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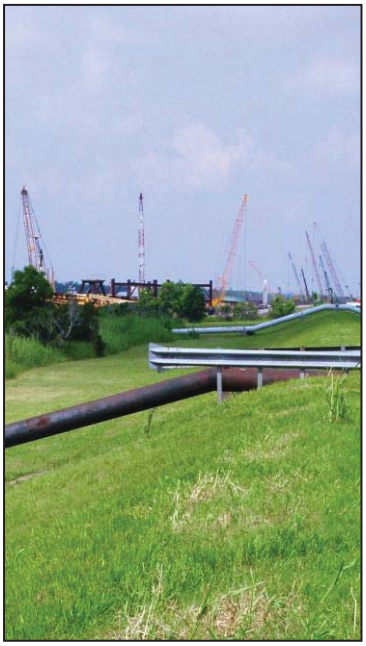
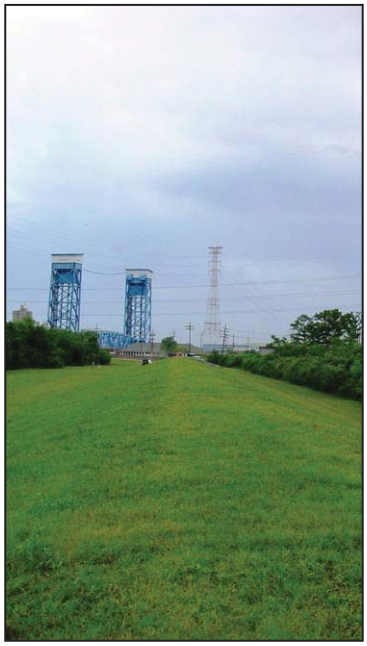
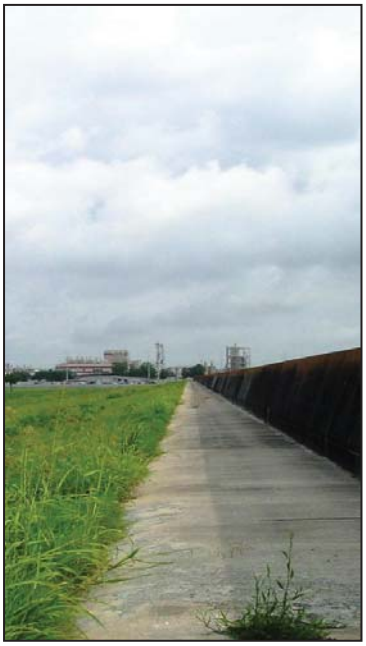
INDIVIDUAL ENVIRONMENTAL REPORT SUPPLEMENTAL

IMPROVED PROTECTION ON THE INNER HARBOR NAVIGATION CANAL

ORLEANS AND ST. BERNARD PARISHES, LOUISIANA

IERS #11.b – TIER 2 BORGNE - IHNC



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1.0 INTRODUCTION

The United States (U.S.) Army Corps of Engineers (USACE)-Mississippi Valley Division, New Orleans District (CEMVN) has prepared this *Individual Environmental Report Supplemental (IERS) #11.b – Tier 2 Borgne – Improved Protection on the Inner Harbor Navigation Canal (IHNC), Orleans and St. Bernard Parishes, Louisiana*, referred to as IERS #11.b – Tier 2 Borgne – IHNC in the remainder of this report. This IERS has been prepared to evaluate the potential impacts associated with restoring and reinforcing approximately 4.6 miles (mi) of non-contiguous IHNC and Gulf Intracoastal Waterway (GIWW) levees and floodwalls in Orleans Parish, Louisiana. This document is the second supplement to *Individual Environmental Report #11 (IER #11) – Tier 2 Borgne - Improved Protection on the Inner Harbor Navigation Canal, Orleans and St. Bernard Parishes, Louisiana* (USACE 2008a), and evaluates strengthening secondary flood risk reduction structures against water that could potentially enter the GIWW and IHNC from overtopping of the primary risk reduction system, and internal rainfall. Evaluation of deficient segments of the IHNC Hurricane Storm Damage Risk Reduction System (HSDRRS) were divided into three reaches (Reach 1, 2, and 3; figure 1) based on the sub-basins that are protected by the existing flood risk reduction system.

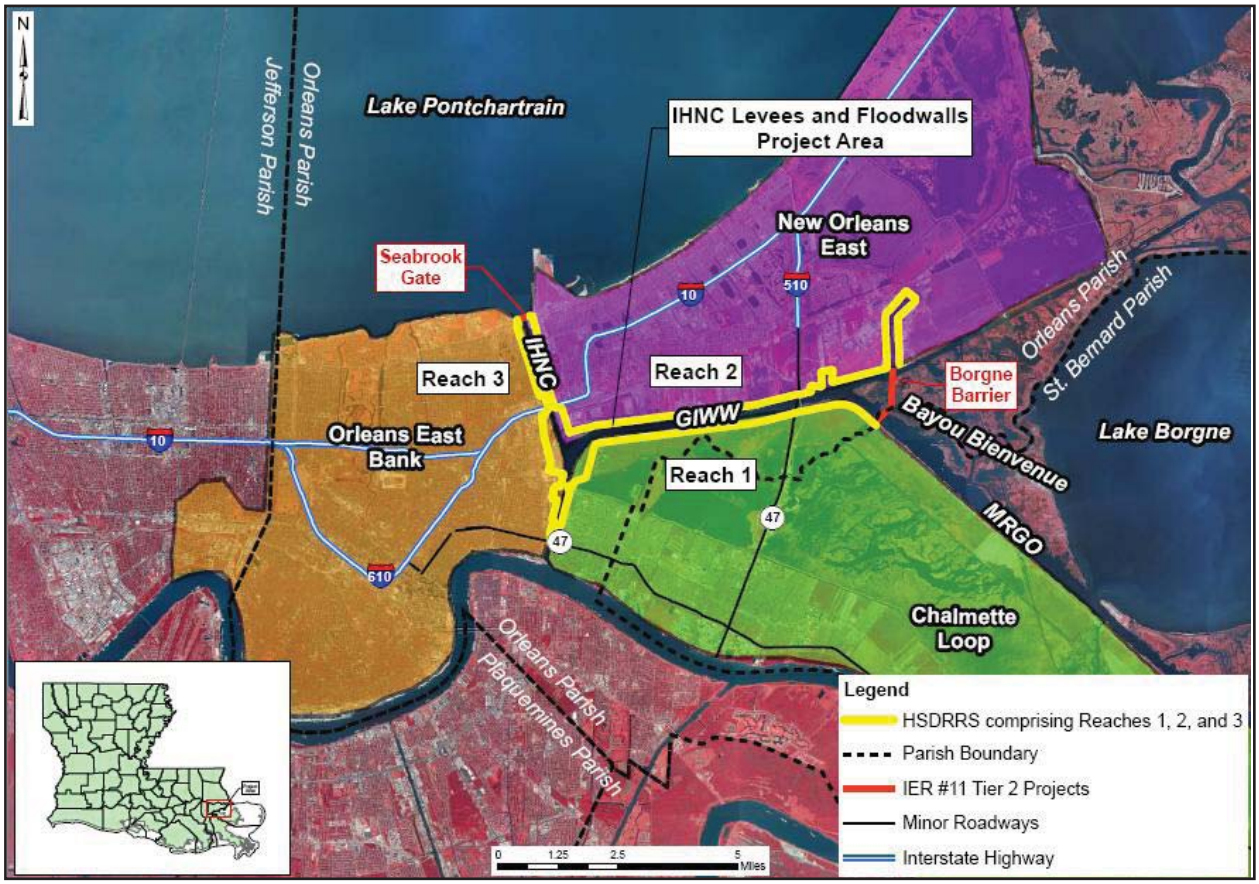

Figure 1. Project Area Map Showing the Location of Sub-basins and Reaches 1, 2, and 3

IERS #11.b – Tier 2 Borgne - IHNC was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA) and the Council on Environmental Quality (CEQ)'s

Regulations (40 Code of Federal Regulations [CFR] 1500-1508), as reflected in the USACE Engineering Regulation (ER) 200-2-2, Environmental Quality, Procedures for Implementing NEPA (33 CFR 230). The proposed action is located in southeastern Louisiana and is part of the Federal effort to rebuild and complete construction of the HSDRRS in the New Orleans Metropolitan Area as a result of Hurricanes Katrina and Rita.

1.1 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of this project is to provide 100-year level risk reduction to the New Orleans Metropolitan Area by restoring and reinforcing existing HSDRRS features along the IHNC and GIWW to meet current HSDRRS design guidelines for safety and stability (USACE 2008b). The term "100-year level of risk reduction," as it is used throughout this document, refers to a level of risk reduction which reduces the risk of hurricane surge and wave-driven flooding that the New Orleans Metropolitan area has a 1 percent chance of experiencing each year. Approximately 33 mi of levees and floodwalls (I-walls, T-walls, L-walls), and closure gate structures within this corridor were examined against HSDRRS seepage and stability criteria. Of the 33 mi, 21 sections of secondary protection totaling approximately 4.6 mi were identified as not meeting the HSDRRS seepage and stability criteria and have been proposed for restoration to improve flood risk reduction. With the construction of the Borgne Barrier and Seabrook Gate (figure 1) underway, these reaches will no longer be the primary line of defense for these areas. However, these floodwalls and levees are part of the HSDRRS and are required to meet HSDRRS Engineering Standards in order for the system to be certified under the National Flood Insurance Program.

