period will remain open until close-of-business, Friday, March 4, 2011.

Sincerely,

A handwritten signature in black ink that reads "Mike Turner".

Wm. Michael Turner  
Chief, Environmental Resources  
Section, Planning Branch



**U.S. Army Corps  
of Engineers**  
Louisville District

## **ENVIRONMENTAL ASSESSMENT**

January 2011

**Indianapolis, White River (North), IN Flood Damage  
Reduction Project  
Phase 3B and Environmental Mitigation**

---

## CONTENTS

Section	Page
<b>1.0 INTRODUCTION AND BACKGROUND .....</b>	<b>1-1</b>
1.1 INTRODUCTION .....	1-1
1.2 BACKGROUND .....	1-1
<b>2.0 PURPOSE OF AND NEED FOR ACTION .....</b>	<b>2-4</b>
<b>3.0 ALTERNATIVES .....</b>	<b>3-55</b>
3.1 FEATURE CHANGE .....	3-5
3.2 ALIGNMENT CHANGE .....	3-5
3.3 ENVIRONMENTAL MITIGATION .....	3-9
<b>4.0 AFFECTED ENVIRONMENT .....</b>	<b>4-11</b>
4.1 PHYSIOGRAPHY, TOPOGRAPHY, GEOLOGY, SOILS, & CLIMATE ....	4-11
4.2 WATER QUALITY .....	4-11
4.3 AQUATIC RESOURCES .....	4-12
4.5 TERRESTRIAL RESOURCES .....	4-13
4.4 WETLANDS .....	4-13
4.6 THREATENED AND ENDANGERED SPECIES .....	4-14
4.7 RECREATION .....	4-14
4.8 CULTURAL RESOURCES .....	4-14
4.9 HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE .....	4-16
4.10 SOCIOECONOMIC RESOURCES .....	4-16
4.11 LAND USE/AESTHETICS .....	4-17
4.12 TRANSPORTATION .....	4-17
4.13 AIR QUALITY .....	4-17
<b>5.0 ENVIRONMENTAL CONSEQUENCES .....</b>	<b>5-19</b>
5.1 PHYSIOGRAPHY, TOPOGRAPHY, GEOLOGY, SOILS, & CLIMATE ....	5-19
5.2 WATER QUALITY .....	5-19
5.3 AQUATIC RESOURCES .....	5-20
5.4 WETLANDS .....	5-21
5.5 TERRESTRIAL RESOURCES .....	5-21
5.6 THREATENED AND ENDANGERED SPECIES .....	5-23
5.7 RECREATION .....	5-23
5.8 CULTURAL RESOURCES .....	5-24
5.9 HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE .....	5-24
5.10 SOCIOECONOMIC RESOURCES .....	5-24
5.11 LAND USE / AESTHETICS .....	5-25

5.12	TRANSPORTATION.....	5-26
5.13	AIR QUALITY.....	5-26
5.14	CUMULATIVE IMPACTS.....	5-27
<b>6.0</b>	<b>ENVIRONMENTAL COMMITMENTS.....</b>	<b>6-30</b>
6.1	BEST MANAGEMENT PRACTICES (BMP).....	6-30
6.2	IMPLEMENTATION MEASURES.....	6-30
6.3	DISPOSAL AREAS.....	6-31
6.4	EQUIPMENT STAGING AREAS.....	6-31
6.5	MITIGATION.....	6-31
<b>7.0</b>	<b>AGENCY COORDINATION AND ENVIRONMENTAL COMPLIANCE... 7-32</b>	
7.1	CLEAN WATER ACT.....	7-32
7.2	FLOODPLAIN MANAGEMENT.....	7-32
7.3	FISH AND WILDLIFE COORDINATION ACT.....	7-32
7.4	ENDANGERED SPECIES ACT.....	7-33
7.5	NATIONAL HISTORIC PRESERVATION ACT.....	7-33
7.6	ENVIRONMENTAL JUSTICE.....	7-33
7.7	CLEAN AIR ACT.....	7-34
7.8	OTHER STATE AND LOCAL APPROVALS.....	7-34
7.9	SUMMARY.....	7-34
<b>8.0</b>	<b>PUBLIC INVOLVEMENT.....</b>	<b>8-35</b>
<b>9.0</b>	<b>DETERMINATION AND CONCLUSION.....</b>	<b>9-36</b>
<b>10.0</b>	<b>REFERENCES.....</b>	<b>10-37</b>
<b>11.0</b>	<b>LIST OF PREPARERS.....</b>	<b>11-39</b>

## **Tables**

Table 1	State Water Quality Data for Indianapolis Water Canal, 1991-2008
Table 2	Population Data for the Project Area
Table 3	Economic Data for the Project Area
Table 4	Federal Act/Executive Order Compliance

## **Figures**

Figure 1	Vicinity Map and Project Study Area
Figure 2	Phase 3B Alignment
Figure 3	Alignment near Butler University
Figure 4	Downstream Area along Canal Towpath
Figure 5	Upstream Alignment
Figure 6	Existing Floodwall Design

## **1.0 INTRODUCTION AND BACKGROUND**

### **1.1 INTRODUCTION**

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 1948, completed a General Reevaluation (i.e. Feasibility) Report (GRR) and Environmental Impact Statement (EIS) in 1996, entitled Indianapolis, White River (North) Flood Damage Reduction Project for implementation of flood damage reduction measures in northern Indianapolis (Marion County), Indiana. See Figure 1 for project area and location. The flood damage reduction measure included protection of residential and commercial properties along a three mile stretch of the White River. The project involved various combinations of earthen levees and constructed floodwalls to protect the communities of Broad Ripple, Warfleigh and South Warfleigh.

The EIS was completed and a Record of Decision (ROD) signed on 8 September 1997. Prior to finalizing the EIS, the community of Rocky Ripple reversed its decision to be included in the flood damage reduction project. As a result, the Corps revisited the downstream alignment of the project, known as the South Warfleigh Section, and developed plans to relocate this segment of the project to the south and east of the town of Rocky Ripple along the Indianapolis Water Canal Towpath. The downstream section of floodwall would then terminate at high ground along the Canal Towpath, approximately 5,500 feet to the southwest of Riviera Club property.

This Environmental Assessment (EA) has been prepared to evaluate existing conditions in 2010 and potential impacts associated with changes in project features and realignment of the South Warfleigh Section of the Indianapolis, White River (North) Flood Damage Reduction Project. The EA also discusses environmental mitigation and the need to acquire different areas than those described in the recommended plan of the GRR. This EA is prepared pursuant to the National Environmental Policy Act (NEPA), CEQ regulations (40 CFR, 1500-1517), and the Corps implementing regulation, Policy and Procedures for Implementing NEPA, ER 200-2-2, 1988.

### **1.2 BACKGROUND**

Much of the information used to prepare this EA is available in the 1996 EIS; therefore that document is incorporated by reference.

The EIS recommended plan included 2315 feet (0.44 miles) of levee and 13,172 feet (2.5 miles) of floodwall. The project would provide protection to an estimated 1300 properties, 83% of which are residential. The project would provide a minimum level of flood protection to an annual one percent chance of exceedance (100-year level of protection). The plan included reforestation and/or wetland plantings at two sites to mitigate for ten acres of impacts due to project construction. The recommended plan also called for acquisition of hardware, software, and precipitation gages for use in the City's Flood Warning Preparedness Plan.