1.2 AUTHORITY FOR THE PROPOSED ACTION

The proposed action was authorized by the Department of Defense (DoD), Emergency Supplemental Appropriations to Address Hurricanes in the Gulf of Mexico, and Pandemic Influenza Act of 2006 (3rd Supplemental – Public Law [PL] 109-148, Chapter 3, Construction, and Flood Control and Coastal Emergencies) and the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (PL 109-234; 4th Supplemental). Additional funding was provided in the Fiscal Year 2008 Emergency Supplemental Funding, PL 110-252 (6th Supplemental).

1.3 PRIOR REPORTS

Several reports related to HSDRRS in the vicinity of the proposed action have been prepared by the USACE, other Federal, state, and local agencies, research institutes, and individuals. Pertinent studies, reports, and projects are summarized below:

- On 7 October 2010, the CEMVN Commander signed a Decision Record on IER #27 entitled, "Outfall Canal Remediation on the 17th Street, Orleans Avenue and London Avenue Canals, Jefferson and Orleans Parishes, Louisiana." The document was prepared to evaluate the potential impacts associated with strengthening of floodwalls along these three outfall canals.

- On 1 April 2010, the CEMVN Commander signed a Decision Record on IER #11 Tier 2 Pontchartrain entitled "Improved Protection on the Inner Harbor Navigation Canal, Tier 2 Pontchartrain, Orleans Parish, Louisiana." The document was prepared to evaluate the potential impacts associated with the proposed construction of a storm surge risk reduction structure on the IHNC where it meets Lake Pontchartrain at Seabrook.

- On 22 January 2010, the CEMVN Commander signed a Decision Record on IER #32 entitled, "Contractor Furnished Borrow Material #6, Ascension, Plaquemines, and St.

Charles Parishes, Louisiana." The document was prepared to evaluate the potential impacts associated with the possible excavation of seven proposed contractor furnished borrow areas.

- On 10 December 2009, the CEMVN Commander signed a Decision Record on IER Supplemental #11 Tier 2 Borgne entitled "Improved Protection on the Inner Harbor Navigation Canal, Orleans, and St. Bernard Parishes, Louisiana." The document evaluates the potential effects associated with proposed project revisions to the original IER #11 Tier 2 Borgne gate design at Bayou Bienvenue.

- On 28 September 2009, the CEMVN Commander signed a Decision Record on IER #30 entitled, "Contractor Furnished Borrow Material #5, St. Bernard and St. James Parishes, Louisiana, and Hancock County, Mississippi." The document evaluates the potential impacts associated with the possible excavation of three proposed contractor furnished borrow areas.

- On 8 September 2009, the CEMVN Commander signed a Decision Record on IER #29 entitled, "Contractor Furnished Borrow Material #4, Orleans, St. John the Baptist, and St. Tammany Parishes, Louisiana." The document evaluates the potential effects associated with the possible excavation of three proposed contractor furnished borrow areas.

- On 31 July 2009, the CEMVN Commander signed a Decision Record on IER #28 entitled, "Government Furnished Borrow Material #4, Plaquemines, St. Bernard, and Jefferson Parishes, Louisiana." The document evaluates the potential impacts associated with the possible excavation of two government furnished borrow areas, and an access road to a previously approved government furnished borrow area.

- On 3 February 2009, the CEMVN Commander signed a Decision Record on IER #25 entitled "Government Furnished Borrow Material #3, Orleans, Jefferson, and Plaquemines Parishes, Louisiana." The document was prepared to evaluate the potential impacts associated with the possible excavation of four government furnished borrow areas.

- On 21 October 2008, the CEMVN Commander signed a Decision Record on IER #11 Tier 2 Borgne entitled "Improved Protection on the Inner Harbor Navigation Canal, Tier 2 Borgne Orleans and St. Bernard Parishes, Louisiana." The document was prepared to evaluate the potential impacts associated with constructing a surge barrier near Lake Borgne.

- On 20 October 2008, the CEMVN Commander signed a Decision Record on IER #26 entitled "Pre-Approved Contractor Furnished Borrow Material #3, Jefferson, Plaquemines, and St. John the Baptist Parishes, Louisiana, and Hancock County, Mississippi." The document was prepared to evaluate the potential impacts associated with the actions taken by commercial contractors as a result of excavating borrow areas for use in construction of the HSDRRS.

- On 30 May 2008, the CEMVN Commander signed a Decision Record on IER #22 entitled "Government Furnished Borrow Material #2, Jefferson and Plaquemines Parishes, Louisiana and Hancock County, Mississippi." The document was prepared to evaluate the potential impacts associated with the actions taken by the USACE while excavating borrow areas for use in construction of the HSDRRS.

- On 5 May 2008, the CEMVN Commander signed a Decision Record on IER #23 entitled "Pre-Approved Contractor Furnished Borrow Material #2, St. Bernard, St. Charles, Plaquemines Parishes, Louisiana, and Hancock County, Mississippi." The document was prepared to evaluate the potential impacts associated with the actions taken by commercial contractors as a result of excavating borrow areas for use in construction of the HSDRRS.

- On 21 February 2008, the CEMVN Commander signed a Decision Record on IER #18 entitled "Government Furnished Borrow Material, Jefferson, Orleans, Plaquemines, St. Charles, and St. Bernard Parishes, Louisiana." The document was prepared to evaluate the potential impacts associated with the actions taken by the USACE as a result of excavating borrow areas for use in construction of the HSDRRS.

- On 14 February 2008, the CEMVN Commander signed a Decision Record on IER #19 entitled "Pre-Approved Contractor Furnished Borrow Material, Jefferson, Orleans, St. Bernard, Iberville, and Plaquemines Parishes, Louisiana, and Hancock County, Mississippi." The document was prepared to evaluate the potential impacts associated with the actions taken by commercial contractors as a result of excavating borrow areas for use in construction of the HSDRRS.

- On 24 July 2006, the CEMVN Commander signed a Finding of No Significant Impact (FONSI) on Environmental Assessment (EA) #433 entitled "U.S. Army Corps of Engineers Response to Hurricanes Katrina & Rita in Louisiana." The document was prepared to evaluate the potential impacts associated with the actions taken by the USACE as a result of Hurricanes Katrina and Rita in southern Louisiana.

- The final Environmental Impact Statement (EIS) for the Lake Pontchartrain and Vicinity (LPV) Hurricane Protection Project was published in August 1974. A Statement of Findings was signed by the CEMVN Commander on 2 December 1974. Final Supplement I to the EIS, dated July 1984, was followed by a Record of Decision (ROD), signed by the CEMVN Commander on 7 February 1985. Final Supplement II to the EIS, dated August 1994, was followed by a ROD signed by the CEMVN Commander on 3 November 1994.

1.4 PUBLIC CONCERNS

Throughout southern Louisiana, one of the greatest areas of public concern is reducing the risk of hurricane, storm, and flood damage for businesses and residences and providing for public safety during major storm events. Hurricane Katrina forced residents from their homes, temporarily or permanently closed businesses and, due to extensive flooding, made returning to communities in a timely manner unsafe. A public meeting for IERS #11.b - Tier 2 Borgne was held on 13 October 2010, and a second public meeting is scheduled for October 26th at 6:00 pm at the St. Maria Goretti Church, 7300 Crowder Boulevard, New Orleans, Louisiana, 70127.

In public meetings held for IERs #11 Tier 2 Borgne and Tier 2 Pontchartrain (USACE 2008a and 2010a), citizens in both Orleans and St. Bernard Parishes expressed concern over inadequate HSDRRS in the area. Public concerns were raised regarding potential social impacts that may be experienced during construction, including increased noise, damage to transportation infrastructure from construction vehicles, and disruption of historical and cultural resources, as well as concerns for potential land use restrictions.

Citizens requested that the CEMVN consider any impacts the project might have on the water table, and warned that groundwater could be contaminated if pipelines carrying chemicals were damaged during construction. Comments were also voiced about the possible hazards of construction in and near residential streets where children play.

Concerns about flood risk reduction during construction were raised, particularly with regard to timelines of projects in the area, the closure structures on the GIWW (IER #11 Tier 2 Borgne), and projects along the IHNC, specifically the east and west wall modifications. Business representatives were concerned about flooding and stress to existing floodwalls from rising water as a result of closing the GIWW, and they expressed interest in the construction of a pump in the

IHNC to alleviate potential flooding during a storm event from the existing pumps that drain into the IHNC.

2.0 PROPOSED ACTION AND ALTERNATIVES

NEPA requires Federal agencies to rigorously explore and objectively evaluate all reasonable alternatives including the potential for taking "no action" in their alternatives analysis.

2.1 DESCRIPTION OF THE PROPOSED ACTION

The proposed action consists of restoring and reinforcing portions of levees and floodwalls that do not meet the necessary factors of safety for stability and seepage, as dictated by current HSDRRS design guidelines (USACE 2008b). These guidelines can be found at http://www.mvn.usace.army.mil/ENG/PageA.asp. The levees and floodwalls within the project area provide a level of risk reduction that is currently below the 100-year level of risk reduction. After construction of the Borgne Barrier (as described in IER #11 Tier 2 Borgne) and the Seabrook Gate (as described in IER #11 Tier 2 Pontchartrain) and once the structures are operational, the IHNC and GIWW reaches would become a secondary risk reduction feature required to withstand water levels caused by pump station outflow, overtopping of the primary risk reduction system, and internal rainfall. The design guidelines used to determine the current safety factors assume that water levels within the IHNC are at 8 feet (ft; North American Vertical Datum of 1988 [NAVD88]) corresponding to a 100-year level hurricane event and 12 ft corresponding to a 500-year level hurricane event.

The project area lies completely within Orleans Parish; however, it defines the dividing line for three sub-basins of the larger Pontchartrain Basin: Orleans East Bank, New Orleans East, and Chalmette Loop (St. Bernard Parish) (figure 1). The HSDRRS within this corridor is composed of various features that provide risk reduction to the three sub-basins, including earthen levees, I-walls, L-walls, T-walls, and closure gates that extend along the IHNC from the IHNC Lock to the Seabrook Bridge at Lake Pontchartrain and along the GIWW from the IHNC to the Michoud Canal near the Borgne Barrier in eastern New Orleans. The project area is divided into three primary reaches, each of which contains deficient segments of levees and floodwalls (figure 2). Detailed figures of each deficient segment included in the proposed action, and their right-of-ways (ROWs), are provided in appendix B.

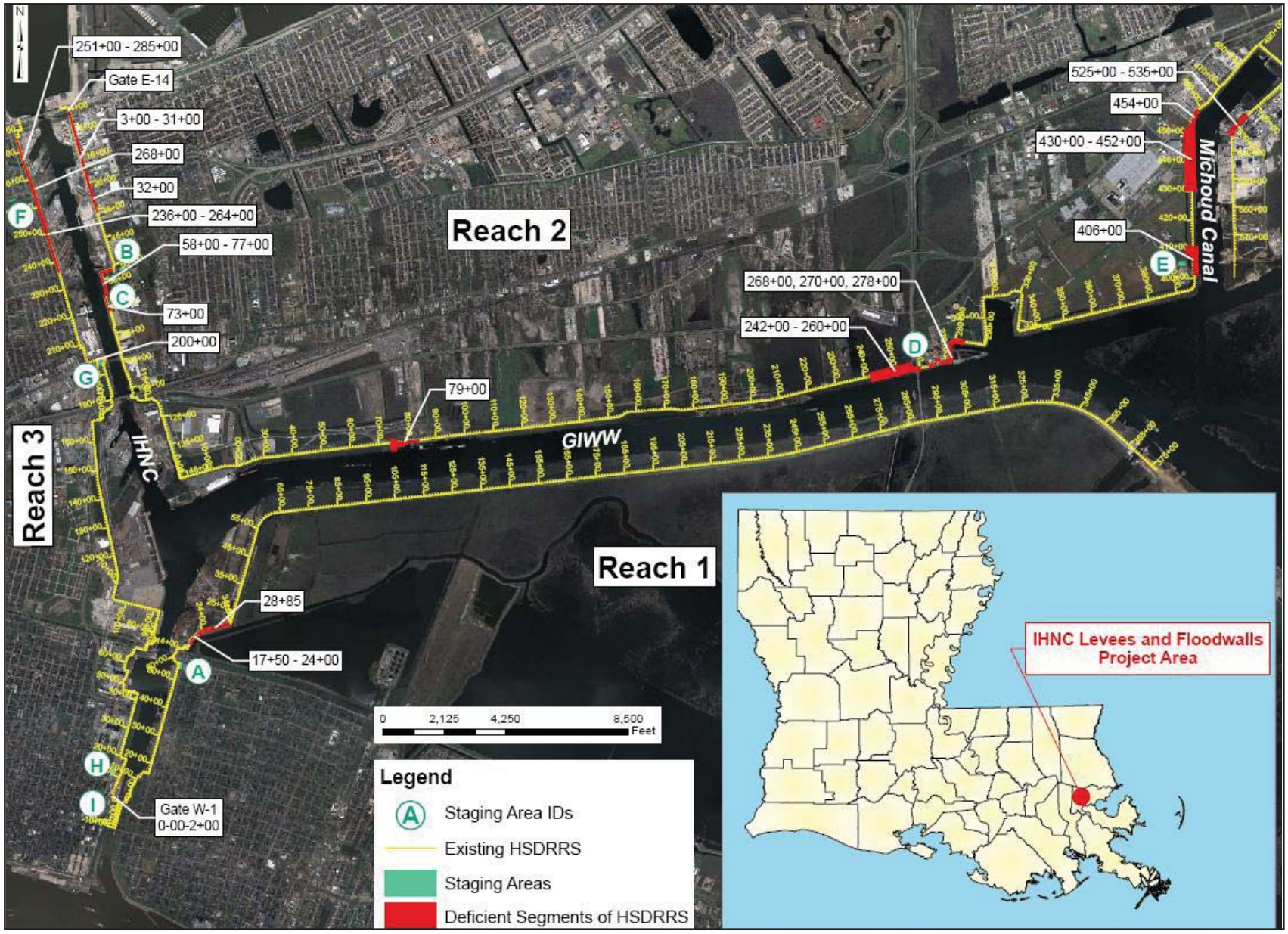

Figure 2. Map of Project Area Showing Deficient Segments of Levees and Floodwalls

2.1.1 Description of Restoration/Reinforcement Methods

Several methods of restoration/reinforcement, all of which would be built entirely within existing ROWs, would be used to address deficiencies within the subject reaches. These construction methods include the following:

Deep Soil Mixing

Deep soil mixing (DSM), a stabilization method that uses cement, lime, slag, other pozzolonic materials, and combinations of these stabilizers to increase the strength and stiffness of soft or loose ground, is a proposed and alternate reinforcement method at six deficient segments of the HSDRRS in the project area. DSM introduces panels of engineered grout or reagent into the underlying soils to modify their physical and chemical characteristics without excavation (see figure 3). The stabilizers are blended into the ground using a variety of mixing tools.

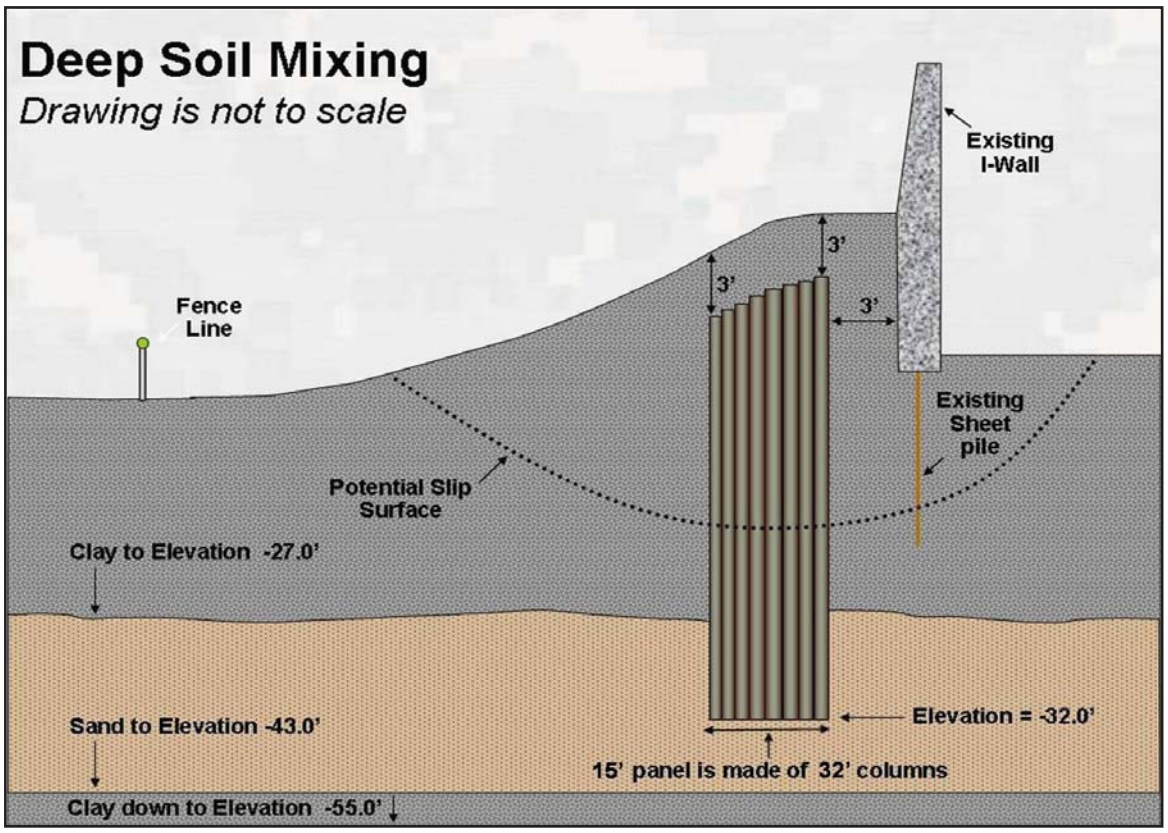

Figure 3. Conceptual Figure of Deep Soil Mixing

DSM would be used to improve the existing earthen embankment on the protected side of the levee or I-wall by installing soilcrete columns. Although, the exact dimensions of reinforcement methods cannot be determined until the final design is complete, DSM typically consists of soil mix columns arranged in rows or panels oriented perpendicular to the levee or I-wall. A typical DSM remediation could consist of eight 32-ft long soil-mixing columns in a row that overlap each other by approximately 6 inches, giving the panels a width of 15 ft. Each set of panels (columns) typically has 8 ft of space between them (figure 4).