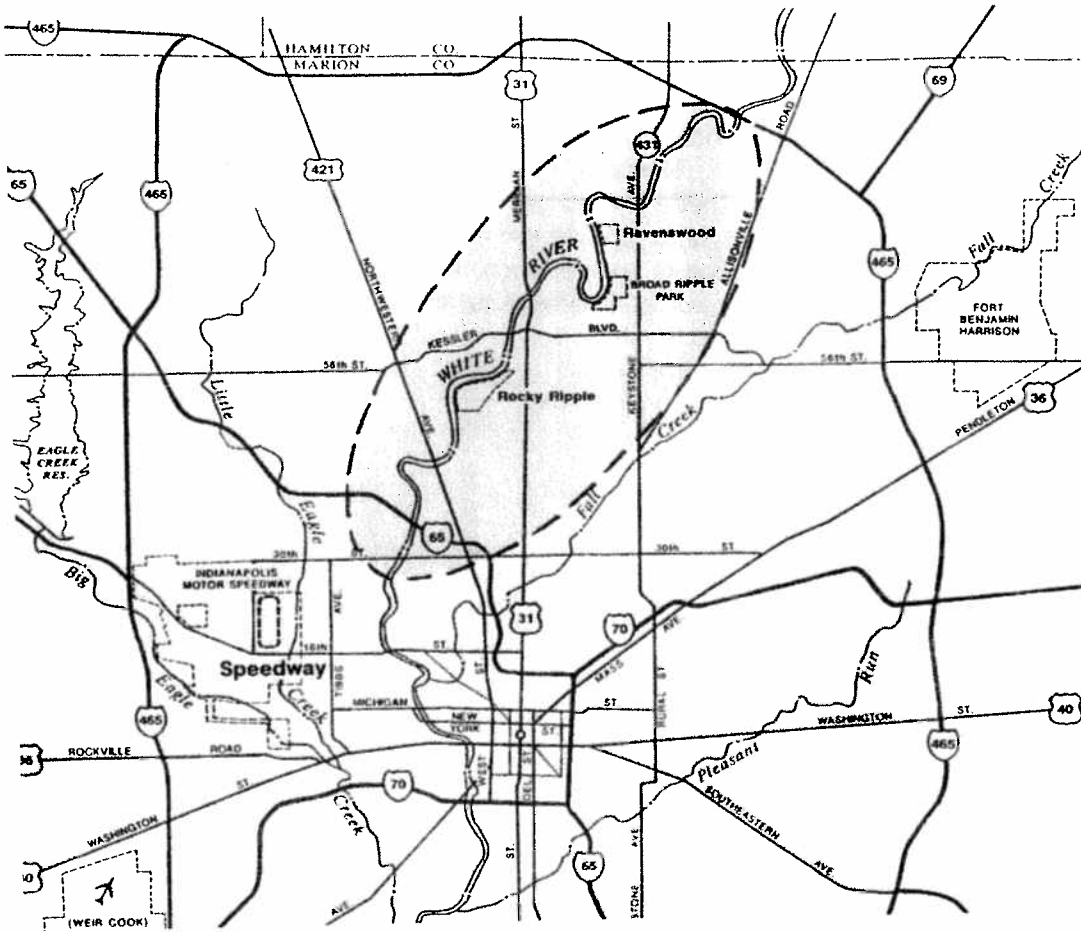
Prior to the GRR being approved and ROD being signed, the Town of Rocky Ripple decided not to be included in the study. With the deletion of the Rocky Ripple portion from the

---

recommended plan, the downstream alignment of the project was relocated along the Indianapolis Water Canal Towpath. The entire project alignment was divided into three segments or sections (Phase 3A, 3B & 3C) due to funding constraints and real estate acquisition.

Phase 3A, the Warleigh Section, consists of a 7600-foot floodwall/levee on the existing Warleigh levee. This section of the project was completed in July 2004. Phase 3C, the Monon-Broad Ripple Section, includes construction of approximately 4800 feet of floodwall and earthen levee from North College Avenue to high ground just upstream of the intake of the Indianapolis Water Canal. The Broad Ripple portion of this section extends approximately 1500 feet from College Avenue, along the south side of 67<sup>th</sup> Street, to the existing Monon East Levee. The Monon portion of this section then extends approximately 800 feet across the existing levee and ties into the road embankment of Westfield Boulevard. From the southeast side of Westfield Boulevard, the project then parallels both Westfield Boulevard and the White River for a distance of approximately 2500 feet to high ground near the intake structure of the Indianapolis Department of Waterworks Canal. Construction of the Phase 3C, Monon—Broad Ripple Section began in April 2007 and was completed in the fall of 2009. Phase 3B, the South Warleigh Section will involve the design and construction of an 8200-foot floodwall and earthen levee. Construction of this section is scheduled to begin in late 2011 or early 2012, pending receipt of sufficient Federal appropriations. There were no substantive changes to the Warleigh and Monon—Broad Ripple sections of the project as described in the approved GRR and final EIS. This EA will therefore address only project features and alignment changes to the Phase 3B, South Warleigh Section of the project and proposed environmental mitigation alternatives.

Figure 1: Vicinity Map and Project Study Area





---

## 2.0 PURPOSE OF AND NEED FOR ACTION

Flooding problems on the White River in North Indianapolis have been studied at various stages since 1913: the flood of record. 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 proposed project is to provide the affected area protection at a minimum level of an annual one percent chance of exceedance; this is commonly referred to as the 100-year level of protection. This area of floodwall is needed to complete the project to provide protection to the city.

---

## **3.0 ALTERNATIVES**

### **3.1 FEATURE CHANGE**

#### **3.1.1 ALTERNATIVES ELIMINATED FROM FURTHER EVALUATION**

The recommended plan of the project's September 1996 GRR showed construction of mostly earthen levee along the northern alignment of the Phase 3B section from Kessler Boulevard southward to the Indianapolis Department of Waterworks Canal. The plan, however, indicated that two 10-foot high concrete T-wall sections would be constructed along the project alignment towards the northern and central limits of the Riviera Club property. The lengths of the northern and central sections were shown as 460 feet and 300 feet, respectively. After further technical analyses, Corps of Engineers' design personnel determined the agency could instead construct a continuous earthen levee between Kessler Boulevard and the canal.

#### **3.1.2 PROPOSED ACTION ALTERNATIVE**

In order to increase design safety and reduced project costs, the preferred alternative is construction of a continuous earthen levee from Kessler Boulevard to the Indianapolis Department of Waterworks Canal. Based upon recent changes in floodwall design standards, the previously described T-wall sections have been eliminated. Interface zones between earthen levees and concrete floodwalls are far more prone to failure than continuously constructed sections. In addition, elimination of the T-walls would provide some cost savings to the Government. The Kessler Boulevard to Waterworks Canal section of earthen levee would include construction of two concrete gate-well structures on the river-side of the earthen levee. The maximum dimensions of the structures would be 12' – 8" wide by 19' – 4" long and about 5 feet above grade. They would be located along the southern end of the levee alignment and contain sluice gates that would be closed during significant flooding events to prevent the back flow of water through the existing sewers and into protected areas behind the levee. This entire proposed action alternative would require clearing more trees than previously required for construction of the T-wall sections identified in the recommended plan of the GRR. The environmental mitigation for the project will replace habitat loss resulting from removal of the trees.

#### **3.1.3 NO ACTION ALTERNATIVE**

The basic alternative to any proposed plan of improvement is the No Action alternative. The No Action alternative would involve construction between Kessler Boulevard and the Indianapolis Department of Waterworks Canal as shown in the recommended plan of the project's September 1996 GRR. Adoption of the No Action alternative would result in increased safety risks associated with design of interface zones between earthen levees and concrete floodwalls and somewhat higher cost for the project.

### **3.2 ALIGNMENT CHANGE**

#### **3.2.1 ALTERNATIVES ELIMINATED FROM FURTHER EVALUATION**

Other routes for the proposed floodwall were considered during initial project planning and evaluation. When the Rocky Ripple Alignment was dropped from consideration for the project, the Corps of Engineers moved the downstream project alignment along the

---

Indianapolis Department of Waterworks Canal towpath to the southeast of Rocky Ripple. The canal towpath alignment, as shown in the recommended plan of the feasibility study and in Figure 2 below, would have involved construction of a 6-inch to 24-inch high wall to increase the height of the earthen mound of the canal towpath. Based upon further geotechnical analyses, the Corps determined the towpath alignment was not technically and economically feasible. The mound that forms the towpath would essentially serve as an earthen levee with its height raised by a short wall. Since the towpath was not constructed using the materials and compaction requirements of a levee, it could not be incorporated into design of the project.

After the Corps identified the technical issues regarding the canal alignment, various options for realignment of the South Warfleigh section, designated as Phase 3B, were considered. Focus was made on the segment extending from the Riviera Club property southward to its termination with high ground on property belonging to Butler University. Corps' personnel investigated alignments that would end within the Butler-Tarkington neighborhood. However, those alignments were not practical, based upon both cost and operational constraints since they would have required installation of numerous, expensive closure gates at street and driveway crossings of the floodwall. The most cost effective and favorable alignment involves construction of a floodwall which crosses the Indianapolis Department of Waterworks Canal and terminates on Butler University property. This alignment does not require the installation and operation of multiple closure gates. In addition, the revised alignment does not change the number of properties protected by the floodwall. As a result, the economic benefits of the project remain unchanged.

### **3.2.2 PROPOSED ACTION ALTERNATIVE**

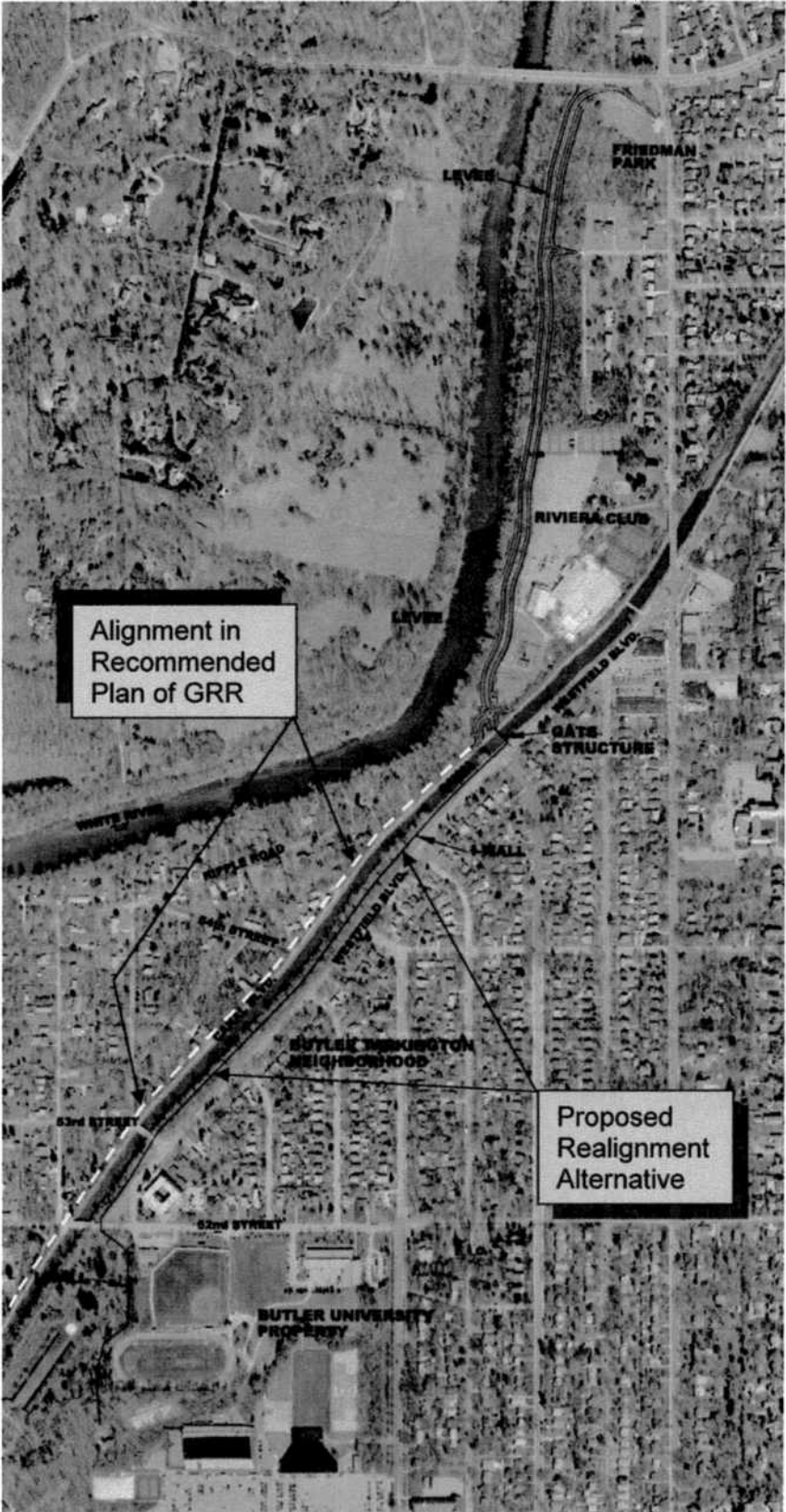
The proposed alignment change would begin on the north side of the Indianapolis Department of Waterworks Canal, cross the canal over a gated structure, and then run in a southwesterly direction, parallel to the canal and Westfield Boulevard, for termination at high ground on Butler University property. The proposed alignment change is shown in Figure 2. The gated structure would have the appearance of a bridge that crosses the canal. The structure would support four large sluice gates that would regulate flow in the canal during significant flood events. The concrete piers and vertical surfaces of the structure would be constructed with decorative commercial form liners to complement the aesthetics of the local area. The Corps of Engineers and City of Indianapolis, local project sponsor, would seek further input from the public on the final appearance of the gated structure. For safety and security purposes, decorative fencing would be installed at both ends of the structure.

A steel sheet pile I-wall would connect to the south end of the gated structure and be constructed to its termination site on Butler University property. Because of the embankment heights at 52<sup>nd</sup> and 53<sup>rd</sup> Streets, there will be no need to build closure structures at those locations. The steel piling would be encased in a decorative concrete facing that is similar in appearance to the floodwall sections that were constructed in previous phases of the project. The Corps and City would again request public input on the appearance of that wall. The floodwall would be approximately 6 feet high at N. Capitol Avenue, but 1 to 3 feet high along the remaining canal section of the project alignment. The section of floodwall across Butler University property would be 3 to 5 feet high. To prevent back flow through existing sewers during significant flooding events, the Corps would construct gate-well structures that contain sluice gates. One structure, with dimensions 11' - 8" wide by 18' - 8" long by about 6 feet above grade, 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. 52<sup>nd</sup> Street, approximately 100 feet east of the Indianapolis Department of Waterworks Canal. That gate-well would be cylindrically-shaped with dimensions of 7' - 2" in diameter and approximately 5 feet above grade. The footprint for construction of the floodwall realignment section would include clearing and maintaining an area approximately 35 feet wide. Construction area work limits would average 80 to 90 feet in width.