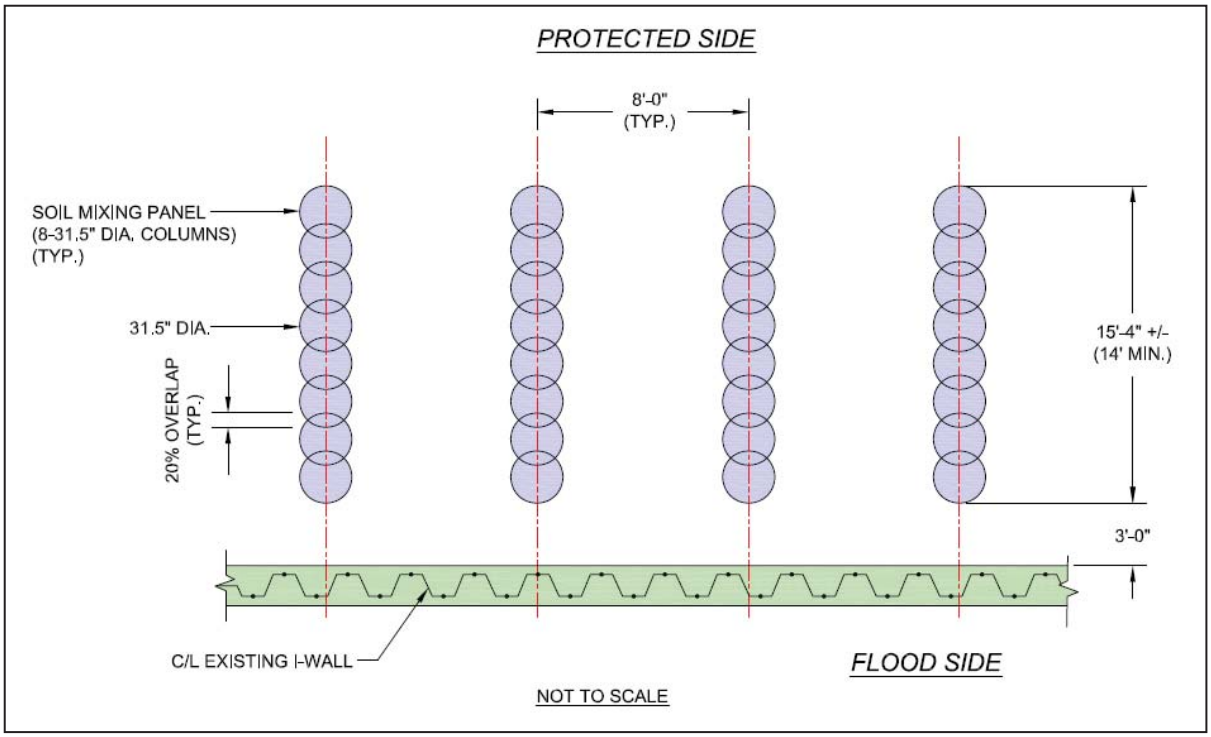

Figure 4. Soil Mixing Diagram Illustrating the Layout of Soil Mixing Panels along the Protected Side of an I-wall

Berm

Berms constructed for this project would consist of soil added to the protected side toe of a levee or floodwall to decrease the risk of failure as a result of stability and/or seepage issues (photo 1). Berms can be used to add extra weight to an area where a stability issue has been encountered and/or to place low-permeability material over a levee to mitigate a seepage problem. Approximately 16,000 cubic yards (cy) of government-approved borrow would be placed on the protected side of five deficient sections of the HSDRRS to increase stability and control seepage. Seepage berms are infrequently used in conjunction with floodwalls since floodwalls are often constructed in areas where ROW availability or cost is insufficient for levee construction (USACE 1989). However, the existing ROW for the floodwalls at stations 73+00, 79+00, 242+00 to 260+00, and 525+00 to 535+00 (Reach 2) offers enough space for stability berms to be built without requiring

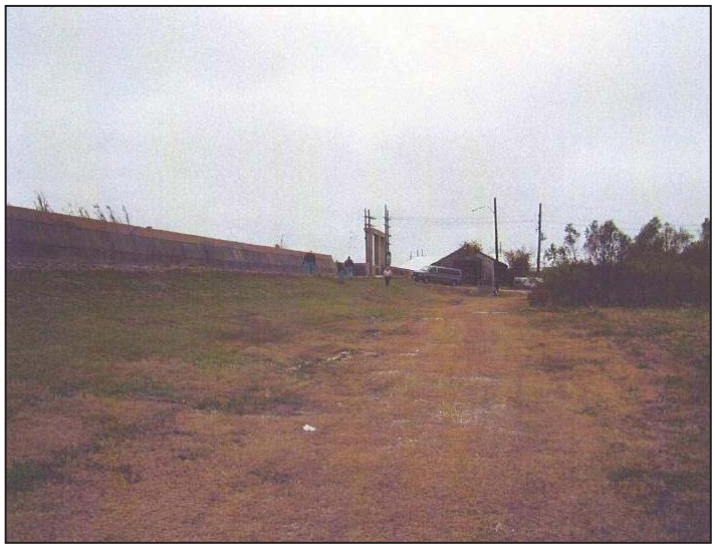

Photo 1. Example of a Berm (area of brown grass)

additional ROW. All proposed berms would have an approximate width of 25 ft, a height of 3 ft, and would be placed at the toe on the protected side of the levee or floodwall. Berms would be constructed to the estimated lengths provided for each station in tables 1 through 3. The embankment would be reseeded with turf grass upon completion.

Buttress Wall

A concrete buttress wall is an addition to an existing I-wall, which is constructed by driving piles, setting forms against (behind) the existing floodwall structure, and placing a concrete slab on the protected side of the floodwall. The new buttress pilings (vertical and batter piles) are installed at intervals directly against the existing walls to assist in resisting the floodwall or levee load (figure 5). Buttress walls are the proposed or alternate reinforcement method for approximately 13 sections of flood risk reduction within the project area.

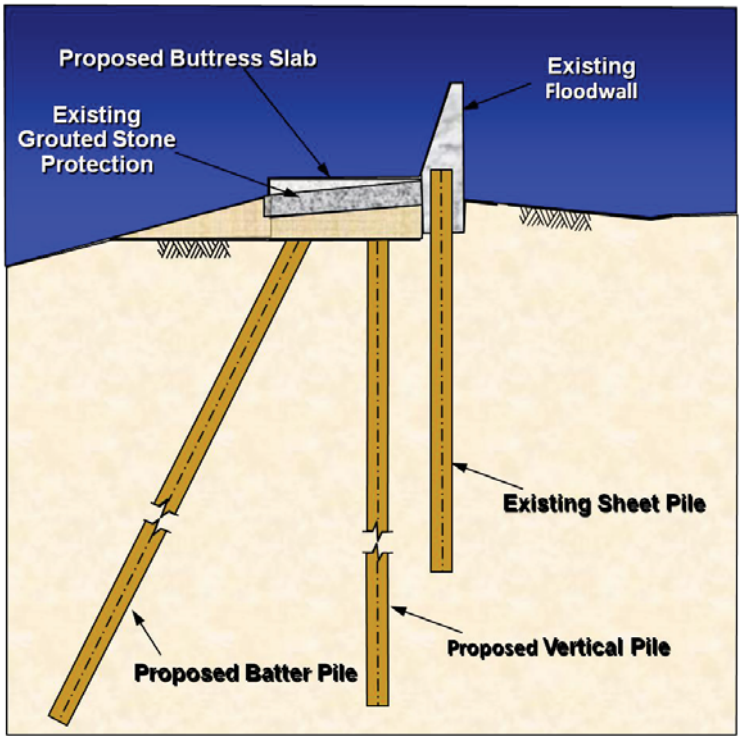

Figure 5. Conceptual Figure of a Buttress Wall

Concrete Slab

A concrete slab is a remediation measure used on I-walls to decrease the protected side height of floodwalls, commonly referred to as "stick-up." A concrete slab differs from a buttress slab in that it is a remediation measure not designed to address stability issues, but to control deflection of the existing I-wall during a storm event. Concrete slabs are sufficiently able to resist the existing floodwall or levee load without the need for buttress piles. Current design criteria require that there be less than 4 ft of stick-up; therefore, if the distance between the protected-side ground surface and either the top of the existing floodwall or the maximum canal water level is greater than 4 ft, a concrete slab would be poured adjacent to the floodwall on the protected side to raise the protected side ground surface. This reinforcement method is the proposed technique at stations 17+50 to 24+00 (Reach 1), Gate E-14, 58+00 to 77+00, 454+00 (Reach 2), and 200+00, 251+00 to 285+00, and Gate W-1 (Reach 3). The thickness of the concrete slabs would vary between 12 inches and 24 inches and extend out approximately 8 ft from the existing I-walls or gates to reinforce areas with stick-up concerns.

Relief Wells

Relief wells are vertically installed wells that intercept underseepage and provide a controlled outlet for the water, thus draining excess water from the subsurface sand layer (figure 6). They consist of a pipe advanced into a subsurface sand layer that is equipped with a well screen surrounded by filter material that is designed to prevent the inwash or migration of foundation materials into the well.