Figure 2. Warfleigh Alignment, Phase 3B



---

### **3.2.3 NO ACTION ALTERNATIVE**

The basic alternative to any proposed plan of improvement is the No Action alternative. Adoption of this alternative continues the acceptance of the existing condition, which would forego completion of the flood damage reduction project that was evaluated and approved in the former EIS and GRR. Without finalizing the last section, the lowermost section of the project, as shown in Figure 2, would continue to experience flooding problems. In addition, successful flooding prevention from the previously completed wall/levee sections would be compromised as floodwaters would be allowed to pass around the structures. Thus, with the No Action alternative, the potential benefits of the entire project would be lost in addition to the loss of expenses incurred to date with project construction. Therefore, the No Action alternative was eliminated from consideration as it would result in an incomplete flood damage reduction project and a loss of flood protection.

### **3.3 ENVIRONMENTAL MITIGATION**

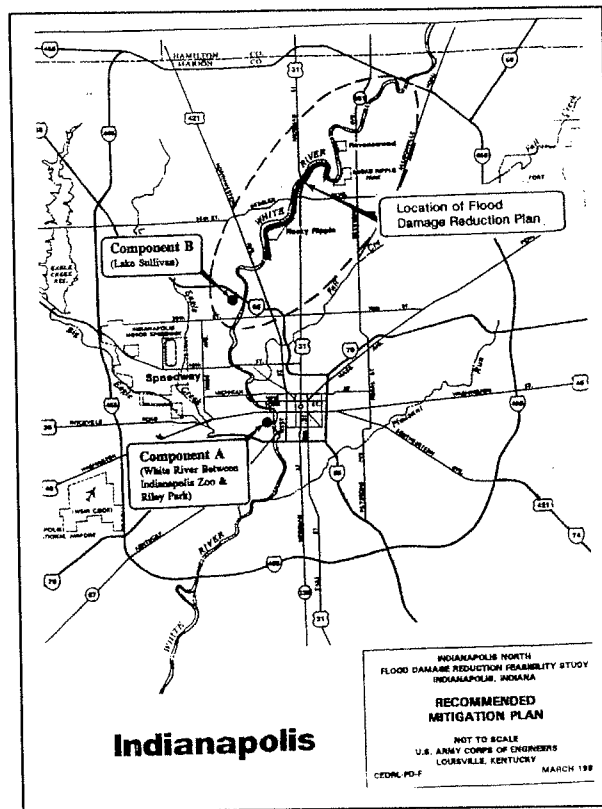
The recommended plan of the GRR indicated the Corps of Engineers would implement environmental mitigation for the entire project at two locations within the City of Indianapolis. One mitigation area involved the forestation of 14 acres of an existing open grass field along the west bank of the White River in the downtown area of Indianapolis between the Indianapolis Zoo and Riley Park. The other mitigation activity 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. See Figure 3 as follows.

Since preparation of the project's 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 10<sup>th</sup> Street, riverbank improvements and bridge improvements. As currently shown, the future trail would cross the 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 therefore 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.

Because of the issues indicated above, both mitigation sites are now eliminated from further evaluation.

**Figure 3. Mitigation Sites in Recommended Plan of GRR**



Corps of Engineers' regulations permit 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.

---

## 4.0 AFFECTED ENVIRONMENT

### 4.1 PHYSIOGRAPHY, TOPOGRAPHY, GEOLOGY, SOILS, AND CLIMATE

Although Indianapolis is a highly urban environment, 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° Fahrenheit (F) during January to highs near 90°F in July (USGS 1998).

### 4.2 WATER QUALITY

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.

In addition to the river, the Indianapolis Department of Waterworks Canal is located within the proposed project area. This water source, which is fed by the White River and eventually flows back to the White River in downtown Indianapolis, is used by the city for one source of its 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 1 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. 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 (Howard 2009; Indiana Administrative Code 2009).



**Table 1. State Water Quality Data for Indianapolis Water Canal, 1991-2008.**

Parameter	Average	Maximum	Minimum	Mode
Dissolved Oxygen (mg/l)	9.8	16.6 (1/1992)	5.5 (8/2002)	9.9
Water Temperature (°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	240 (11/1999)	305 (6/2002)	527
Data obtained from IDEM (Howard 2009)				

### 4.3 AQUATIC RESOURCES

#### 4.3.1 Fish

The White River varies between 150 and 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 (*Camptostoma* 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 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 1992, 1995). 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 Indianapolis 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 aquatic vegetation is likely a limiting factor for fish and macroinvertebrates use of the waters. There are no fish consumption advisories for the Indianapolis Water Canal (Stahl 2009).

#### **4.3.2 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 Indianapolis Water Canal.

#### **4.4 WETLANDS**

The EIS reported one potentially jurisdictional wetland within the entire area previously studied. This site was located near the south end of the existing Rocky Ripple levee and outside the proposed project area. No new wetlands have been identified.

#### **4.5 TERRESTRIAL RESOURCES**

Given the urban setting for this proposed project, an abundant amount of forested habitat remains, especially in proximity to the White River. Aerial photography of the proposed project area (Figure 2) shows that even with the urban/suburban setting, much of the land tracts continue to have a substantial amount of trees, grass and shrubs. Adjacent to, but outside of, the proposed project area and along the right descending bank of the White River, relatively large tracts of land remain in grass and forest.

Within the footprint for the proposed project area, there is limited shrub and tree vegetation. At the most downstream end of the proposed project area, along the canal, primarily between Boulevard Place and 52<sup>nd</sup> Street, there is a narrow riparian strip; above Boulevard Place there are only sparse trees between the canal and Westfield Blvd. Common tree species in the area include cottonwood (*Populus deltoides*), black willow (*Salix nigra*), sycamore (*Plantanus occidentalis*), maples (*Acer* spp), oaks (*Quercus* spp), elm (*Ulmus americana*), box elder (*Acer negundo*), and green ash (*Fraxinus pennsylvanica*). The shrub layer along the proposed realignment is densely vegetated. Non-natives such as bush honeysuckle (*Lonicera maackii*) and creeping wintergreen (*Euonymus* spp.), are common components of the understory.

Common wildlife species include opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), fox and gray squirrels (*Sciurus niger*, *S. carolinensis*), white-tailed deer (*Odocoileus virginianus*), 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.

#### **4.6 THREATENED AND ENDANGERED SPECIES**

The USFWS reports one endangered species, the Indiana bat (*Myotis sodalis*) (USFWS 2009), as occurring in Marion County. This species uses riparian corridors, forested habitats with open understory, and forest edges for foraging. In addition, reproductive females, upon leaving hibernation from caves and mines, migrate to wooded areas where they bear and raise young. These roosting areas often are riparian corridors, wooded wetlands, bottomland and floodplain habitats, and upland communities (USFWS 2007).

Based on discussions and correspondence with USFWS during the preparation of the EIS, the Fish and Wildlife Coordination Act Report stated that the Indiana bat was the primary species of concern. Specific concerns were with the loss of possible foraging and reproductive habitat. The agency went on to say that it did not expect any significant impacts to the species with the proposed project. The Corps agreed that, where possible, mature trees in the project area would be preserved and any clearing would be done when the bats would not be present. A No Effect determination was made for potential impacts to the Indiana bat (USACE 1996).

#### **4.7 RECREATION**

The White River and the 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, which includes the property where the new proposed route leaves the original alignment as discussed in the EIS, also provides recreational opportunities to area residents. Its amenities include tennis courts, swimming pool, fitness center, gymnasium, and ballroom. This facility is not open to the public and requires a paid membership. In the most downstream section of the proposed project, Butler University property includes athletic fields, track, and gardens that provide recreation for university staff and students.

#### **4.8 CULTURAL RESOURCES**

A review of existing records on file with the Louisville District, the City of Indianapolis, and Indiana's Department of Natural Resources, Division of Historic Preservation and Archaeology (DHPA) indicates that there has been considerable consultation on the White River (North) Flood Damage Reduction Project and its affect to historic properties and/or cultural resources. The following is a summary of this consultation.

An assessment of cultural resources and historic properties affected by the project was conducted in 1994 by Dr. Bob Jeske and Mr. Larry Stillwell of Indiana University-Purdue University at Ft. Wayne (see report by Jeske and Stillwell 1995). A total of 179 acres were surveyed using a variety of field techniques such as a walkover inspection, shovel probes, bucket augering, and backhoe trenching. Eight archaeological sites were identified during the investigation, predominately in the South Warfleigh and Rocky Ripple alignments. Six of these were recommended for a Phase II Archaeological Testing of Significance, specifically 12 Ma: 630, 631, 632, 633, 634, and 635. None of these sites are located within the current project.

---

Consultation on affects to historic properties under Section 106 of the National Historic Preservation Act of 1966 (as amended) for the Phase 3B alignment was initiated on October 24, 2008. No cultural resources were identified within the proposed project based on a review of existing research and documentation. However, in a response letter dated November 20, 2008, the Indiana State Historic Preservation Officer (IN SHPO) and the DHPA recommended a reconnaissance level archaeological survey of the proposed project to determine its affects to previously unidentified archaeological resources. They also asked for information on the project's design and scope to establish the area of potential effect beyond its construction limits. Several historic structures and properties were noted in the surrounding area which they felt could be affected by the proposed project, including a National Historic Landmark (Hinkle Fieldhouse at Butler University, Site #: 097-296-11140), and National Register Eligible Properties (Butler University Historic District, Site #: 097-296-18001-042; the Karstadt House, 341 Ripple Avenue, Site #: 097-296-05977; and a single family dwelling, 337 Ripple Avenue, Site #: 097-296-05976).

A Phase I archaeological survey of the Phase 3B alignment 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, designated as 12Ma947 and 12Ma948. Significant soil disturbance was also noted within the project along the Indianapolis Water Canal Towpath, likely related to its construction. No archaeological resources were identified on the Butler University property (Snell and Snyder 2009).

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, which was identified in a disturbed soil stratum. No additional evidence of cultural features or in situ cultural materials was found as a part of this investigation.

Site 12MA948 is a historic wall feature made of cut limestone, concrete and wood. It is located on the eastern cut bank of the Indianapolis Water Canal Towpath, and likely dates to early twentieth century. No additional evidence of cultural features or in situ cultural materials were identified as a part of this investigation. The wall may be a remnant park feature (such as a walkway, landing, or overlook) related to either the Indianapolis Water Canal Towpath or Fairview Park, which is located to the south.

Based on the available information, sites 12Ma947 and 12Ma948 are ineligible for listing to the listing to the National Register of Historic Places. No further assessment of archaeological resources within the project is necessary.

A visual reconnaissance of the proposed project was undertaken on March 4, 2009 to assess its affects to above-ground historic properties mentioned in the October 24, 2008 DHPA letter. The greatest affect to these properties are located on the campus of Butler University. The proposed wall lies within a reasonable view of the Butler/Hinkle Fieldhouse, particularly during the fall and winter months when the view is not obstructed by trees and vegetation.

It was also noted that the proposed wall will extend on to Butler University property between a recreational area to the east and Holcomb Gardens: a 20-acre garden containing native Indiana plants, a statue of Persephone, and a pond. This portion of the wall is within the limits of the Butler University Historic District and would likely create a divide or boundary between the two areas. Additional consultation will be required with concerned parties to resolve these affects.

---

Conversely, the Ripple Avenue historic properties will not be affected by the proposed undertaking. Both are located on the opposite side of the canal away from the proposed project. They are obscured by vegetation and trees along to the canal, and are unlikely to be seen, directly or indirectly.

#### **4.9 HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE**

Due to the concentration of commerce and industry in Marion County, contamination of native soil may have occurred throughout the county. Sources for contamination include, but are not limited to: 1) leaking underground storage tanks, 2) accidental release of hazardous materials, 3) runoff from parking lots, and 4) runoff from outdoor industrial storage sites. In addition, the possibility of ground water contamination exists, especially in the water table aquifer. Sources for ground water contamination include, but are not limited to: 1) leaking underground storage tanks, 2) storm water drains that discharge to ponds, streams or ground water, 3) accidental release of hazardous materials, 4) legacy land disposal of hazardous materials, 5) runoff from parking lots, and 6) runoff from outdoor industrial storage sites.

An investigation was performed in order to identify parcels within the proposed project area, and to provide sufficient investigation for identifying potentially recognized environmental conditions within the area that may require further investigation or could impact project implementation.

A visual investigation of the proposed study area showed to be free of hazardous material concerns. There appeared to be 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.

An Environmental Protection Agency (EPA) Envirofacts database search was also conducted in order 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.

#### **4.10 SOCIOECONOMIC RESOURCES**

Ninety one percent of the population of Marion County, Indiana occurs within the Indianapolis metropolitan area. Both the county and city have 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 2. Economic figures for city, county, and state residents are shown in Table 3. 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 educational, health care, 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 project area affected by the proposed realignment is primarily residential with some commercial uses as well as Butler University.

---

**Table 2. Population Data for the Project Area**

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

**Table 3. Economic Data for the Project Area.**

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

#### **4.11 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 proposed right of way for the floodwall realignment along Westfield Blvd.

#### **4.12 TRANSPORTATION**

Primary roads within the proposed project corridor include Kessler Blvd, which provides access across the White River, 52<sup>nd</sup> and 53<sup>rd</sup> Streets, and the canal, and Westfield Blvd., which parallels the canal. There are also numerous residential streets and corridors within the proposed project area. The majority of the realigned section of the floodwall is between the canal and Westfield Blvd.

#### **4.13 AIR QUALITY**

In compliance with the Clean Air Act (CAA) and the 1977 and 1990 Amendments (CAAA), the US Environmental Protection Agency (EPA) has promulgated ambient air quality standards and regulations. The National Ambient Air Quality Standards (NAAQS) were enacted for the protection of the public health and welfare. To date, EPA has issued NAAQS for the following criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), particulate matter 10 micron (PM<sub>10</sub>), particulate matter 2.5 micron (Fine Particles), ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>), and lead (Pb). Areas that are below the standards are in "attainment," while those that equal or exceed the standards are in "non-attainment."

---

The 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 the gaseous pollutants (CO, O<sub>3</sub>, SO<sub>2</sub>) 24 hours a day, 7 days a week. The particulate type pollutants (Fine Particles, PM<sub>10</sub>, Pb) are collected over a 24 hour period and measured once every day (Fine Particles) to every 6th day (PM<sub>10</sub> 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 is 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 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 maintenance under the revised ozone standard, meaning a maintenance plan is being/will be implemented (IDEM 2009).