Three segments within Reach 2 (406+00 and 430+00 to 452+00) and Reach 3 (236+00 to 264+00), totaling approximately 5,600 ft in length, are proposed to be reinforced by relief wells.

Preliminary designs indicate that the relief wells would be installed at the toe on the protected side of deficient floodwall segments. Each relief well would be 8 inches in diameter and installed to a depth of approximately 40 ft to 45 ft. In addition, a collector pipe and discharge line would also be constructed along each segment where relief wells are installed. The collector pipe collects the excess seepage from each well and a discharge line for each I-wall segment discharges it to the nearest canal.

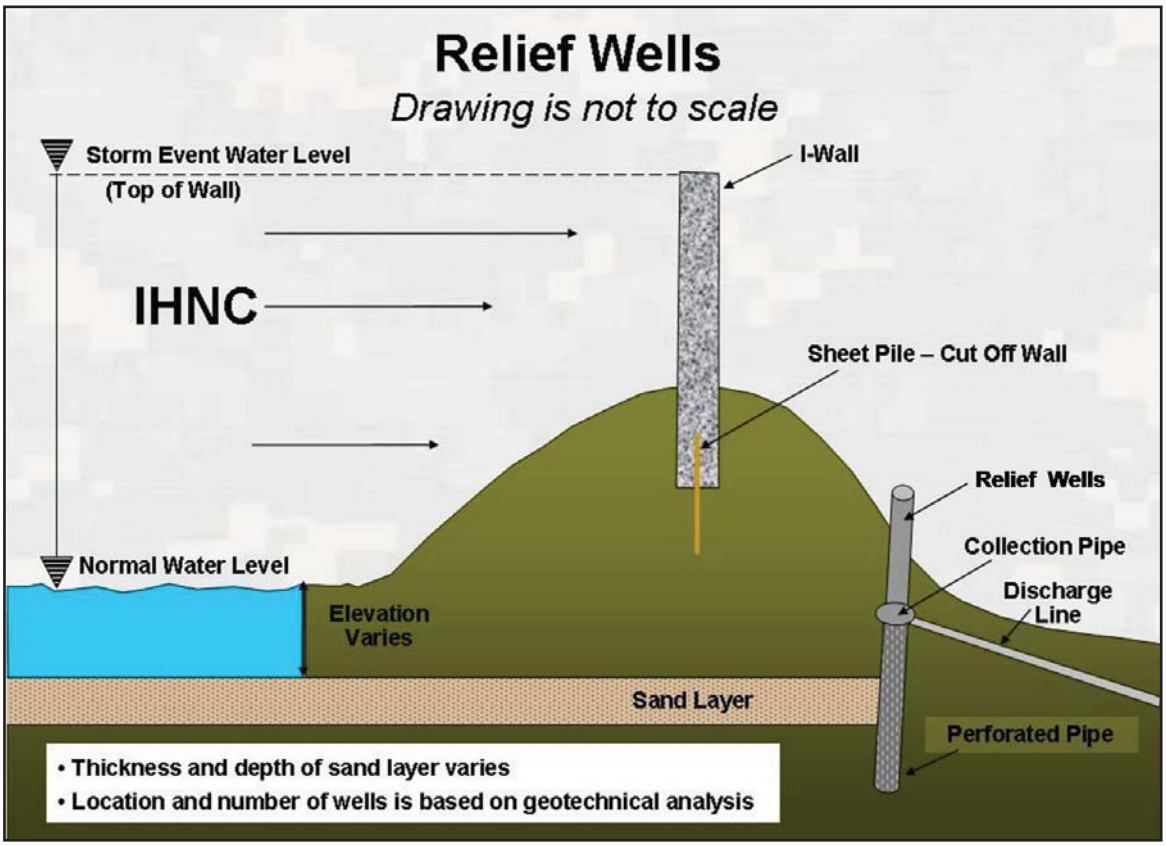

Figure 6. Conceptual Figure of Relief Wells

2.1.2 Proposed Restoration/Reinforcement Methods by Reach

A recommended plan for the proposed action of restoring and reinforcing multiple deficient segments of levees and floodwalls to meet the HSDRRS safety factors along the IHNC was developed based on preliminary engineering and cost analyses. Deficient segments (identified by station number) and the proposed restoration/reinforcement method for each are listed in tables 1 through 3. The proposed action is based on these proposed restoration/reinforcement methods; however, alternate restoration/reinforcement methods that could instead be employed at each of the subject stations are also provided in tables 1 through 3. Future detailed engineering and cost analyses conducted prior to finalizing the design could indicate that an alternate restoration or reinforcement method among those listed in the tables may be more appropriate for a given station; however, because all restoration/reinforcement methods would be conducted within approximately the same footprint and would provide the same level of risk reduction, the alternate restoration/reinforcement methods are not considered separate alternatives and are all evaluated as part of the proposed action for each segment. For several deficient segments of the HSDRRS, no alternate restoration/reinforcement method was available;

therefore, at these segments (stations), only the no action alternative and the proposed action were evaluated. All segments, regardless of restoration/reinforcement method used, would meet the required factor for safety.

Reach 1

Reach 1 extends from stations 0+00 to 380+00 along the east side of the IHNC from the IHNC Lock to the GIWW including the south side of the GIWW from the IHNC to Bayou Bienvenue. Reach 1 includes approximately 1,200 ft of deficient areas, which correspond with two stations, 28+85 and 17+50 to 24+00. Reach 1 station IDs, type of flood risk reduction structure, length, and proposed and alternate restoration/reinforcement methods are presented in table 1.

Table 1.
Reach 1 Restoration/Reinforcement Methods

Station	Type	Estimated Length (ft)	Proposed Restoration or Reinforcement Method	Alternate Restoration or Reinforcement Method
28+85	Earthen Levee	500	Deep Soil Mixing	Berm
17+50 to 24+00	I-wall	700	Concrete Slab	Buttress Wall

Reach 2

Reach 2 comprises the east side of the IHNC from Lake Pontchartrain to the GIWW and extends along the north side of the GIWW from the IHNC to the Borgne Barrier. Reach 2 has a total of approximately 3.2 mi (16,700 ft) of deficient areas, which are presented in table 2.

Table 2.
Reach 2 Restoration/Reinforcement Methods

Station	Type	Estimated Length (ft)	Proposed Restoration or Reinforcement Method	Alternate Restoration or Reinforcement Method
E-14	Gate	1,000	Concrete Slab	Buttress Wall
3+00 to 31+00	I-wall	2,800	Buttress Wall	NA
32+00	Gate	500	Buttress Wall	NA
58+00 to 77+00	I-wall	1,900	Concrete Slab	Buttress Wall
73+00	I-wall	200	Berm	Deep Soil Mixing
79+00	L-wall	3,000	Berm	Deep Soil Mixing
242+00 to 260+00	Earthen Levee	1,800	Berm	Deep Soil Mixing
268+00	T-wall	500	Buttress Wall	NA
270+00	I-wall	400	Buttress Wall	NA
278+00	I-wall	400	Buttress Wall	NA
406+00	I-wall	600	Relief Wells	NA
430+00 to 452+00	I-wall	2,200	Relief Wells	NA
454+00	I-wall	400	Concrete Slab	Buttress Wall
525+00 to 535+00	I-wall	1,000	Berm	Deep Soil Mixing

NA = no alternate restoration/reinforcement method available.

Reach 3

Reach 3 lies along the west side of the IHNC and extends from the IHNC Lock at the Mississippi River to the Seabrook Bridge at Lake Pontchartrain. As shown in table 3, Reach 3 has approximately 1.19 mi (6,300) ft of deficient areas.

Table 3.
Reach 3 Restoration/Reinforcement Methods

Station	Type	Estimated Length (ft)	Proposed Restoration or Reinforcement Method	Alternate Restoration or Reinforcement Method
268+00	I-wall	600	Deep Soil Mixing	Buttress Wall
236+00 to 264+00	I-wall	2,800*	Relief Wells	NA
251+00 to 285+00	I-wall	3,400*	Concrete slab	Buttress Wall
200+00	I-wall	600	Concrete Slab	Buttress Wall
W-1 0+00 to 2+00	Gate	200	Concrete Slab	Buttress Wall

NA = no alternate restoration/reinforcement method available.
* = Approximately 1300 ft of these two deficient areas overlap. In this 1300 ft, two restoration and reinforcement methods would likely be applied. For calculation of the total length of deficiency, the overlapping area is only counted once. Therefore, the length of deficiency from station 236+00 to 285+00 is 4,900 feet.

In addition to the 1.19 mi of deficient segments in Reach 3 that would be restored/reinforced two structures, one maintenance building and one small shed would either be relocated or demolished as part of the proposed action. The structures are located adjacent to Gate W-1 and stations 0+00 through 2+00 at the IHNC Lock (photo 2). The buildings are approximately 1 ft from the floodwall; therefore, construction of a concrete slab to provide additional stability would require the demolition or relocation of the buildings. The structures, which are owned by the USACE and used for equipment and material storage associated with operation of the IHNC Lock, are sited on USACE property outside of the existing ROW for the proposed action. The shed has a footprint of approximately 560 square feet (sq ft) and contains maintenance equipment such as ladders, lawnmowers, containers, etc.). The maintenance building houses chemicals for cleaning and mechanical operations (degreasers, etc.) and occupies approximately 260 sq ft. The decision as to whether these structures would be relocated or demolished would be made during the final design process for the proposed work at Gate W-1. If relocation is selected, the structures would be moved to another location on the current USACE property.