Currently Marion County has a Lead (Pb) Maintenance Plan on legal notice 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).

---

## **5.0 ENVIRONMENTAL CONSEQUENCES**

Impacts for the Proposed Action, Alternatives Eliminated from Further Evaluation, and No Action alternatives are discussed and illustrate the different consequences of the two alternatives.

### **5.1 PHYSIOGRAPHY, TOPOGRAPHY, GEOLOGY, SOILS, AND CLIMATE**

#### **5.1.1. Proposed Action**

Prior to proceeding 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. There would be no significant impacts to physiography, topography, geology, soils, or climate. If additional soil was 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.

#### **5.1.2. Alternatives Eliminated from Further Evaluation**

Neither changes in levee type (aka feature) or alternative alignments would have any significant impacts to physiography, topography, geology, soils, or climate.

#### **5.1.3 No Action**

There would be no change in physiography, topography, geology, soils, or climate with the No Action alternative. Any ongoing soils erosion or deposition due to floodwaters overtopping the riverbanks would continue.

### **5.2 WATER QUALITY**

#### **5.2.1 Proposed Action**

Temporary impacts would occur during the construction of the floodwalls. This would include installation of the gated structure across and within the canal. Construction would include dewatering the crossing site and diverting canal waters around the 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 with construction of the floodwall along the alignment paralleling the canal. This could include possible sediment and erosion with land clearing activities. With the removal of vegetation, there is potential for water quality impacts due to some loss of shade for the waterway. To ensure structural integrity and permit future inspection of the floodwall, Corps of Engineers design regulations require a root free zone within 15 feet of the floodwall. As a result, grasses will be established adjacent to the floodwall while deep-rooted vegetation would be permitted only between the limits of the easement and canal.



---

Based on visual observations and discussions with IDEM, 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 sediment and erosion would be limited in time and duration. 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 are included in Section 6, Environmental Commitments, of this EA.

### **5.2.2. Alternatives Eliminated from Further Evaluation**

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

### **5.2.3 No Action**

Water quality would continue to be impacted during flooding/high flow events as have occurred with previous floods. High water would collect materials, obstructions, and contaminants, such as sewage from overflowing collection systems and oil and gas residue from roadways, and receding waters would carry these back into the river and canal.

## **5.3 AQUATIC RESOURCES**

### **5.3.1. Proposed Action**

Impacts from the proposed project on aquatic resources would be similar to those previously mentioned in water quality. The primary concern would be due to possible erosion and sediment during construction. However, as previously stated, these would be temporary. In addition, adequate BMPs would be in place to ensure proper and effective containment of sediment and/or erosion.

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.

Access to the canal would be impeded by the erected floodwall; however the existing Westfield Blvd already serves as an impediment. The floodwall could prevent some reptile and amphibian losses due to road kill by preventing them from moving across the road. Aquatic fauna would also be removed from the footprint of the proposed crossing of the canal 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 the proposed activity would not significantly affect the limited aquatic resources.

### **5.2.2. Alternatives Eliminated from Further Evaluation**

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

---

### **5.3.3 No Action**

Impacts to aquatic resources with the no action alternative would be similar to those mentioned above with water quality and the negative impacts from flood/receding water levels.

### **5.4 WETLANDS**

As there are no wetlands in the proposed project area, there would be no impacts to wetlands with the Proposed Action, Alternatives Eliminated from Further Evaluation, or No Action alternatives.

## **5.5 TERRESTRIAL RESOURCES**

### **5.5.1. Proposed Action**

The proposed project area is primarily a maintained right-of-way between Westfield Blvd and the canal. In the most downstream end of the proposed project, between 52<sup>nd</sup> Street and the termination on Butler University, the alignment would follow an open area maintained in grasses and avoid the established boundary line of trees (Figure 4a). The final 200 to 400 feet moving upslope to tie to high ground would require removal of trees for the construction footprint (Figure 4b). In the downstream end, adjacent to the canal, this corridor is 90 to 100 feet wide and consists of mowed grass and trees (Figure 5). The uppermost end of the proposed project, 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 (Figure 6).

The largest expanse of trees and shrubs is within Butler University property. The proposed floodwall route through this area would skirt the edge of the treeline and then follow an existing path to high ground. Clearing for the levee in Freedman Park will remove riparian woods and will require mitigation acreage and plantings beyond that identified in the 1996 EIS. The remaining areas have minimal habitat present due to the urbanized setting and limited width between Westfield Blvd and the canal. In this area, the proposed levee would be constructed as far away from the canal as possible throughout its length to limit effects to terrestrial resources. Upon completion, areas between the canal and limits of the floodwall easement would be planted and allowed to revegetate. 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.

### **5.5.2 Alternatives Eliminated from Further Evaluation**

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

### **5.5.3 No Action**

There would be no impacts to terrestrial resources beyond those discussed in the EIS. Under this alternative, there would be less impacts to terrestrial resources as vegetation that was to be previously removed would remain undisturbed.

---

**Figure 3. Alignment near Butler University**



a. Route between fence and tree line



b. Approaching high ground

**Figure 4. Downstream Area along Canal Towpath**



**Figure 5. Upstream Alignment**



---

## **5.6 THREATENED AND ENDANGERED SPECIES**

### **5.6.1. Proposed Action**

With completion of the proposed project, there would be loss of some potential summer habitat for the Indiana bat. Destruction of larger, mature trees that could serve as roosting habitat would be avoided to the greatest extent possible. Overall loss of canopy and understory vegetation would be minimal as there are limited amounts currently existing within the project footprint. 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.

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 diameter, living or dead, with loose or hanging bark) not be cut from April 15 through September 15.

### **5.6.2 Alternatives Eliminated from Further Evaluation**

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

### **5.6.3 No Action**

Under the "No Action" alternative there would be less potential impact to the Indiana bat as there would be fewer trees and areas of possible habitat disturbed.

## **5.7 RECREATION**

### **5.7.1 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 could be 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 impact use of the Butler University track. However, this impact would be temporary and minimal. Impacts to the Riviera Club are expected to be minimal, as the Riviera Club has no facilities located in the proposed project area.

### **5.7.2. Alternatives Eliminated from Further Evaluation**

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

---

### **5.7.3 No Action**

Under the No Action alternative negative impacts to Butler University and Riviera Club recreational facilities and the public greenway would continue with inundation by floodwaters during high flow events.

## **5.8 CULTURAL RESOURCES**

### **5.8.1 Proposed Action**

Additional consultation and evaluation will be needed to account for affects by the proposed undertaking to the Butler University historic properties. Specifically, they are the Hinkle Field House at Butler University (which is listed as National Historic Landmark, Site #: 097-296-11140) and the Butler University Historic District (Site #: 097-296-18001-042). This effort will work toward avoiding adverse affects by the project. Documentation will be submitted to the Indiana SHPO and Secretary of Interior for review and comment. No additional historic properties will be affected by the proposed undertaking.

Inadvertent discoveries during construction will be addressed in accordance state and Federal laws and regulations. This would include ceasing all work in the area of discovery and appropriate notification, assessment, and consultation with the appropriate parties.

### **5.8.2. Alternatives Eliminated from Further Evaluation**

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

### **5.8.3. No Action**

There would be no impacts to cultural resources beyond those discussed in the EIS. Under this alternative, there would be less impacts to cultural resources as areas that were to be disturbed or have vegetation removed would remain as is.

## **5.9 HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE**

A visual site inspection was conducted of the proposed project area. In addition a database search was conducted. There are no environmental concerns regarding hazardous materials identified at the proposed project site. Therefore none of the alternatives would have any impact.

## **5.10 SOCIOECONOMIC RESOURCES**

### **5.10.1 Proposed Action**

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.

---

## 5.10.2 Alternatives Eliminated from Further Evaluation

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

## 5.10.3 No Action

Under the No Action alternative, the City of Indianapolis would continue to experience damages from floodwaters. The expenses incurred would negatively impact the city, state, and individual property owners due to damages and repair and decreased property values. In addition, the monies spent by the City and Federal government to date for other phases of the floodwall/levee system would be lost as the entire White River (North) Flood Damage Reduction Project would be jeopardized without a completion of the final phase.

## 5.11 LAND USE / AESTHETICS

### 5.11.1 Proposed Action

The proposed project would change the aesthetics of the area by removal of some 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. In previous phases of the flood damage reduction study, floodwalls have been designed with a facing or texture similar to native stone and/or colored to blend with the surrounding topography (See Figure 6). These efforts would be incorporated for the proposed project.

### 5.11.2 Alternatives Eliminated from Further Evaluation

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

**Figure 6. Existing Floodwall Design**



---

### **5.11.2 No Action**

Land use/aesthetics would remain as is as no vegetation would be removed. Aesthetic impacts associated with flooding and high waters, such as deposition of trash, silt, and debris, would continue to occur and negatively affect the proposed project area.

## **5.12 TRANSPORTATION**

### **5.12.1 Proposed Action**

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.

### **5.12.2 Alternatives Eliminated from Further Evaluation**

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

### **5.12.2 No Action**

Impacts previously occurring during flooding or high water events would continue to negatively affect roadways and traffic patterns.

## **5.13 AIR QUALITY**

### **5.13.1 Proposed Action**

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. During construction, best management practices (BMP) would be implemented in accordance with state regulations to minimize fugitive dust emissions and to remove mud and soil tracked onto adjacent roadways. Activities with the construction of the proposed project would not significantly affect the air quality indices for Marion County; conversely, impacts to air quality would be minor and temporary.

### **5.13.2 Alternatives Eliminated from Further Evaluation**

The proposed action will complete the levee. Alternative alignments therefore must be in the immediate vicinity. As such, these alternative alignments would have the same impacts as the proposed action.

---

### 5.13.3 No Action

Under the No Action alternative, there would be no change to existing air quality.

### 5.14 CUMULATIVE IMPACTS

Cumulative impacts would result from the incremental impact of the proposed action when added to those of other past, present and reasonably foreseeable future actions in the local area. Geographical boundaries for this discussion of cumulative impacts are the White River watershed. Temporal boundaries established span from the 19<sup>th</sup> century when the Indianapolis Water Canal was built to fifty years future projection.

#### Past and Present Actions

Although the sandy, shallow conditions of the White River prevented the river 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 20<sup>th</sup> century and remains as the state's largest city as well as its capital. Urbanization followed during the second half of the century (Wikipedia 2008) with Indianapolis, Muncie, and Anderson being the primary cities of development (USGS 2001).

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

With urbanization came pollution to the White River. In the City of Muncie alone, wastewater treatment plants, combined sewer overflows, raw sewage discharges, foundries, steel mills, and various other point source pollutants' discharges reached the White River unregulated (Muncie 2008). Urbanization of the Indianapolis area had similar impacts to the river and watershed.

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 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 (Wikipedia 2008).

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 impacts to agriculture and residential and commercial facilities. This has encouraged use and expansion in previously flood prone areas.



---

The Indianapolis 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 19<sup>th</sup> 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 (Wikipedia 2009a).

A section of canal, which is beyond the project area and located more in the downtown area of Indianapolis, runs through White River State Park, an urban cultural state park. Restoration of this area was undertaken in the 1980s and was centered around the canal. (Wikipedia 2009b). This section of the canal has undergone major renovations to improve the aesthetics and is now a park-like setting with a reflection pool and is the focal point of many downtown area events (Hagan 2008). The canal towpath is also part of the Indianapolis Greenways Plan and is used by walkers, joggers, and cyclists (Greenways 2009). The canal has been historically dredged for the restoration mentioned above as well as to maintain depths for water withdrawal for water supply (Hagan 2008).

#### 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 outside the traditional city boundaries may result in change of some agricultural land to residential development. Erosion from residential developments and pesticide residue from residential and agricultural use are likely to continue as a major contributors of non-point source (NPS) pollution. NPS pollution will likely continue as one of the leading impacts to water quality as this is a nationwide concern for water resources.

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).

Dredging of the Indianapolis Water Canal, or sections of the canal, are expected to continue in order for the canal to provide a source for the city's municipal water supply.

#### Effects

**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. In addition, the city participates with Federal Emergency Management Agency (FEMA), therefore they have

---

enforceable floodplain ordinances in place that would further reduce flood damages in the future.

**Land Use Changes.** As mentioned above, 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 FEMA regulations and guidance. Therefore, future development is most likely to be in the form of redevelopment of previously used properties.

**Terrestrial Resources.** Implementation of the proposed project would have an minimal impact to terrestrial resources as the habitat directly affected is limited. 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.

**Aquatic Resources and Water Quality.** Alleviation of flooding would reduce the influx of sediments and contaminants as waters return to the creek. Continued dredging of the canal by the city would cause temporary impacts to aquatic resources and water quality during dredging operations. Aquatic fauna would likely experience temporary setbacks in numbers and colonization with dredging operations. NPS pollution would continue to be a water quality concern regardless of the implementation of the proposed project. Public awareness for conservation and protection of natural resources is growing and could help reverse negative impacts from NPS pollution.

**Cultural Resources.** Currently, no adverse affects 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.

**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. Revitalization of the area would provide economic and social benefits.

**Summary.** 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.

---

## **6.0 ENVIRONMENTAL COMMITMENTS**

### **6.1 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.

### **6.2 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 plans and specifications result in significant changes from those outlined in the Environmental Assessment and/or Indiana Department of Environmental Management Water Quality Certification, the NEPA process would be revisited.

### **6.3 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.

### **6.4 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.

### **6.5 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.

---

## **7.0 AGENCY COORDINATION AND ENVIRONMENTAL COMPLIANCE**

Preparation and circulation of this EA includes coordination with local, state and Federal government agencies. This process includes review of the EA and unsigned Finding of No Significant Impact (FONSI).

Compliance with environmental laws and regulations required for the Proposed Action are identified below and summarized in Table 4.

### **7.1 CLEAN WATER ACT**

#### **7.1.2 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 original EIS. All current and completed construction is in compliance with that evaluation. The contents of this EA update and/or supplement the information provided therein.

#### **7.1.2 Section 401**

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.

#### **7.1.3 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 permit would be requested within one year of the anticipated start of construction.

### **7.2 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. 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.

### **7.3 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 to this EA.

#### **7.4 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 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, habitat for the endangered Indiana bat may be affected. However, the impacts would be minimized to the greatest extent possible through the preservation of mature trees to the greatest extent possible. Mitigation lands and plantings will preserve current habitat and provide future habitat for the bat and other species. Therefore, the Corps believes the proposed realignment would not adversely affect the Indiana bat. This finding has been provided to the US Fish and Wildlife Service for their consideration.