2.1.3 Construction-Related Information for the Proposed Action

Restoration/reinforcement construction would occur entirely within the existing levee/floodwall ROW. The construction duration would be approximately 300 days (10 months). Construction schedules for work on the various deficient segments could overlap and may include work up to 24 hours per day and 7 days per week. Each restoration/reinforcement process would require its own combination of construction equipment (table 4) and would have its own estimated duration.

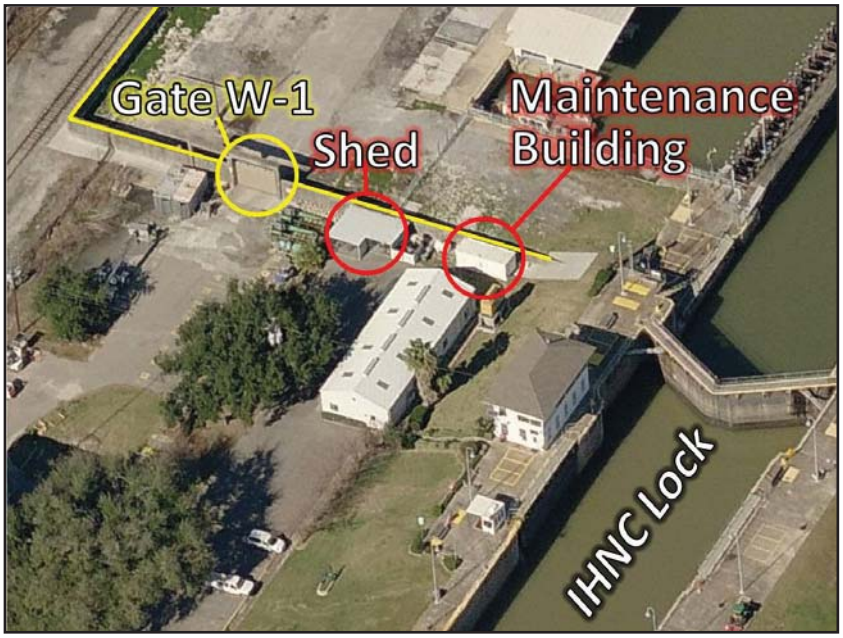

Photo 2. Location of Two Structures Proposed for Relocation or Demolition in Reach 3

Table 4.
Restoration/Reinforcement Method Construction Equipment Requirements

Construction Equipment	Project Restoration/Reinforcement Alternatives				
	Deep Soil Mixing	Berm	Buttress Wall	Concrete Slab	Relief Wells
Backhoe	X				
Crane	X		X		X
Dump Truck		X			
Excavator		X	X		
Front end loader		X			
Concrete mixer truck			X	X	
Auger drill rig	X				X
Dozer	X	X	X		X
Generators	X				X
Flatbed Trucks	X	X	X	X	X
Rollers		X			
Graders	X	X			
Portable Air Compressors	X				X
Welding Machines					X
Drill Rig	X				X

DSM is estimated to take approximately 12 weeks at a single location. Dust emissions would not be an issue due to the high water content of soil at the locations where DSM is the proposed reinforcement method; therefore, best management practices (BMPs) for dust control would not be required. However, if conditions change, BMPs for dust control would be incorporated.

The process to restore an I-wall or levee with a berm could take approximately 50 working days, allowing for rain and other weather delays. Embankment material would be transported to the site via dump truck. Given that approximately 18 cy of material can be carried in a single truckload and a rate of approximately one truckload every 30 minutes would be utilized, this process would require approximately 16 truckloads per day. Dust emissions from this method would be controlled using a water sprinkler truck.

Project design engineers estimate that construction of a buttress wall would require the excavation of approximately 600 cy of earthen material at each station to be reinforced with this method. Because the amount of excavated material would be relatively minor, it would not require disposal, but instead be used for backfill. Water trucks would be used for dust control should the water content of the soil not be sufficient to eliminate dust during the placement of embankment material.

Excavation activities would not be necessary for the addition of concrete slabs proposed at seven deficient segments because they would be placed over the existing ground. Each slab would then be attached to the ground using ground hooks. Concrete transport trucks may kick up some dirt in and around the project sites, but the use of water trucks would be implemented to control dust during construction as needed.

Preliminary project design indicates that relief wells would be approximately 30 ft to 35 ft deep, which would result in approximately 1 cy of soil tailings per well; therefore, soil quantities would not be significant enough to require disposal. Installation of relief wells would not generate any dust and no BMPs should be necessary.

Restoration and reinforcement activities within each subject reach would occur entirely within existing ROW. USACE-provided Geographic Information System (GIS) layers of ROW boundaries were used to determine the proposed footprint at each station. The total area of all existing ROW for the deficient segments of HSDRRS is approximately 82.6 acres (see breakdown by reach and station ID in table 7). This acreage is the total footprint that would be impacted (either temporarily or permanently) by the proposed action if the restoration/ reinforcement methods required that the entire ROW at each deficient segment be disturbed during construction (worst-case scenario). If construction of the proposed action occurs without the disturbance or degradation of all ROW areas at the deficient segments, fewer acres would be impacted. The classification of impacts associated with the project footprint as permanent or temporary depends solely on the specific method of restoration/reinforcement being performed and the resource being evaluated.

For the duration of construction, materials and equipment necessary to complete the proposed restoration and reinforcement methods would be staged at nine locations throughout the project area. No construction would occur at these temporary staging areas, which are primarily located outside of existing ROW and are each approximately 0.5-acre in size or smaller (see table 7 in Section 3.2.2 for descriptions and approximate acreages and appendix C for detailed figures). The majority of the staging areas are located either in industrial areas or on undeveloped parcels. Staging Area F is located immediately adjacent to the Pontchartrain Park residential area. One staging area would be located along the east bank of the IHNC (Reach 1), south of its convergence with the GIWW; four staging areas would be required for Reach 2 restoration/reinforcement work along the east bank of the IHNC and north bank of the GIWW;

and four staging areas would be established along the west bank of the IHNC within Reach 3. Staging Area G, depicted as being located over Highway 90 (Chef Menteur Highway) in appendix C, was illustrated as such to show its location on the aerial map; this staging area would actually be located underneath the overpass.

Project access would occur along existing roads and properties, including but not limited to those illustrated in figure 7. Temporary construction easements adjacent to the existing ROW may be needed to provided access and adequate room for equipment operation. Small, ancillary streets are not highlighted on figure 7, but would be used to access existing HSDRRS. Reach 1 primary access would be from Florida Avenue, St. Claude Avenue, Jourdan Avenue, N. Claiborne Avenue, Paris Road, and to traverse the levee as needed. Primary access to Reach 2 would require use of the following roadways: Jourdan Road, Almonaster Boulevard, N. Claiborne Avenue, Japonica Street, Highway 90, and Paris Road, with secondary access through Terminal Road, Elaine Street and Boh Brothers Almonaster Yard, Industrial Parkway, and to traverse the levee as needed. Primary access to Reach 3 would occur from Hayne Boulevard, France Road, Japonica Street, Highway 90, N. Claiborne Avenue, Poland Avenue, and St. Claude Avenue, and to traverse the levee as needed. Construction of the proposed action would adhere to the New Orleans Codes of Ordinances regarding street weight limits for trucks and oversized vehicles (CNO 2010a) and would not result in any temporary road closures. Traffic Control Plans could be implemented for work in the project area, particularly along the IHNC on France Road and Jourdan Road.

Table 5 provides information on the approximate volumes of materials that would be required for construction of the proposed action.

Table 5.
Estimated Construction Material Quantities Required to Complete the Proposed Action

Material	Total Length of Material Placement (ft)	Units of Measure	Quantity
Reach 1			
Structural Concrete	700	cy	2,800
Silt Fencing	1200	linear feet (LF)	1,440
Concrete for DSM	500	cy	2,000
Rebar	700	LF	4,200
Reach 2			
Embankment Fill	6,000	cy	30,000
Top Soil	6,000	cy	30,000
Concrete Form	7,900	sq ft	31,600
Structural Concrete	3,300	cy	13,200
Silt Fencing	16,700	LF	20,040
Corrugated Metal Piping (CMP)	2,800	LF	7,000
Rebar	7,900	LF	47,400
Reach 3			
Concrete for DSM	600	cy	2,400
Concrete Form	4,200	sq ft	16,800
Structural Concrete	4,200	cy	16,800
Rebar	4,200	LF	25,200
Silt Fencing	7,600	LF	9,120
CMP	2,800	LF	7,000

Figure 7. Map of Anticipated Project Access Roads and Properties

2.2 ALTERNATIVES TO THE PROPOSED ACTION

2.2.1 No Action Alternative

The CEQ regulations and USACE's ER for implementing NEPA require that a no action alternative be evaluated. Under the no action alternative, the proposed action would not be constructed by the CEMVN. The 4.6 mi of levees, floodwalls, and closure gate structures that were identified as being deficient would not be restored or reinforced; therefore, the secondary line of defense provided by these flood risk reduction structures in Reaches 1, 2, and 3 would remain in its current condition with potential seepage and stability issues. The Borgne Barrier and Seabrook Gate would be in place and would continue to serve as the primary line of defense for the project area. The Borgne Barrier consists of approximately 2 miles of new floodwalls and gates extending from the Michoud floodwall north of the GIWW to the levee on the west side of the MRGO. The Seabrook Gate is comprised of a sector gate and two vertical lift gates in the IHNC just south of the Senator Ted Hickey Bridge with T-wall floodwall tie-ins to LPV 104 to the west and LPV 105 to the east.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

The following alternatives were eliminated from further consideration due to increased engineering costs and because they did not adequately meet the purpose and need. These alternatives are considered complementary to alternatives that reduce flood risks.