#### **7.5 NATIONAL HISTORIC PRESERVATION ACT**

Section 106 of the 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 the 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.

#### **7.6 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.

## 7.7 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.

## 7.8 OTHER STATE AND LOCAL APPROVALS

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

## 7.9 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 4 below.

**Table 4: 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	Requested	C
NPDES	Obtained prior to construction	C
Fish and Wildlife Coordination Act	Requested	C
Endangered Species Act	No affect	C
National Historic Preservation Act	No affect	C
Environmental Justice (EO 12898)	No affect	C
Clean Air Act	No affect	C
Comprehensive Environmental Response Compensation and Liability Act (CERCLA)		As Necessary
Resource Conservation and Recovery Act (RCRA)		N/A
Wild and Scenic Rivers Act		N/A
<b>Other:</b>		
Local approval for work within floodway		As Necessary
N/A—not applicable C--Compliant		

---

## **8.0 PUBLIC INVOLVEMENT**

Preparation of the EA includes agency and public notification of the proposal and an opportunity for agency and public review and comment prior to agency decision making. This EA is being circulated to local, state, and Federal governmental agencies with jurisdiction by law or special expertise and members of the public for a 30-day review/comment period.



---

## 9.0 DETERMINATION AND CONCLUSION

### FINDING OF NO SIGNIFICANT IMPACT

I have reviewed and evaluated, in light of the overall public interest, the documents and factors concerning this EA and proposed component of the Indianapolis, White River (North) Flood Damage Reduction Project, authorized by the Flood Control Act of 1936, as amended by the FCA of 1948, as well as the stated views of other interested agencies and the concerned public. In doing so, I have considered the possible consequences of the proposed project in accordance with regulations published in 33 CFR Parts 230 (Corps of Engineers Regulations) and 40 CFR 1500-1508 (Council for Environmental Quality Regulations). The following paragraphs provide my conclusion and how the action complies with the above-cited regulations.

I believe that the proposed project is environmentally sustainable. I believe that this action will not result in any significant adverse impact to the environment. In fact it has several positive impacts to such. I believe that this proposed action does not constitute a major federal action that would result in any irretrievable or irreversible losses to aquatic or terrestrial resources. Additionally, it would not significantly affect the quality of the human environment. This constitutes a Finding of No Significant Impact (FONSI). As a consequence, I find that an Environmental Impact Statement is not required by provision of Section 102 of the National Environmental Policy Act Public Law 91-190, or 42 USC 4332, or by applicable implementing Corps of Engineers regulations and guidance. This FONSI was prepared in accordance with 33 CFR 230 and 40 CFR 1500-1508.

KEITH A. LANDRY  
Colonel, Corps of Engineers  
District Commander

---

## 10.0 REFERENCES

Bell, Charles. February 9, 2009. [Personal Communication]. Located at: Indiana Department of Environmental Management (IDEM), Assessment Information Management System (AIMS) Database, Indianapolis, Indiana.

Greenways Foundation, 2008. Central Canal Towpath. [www.indygreenways.com/news/masterplan/central\\_canal\\_towpath.pdf](http://www.indygreenways.com/news/masterplan/central_canal_towpath.pdf).

Hagan, Max. December 31, 2008. Personal Communication with Mr. Hagan, US Army Corps of Engineers Regulatory Branch, Indianapolis Office, Indianapolis, Indiana.

Indiana Department of Environmental Management, 2008. Air Quality Monitoring. [www.in.gov/idem/4656.html](http://www.in.gov/idem/4656.html).

Indiana Administrative Code, Article 2 Water Quality Standards, 2009. [www.in.gov/legislative/iac/T03270/A00020.pdf](http://www.in.gov/legislative/iac/T03270/A00020.pdf).

Indianapolis Department of Public Works, 2009. Air Monitoring. <http://www.indy.gov/eGov/City/DPW/Environment/AirQuality/AirMonitoring/Pages/home.aspx>

Jeske, Robert J. and Larry N. Stillwell 1995. A Phase I Archaeological Survey And Subsurface Reconnaissance of the Indianapolis North Flood Control Project Area in Marion County, Indiana. Report prepared by Indiana University-Purdue University at Ft. Wayne for the Louisville District-U.S. Army Corps of Engineers.

Muncie Sanitation District, 2008. Bureau of Water Quality White River Timeline. [www.munciesanitary.org](http://www.munciesanitary.org).

Snell, Samuel P. and Jim Snyder. Phase I Archaeological Survey for Phase 3B Realignment for the Indianapolis, White River (North) Flood Damage Reduction Project in Washington Township, Marion County, Indianapolis, Indiana. Report prepared by ASC Group, Inc. for the Louisville District-U.S. Army Corps of Engineers.

Sobat, Stacey L. February 6, 2009. [Personal Communication]. Located at: Indiana Department of Environmental Management (IDEM), Assessment Information Management System (AIMS) Database, Indianapolis, Indiana.

Stahl, Jim. February 12, 2009. [Personal Communication]. Located at: Indiana Department of Environmental Management (IDEM), Assessment Information Management System (AIMS) Database, Indianapolis, Indiana.

US Army Corps of Engineers, 1996. Indianapolis North Flood Damage Reduction Feasibility Study, Indianapolis, Indiana, General Reevaluation Report and Final Environmental Impact Statement. September 1996. Louisville District, Louisville, Kentucky.

US Census Bureau, 2008. Census information on website [www.quickfacts.census.gov](http://www.quickfacts.census.gov)

US Fish and Wildlife Service (USFWS), 2009. Indiana County Distribution of Federally-Listed Threatened, Endangered, Proposed, and Candidate Species. <http://www.fws.gov/midwest/Endangered/lists/indiana-cty.html>

---

USFWS, 2007. Indiana Bat (*Myotis sodalis*) Draft Recovery Plan: First Revision. April 2007. Department of the Interior, US Fish and Wildlife Service, Great Lakes-Big Rivers Region—Region 3, Fort Snelling, Minnesota.

USFWS, 1995. Correspondence from USFWS Bloomington Field Office to USACE, Louisville District. May 9, 1995.

USFWS, 1992. Correspondence from USFWS Bloomington Field Office to USACE, Louisville District. November 30, 1992.

US Geological Survey (USGS), 1998. WO-1-98. Ecoregions of Indiana and Ohio. USGS, Reston, VA.

USGS, 2001. National Water Quality Assessment Program: White River Basin Study. <http://in.water.usgs.gov/nawqa/wr0002.htm>.

Wikipedia 2009a. Indiana Central Canal. [http://en.wikipedia.org/wiki/Indiana\\_Central\\_Canal](http://en.wikipedia.org/wiki/Indiana_Central_Canal).

Wikipedia 2009b. White River State Park. [http://en.wikipedia.org/wiki/White\\_River\\_State\\_Park](http://en.wikipedia.org/wiki/White_River_State_Park).

Wikipedia 2008. Indianapolis, Indiana. [www.wikipedia.org](http://www.wikipedia.org).

---

## 11.0 LIST OF PREPARERS

The following personnel prepared portions of and/or reviewed this EA:

Kim Franklin, Biologist  
NEPA Document Preparation

Keith Keeney, Archaeologist  
Cultural Resources Coordination

Mike Holley, Project Manager  
Background and Design Information

Sharon Logsdon, Biologist  
Independent Technical Review

Mike Turner, Ecologist  
Chief, Environmental Resources Section