2.3.1 Non-Structural Alternatives

Section 73 of the Water Resources Development Act (WRDA) requires consideration of non-structural alternatives in flood damage reduction studies. ER 1105-2-100 provides planning guidance on applicable non-structural measures, which states that non-structural measures can be considered independently or in combination with structural measures (USACE 2000). Non-structural measures reduce flood damages without significantly altering the nature or extent of flooding. Damage reduction from non-structural measures is accomplished by changing the use of the floodplains, or by accommodating existing uses to the flood hazard. Examples are flood proofing, relocation of structures, flood warning and preparedness systems (including associated emergency measures), and regulation of floodplain uses. Although the project area is located entirely within Orleans Parish, St. Bernard Parish is also considered in the cost estimate for non-structural alternatives because the proposed action would reduce the flood risk in both parishes. Both Orleans and St. Bernard Parish already have flood warning systems and evacuation plans in place and regulation of floodplain use is addressed by the National Flood Insurance Program; therefore, only flood proofing and relocation were considered as non-structural measures. The flood proofing non-structural measures evaluated in this analysis are to raise in place existing structures and the acquisition and relocation of the structures, which is defined as a buyout or permanent physical relocation.

Raise in Place

Flood proofing would require elevating all residential and commercial properties' structures subject to flooding in the study area above the expected levels of flooding. This alternative would also have to consider elevating roadways, public buildings, and some forms of public infrastructure that would need to continue operations during and after a storm event. Some facilities, such as roadways and railroads, might remain at grade when repair from storm damage would be less costly than the construction, operation, and maintenance of them on elevated structures. The average cost of elevating residential structures in the study area has been estimated at approximately $95 per sq ft (USACE 2007a and 2007b). This includes the cost of

administration, design, inspection, costing, project management, and all other associated costs of elevating the structures, as well as the costs of the occupants of the residential structures being relocated to temporary housing during the time that the structures are being elevated. Approximately 107,000 homes in Orleans Parish and 20,000 homes in St. Bernard Parish were damaged by flooding from Hurricane Katrina (U.S. Department of Housing and Urban Development [HUD] 2006). Although Hurricane Katrina was greater than a 100-year storm and not all of this flooding was a product of breaching or overtopping of the IHNC HSDRRS, this figure is reasonably representative of the magnitude of homes in these parishes that are vulnerable to storm surge induced flooding. The $95 per sq ft average cost results in a cost of approximately $152,000 to raise a 1,600-sq ft residence above the expected level of flooding. Using these assumptions, the cost of raising flood-prone homes would be estimated at approximately $16.3 billion in Orleans Parish and $3 billion in St. Bernard Parish for a total cost of $19.3 billion.

Other costs associated with flood proofing would include elevating non-residential buildings, roads and railroads, and other infrastructure. No information is available on the cost of elevating commercial, industrial, and public buildings because these buildings are so different from one another that information would have to be developed for each individual building. However, it can reasonably be expected that it would equal the cost associated with elevating the residential structures, and bring the total estimated cost to more than $40 billion.

Elevating the roadways would be equivalent to converting all roadways and railroads to bridges. The costs for repairing all roads and railroads would be much more reasonable, and these costs were estimated based on highway design assumptions and current unit prices. A non-structural alternative that left roads and railroads at existing elevations would mean they would have to be repaired after each storm event. Costs for repairing two-lane asphalt roads with shoulders were estimated at $400,000 per mile. There are approximately 1,432 mi of two-lane roads in Orleans Parish. About 80 percent of the roads in Orleans Parish were flooded during Hurricane Katrina. Therefore, repair costs would be $458.2 million for each storm event that exceeded the level of flood risk reduction. Repair costs were estimated at $800,000 per mile for four-lane divided roadways with shoulders. There are approximately 398 mi of four-lane roadways in Orleans Parish. The cost of repairs to the four-lane roadways would be $254.7 million for each storm event that compromised hurricane risk reduction. Repair costs to railroads were calculated for the 114 mi of railroad in Orleans Parish. Railroad repair costs were estimated at $100 per LF. This resulted in railroad repair costs of approximately $60.2 million for the parish.

No information is available on the costs for elevating other infrastructure such as airport facilities, electrical distribution and transmission grids, gas distribution lines, drainage, sewage and water distribution facilities, communication networks, public transit, and waterborne navigation facilities. However, the estimated costs of elevating all flood-prone infrastructure in the study area would likely exceed $20 billion, which would be much more than the costs of other structural alternatives. Therefore, this alternative was eliminated from further consideration.

Real Estate Acquisition and Relocation Assistance

Public acquisition of properties in areas subject to flooding can also reduce damages from storms and hurricanes. Acquisition of these properties as part of a Federal project and for projects where there is Federal financial assistance in any part of project costs would be subject to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 42 United States Code (USC) Section 4601, et seq., as amended (the Relocation Assistance Act). Accordingly, the displacement of individuals, families, businesses, farms, and non-profit

organizations would have to be organized and a system established to minimize the adverse impacts on displaced persons.

There are several options that could be offered for the acquisition and relocation alternative: sale of the site and home or commercial structure to the local sponsor for demolition, sale of the site to the local sponsor and relocation of the structure to a comparable site outside the area of flooding, or relocation of the displaced persons to a comparable home or business outside the area of flooding. In addition to compensation for real property, displaced persons would be eligible for expenses for moving themselves and their personal or business-related property, costs of property lost as a result of moving or discontinuing a business, expenses in searching for a replacement business or farm, and necessary expenses for reestablishment of a displaced farm, nonprofit organization, or small business at its new location. However, the estimated costs for real estate acquisition and relocation assistance for all flood-prone infrastructures in the study area would exceed the costs of structural alternatives. Therefore, this alternative was eliminated from further consideration.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 ENVIRONMENTAL SETTING

General

The project area is located within the Central Gulf Coastal Plain, or more specifically, on the eastern flank of the Mississippi River Deltaic Plain along the banks of the IHNC and the GIWW (figure 8). The study area lies completely within Orleans Parish; however, it defines the dividing line for three sub-basins of the larger Pontchartrain Basin: Orleans East Bank, New Orleans East, and Chalmette Loop (figure 1).

The Orleans East Bank sub-basin extends westward from the IHNC to the 17th Street Canal and is bordered to the north by Lake Pontchartrain and to the south by the Mississippi River. The New Orleans East sub-basin extends eastward from the IHNC toward the Rigolets Pass and is bordered by Lake Pontchartrain and the GIWW to the north and south, respectively. The Chalmette Loop Sub-basin extends east and south, bordered on the north by the GIWW, on the east by the Mississippi River-Gulf Outlet (MRGO), and on the south by the Mississippi River and the portion of the Chalmette Loop Levee that runs from the Mississippi River to Highway 46 between the communities of Caernarvon and Verret (USACE 1984).

Relief in the area is very slight with a minimum of 4 ft between the remnant alluvial ridge marking the location of an ancient distributary of the Mississippi River and the adjacent lowlands. Maximum elevations of 2 ft are found toward the southern end of the project area along the remnant alluvial ridge located between Highway 90 and Interstate 10. Minimum elevations of -4 ft are found in drained marsh areas near the north end of the project.

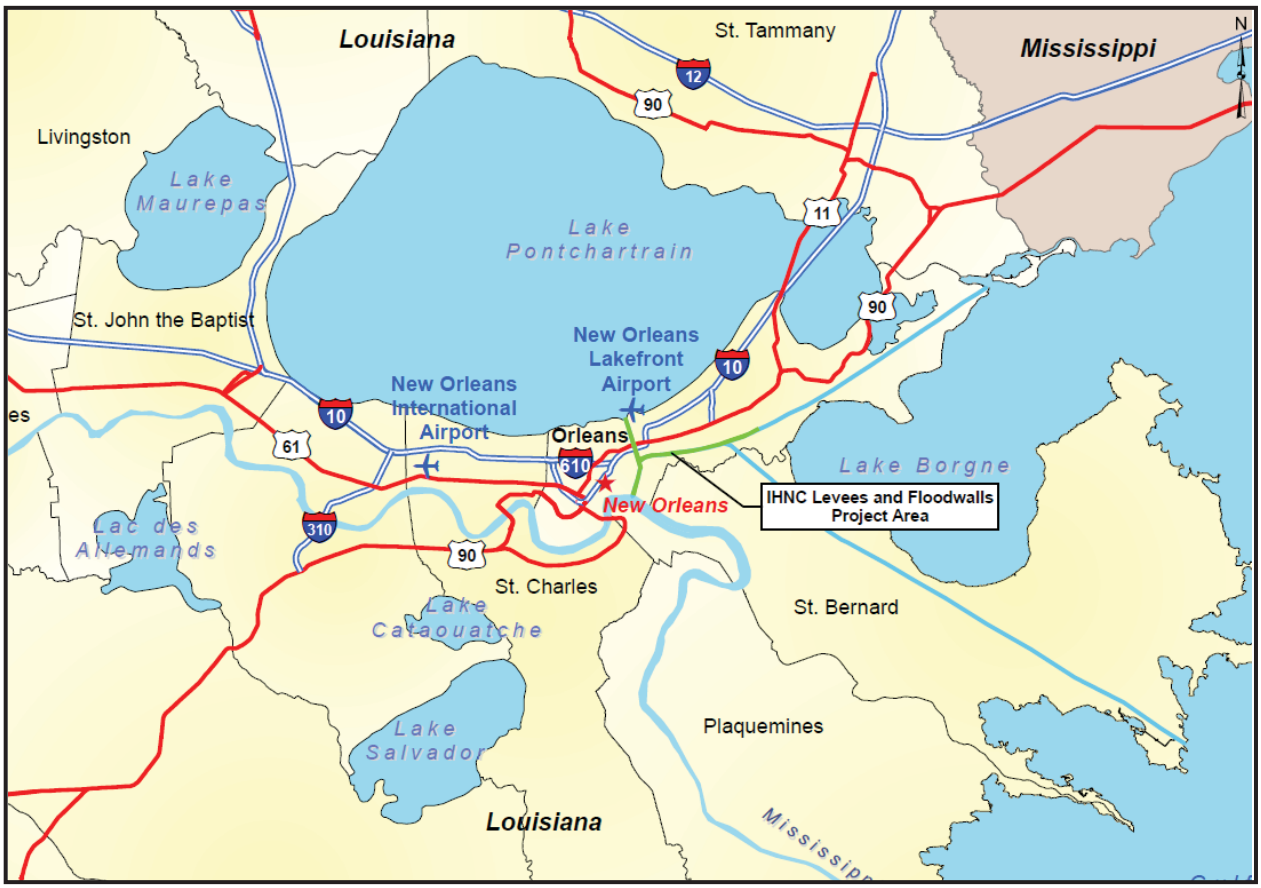

Figure 8. Regional Map of the IHNC Levees and Floodwalls Project Area

Climate

Orleans and St. Bernard Parishes are located at subtropical latitude. The climate is influenced by the many water surfaces of the nearby wetlands, rivers, lakes, streams, and the Gulf of Mexico. Throughout the year, these water bodies modify relative humidity and temperature conditions, decreasing the range between the extremes. Summers are long and hot, with an average daily temperature of 81 degrees Fahrenheit (°F) and high average humidity. Winters are characterized by cold, dry, polar air masses moving southward from Canada, with an average daily temperature of 53°F. Average annual precipitation is approximately 61 inches with monthly averages varying from 2.8 inches in October to 6.5 inches in July (USACE 1974; National Oceanic and Atmospheric Administration [NOAA] 1987).

Precipitation in Louisiana is largely due to convectional activity in the summer and tropical storms during the winter. Due to its proximity to the Gulf of Mexico, the study area is susceptible to tropical waves, tropical depressions, tropical storms, and hurricanes. These weather events can produce significant amounts of precipitation over a very short period and are often accompanied by strong winds, tornadoes, and storm surge along the coastal areas. Analysis of historic data from the National Hurricane Center dataset on tropical cyclones (including tropical depressions, tropical storms, and hurricanes) of the Louisiana coast from 1900 to 1999 shows a total of 63 storms, of which 49 were Category 3 or less. Not all of these storms had direct contact with the New Orleans metro area (U.S. Geological Survey [USGS] 2002). Since 1999, a total of 10 storms, of which 7 were Category 3 or less, have impacted Louisiana (USACE 2006).

Geology and Soils

Dominant physiographic features in the vicinity include Lake Pontchartrain and the lakefront levee to the north, the IHNC to the west, the GIWW in the center, Bayou Bienvenue and Golden Triangle marsh to the east, and the Mississippi River to the south. The foundation soils consist of artificial fill materials underlain by Holocene and Pleistocene age deposits. These material types are comprised predominantly of sands with some fat and lean clays, silts, and organics. At the northern end of Reaches 2 and 3, the surface and shallow subsurface is composed of up to 18 ft of hydraulic fill from Lake Pontchartrain. Fill deposits contain sand, silt, and clay, overlying lacustrine and beach deposits. Lacustrine deposits are characterized by soft to medium clays with some silt and sand layers and shells and are approximately 10 ft thick. Beach deposits are approximately 30 ft thick and are related to the Pine Island Beach Ridge that trends east-west across the area. The beach deposit is generally composed of silty sand and sand with shells. Beach deposits overlie 5 ft to 10 ft of bay-sound deposits, which are characterized by soft to medium clays, silts, and some sand containing shell fragments. Pleistocene deposits are located beneath bay-sound deposits at approximate elevation of -50 ft NAVD88. These deposits are mainly stiff to very stiff, oxidized clays, silts, and sands. This area along the IHNC also contains Aquent soils, which are poorly drained soils that are stratified and clayey to mucky throughout, resulting from hydraulically dredged material (U.S. Department of Agriculture, Soil Conservation Service 1989). Groundwater has been artificially lowered by forced drainage. The sands and silts in the fill and beach deposits may be hydraulically connected to Lake Pontchartrain or the IHNC (USACE 2008c).

Soils along the GIWW vary from west to east. Soils along the western portion of the canal include Aquent soils from dredged material in addition to Harahan and Schreiver clay, Lafitte muck, and urban lands. Both Harahan and Schreiver clays are poorly drained soils that typically form from backswamp alluvium. Lafitte muck is very poorly drained very slightly saline to saline muck and clay that forms in marshes. Along the Michoud canal on the western side of the GIWW and extending into Bayou Bienvenue on the east, soils include urban land, dredged Aquents, Harahan and Schriever clays, and Lafitte muck as described above in addition to Allemands muck (drained), Kenner muck (drained), and Clovelly muck. Allemands muck is a poorly drained non-saline to very slightly saline soil that forms from decomposed organic material overlaying clayey backswamp deposits. Kenner muck is a very poorly drained non-saline to very slightly saline soil that forms in marshes. Both the Allemands and Kenner mucks along this portion of the GIWW have been drained. Clovelly muck is a very poorly drained and very slightly saline to saline soil that forms in marshes, primarily in Bayou Bienvenue on the eastern end of the GIWW. Both the Kenner and Clovelly mucks form from herbaceous organic material over fluid clayey alluvium.

Soil borings collected from the project vicinity can provide information on the nature and extent of soils and shallow sediments, along with their physical and engineering properties. Figure 9 illustrates past soil borings and cone penetrometer tests (CPTs) collected every 50 ft along the subject reaches.

Hurricanes Katrina and Rita

On 29 August 2005, Hurricane Katrina made landfall near Buras on the Louisiana Coast south of New Orleans. At landfall, Hurricane Katrina was at the upper end of Category 3 intensity range with maximum sustained winds estimated at 123 miles per hour (mph). Because of the storm surge, large areas of New Orleans East and St. Bernard Parish were flooded due to the over-topping and breaching of levees and floodwalls on the INHC, the GIWW, and the MRGO. Additionally, the Orleans East Bank was flooded due to breaching of levees and floodwalls

associated with Lake Pontchartrain, located within the Orleans East Bank sub-basin and areas west.

On 24 September 2005, Hurricane Rita hit the western part of Louisiana and the storm surge inflicted additional damage in the project vicinity, re-flooding areas in the ninth ward and Gentilly prior to making landfall near the Texas-Louisiana border. The damages to Orleans Parish's residences were widespread, and at least 10 of the 29 historic districts in the parish suffered extensive damage from flooding.

Figure 9. Soil Boring Locations in the Project Area

3.2 SIGNIFICANT RESOURCES

This section contains a list of the important resources located in the vicinity of the proposed action, and describes in detail those resources that would be impacted, directly or indirectly, by the alternatives. Direct impacts are those that would be caused by the action taken and occur at the same time and place (40 CFR 1508.8(a)). Indirect impacts are those that would be caused by the action and would be later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8(b)). Cumulative impacts are discussed in section 6.0.

The resources described in this section are those recognized as important by laws, executive orders, regulations, and other standards of National, state, or regional agencies, and organizations; technical or scientific agencies, groups, or individuals; and the general public. Important resources described in this section include hydrology, aquatic resources, upland resources, wildlife, threatened and endangered species, cultural resources recreational resources, aesthetics, noise, air quality, socioeconomics, and transportation. Further detail on these resources can be found by contacting the CEMVN, or on www.nolaenvironmental.gov, which offers information on the ecological and human value of these resources, as well as the laws and regulations governing each resource. Search for "Significant Resources" in the website's digital library for additional information.

Table 6 shows those significant resources found within the project area, and notes whether they would be impacted by the alternatives analyzed in this draft IERS.

Table 6.
Significant Resources in the Project Study Area

Significant Resource	Impacted	Not Impacted
Water and Coastal Resources		X
Upland Resources	X	
Wildlife	X	
Threatened and Endangered Species		X
Cultural Resources		X
Recreational Resources	X	
Aesthetics	X	
Noise	X	
Air Quality	X	
Socioeconomics	X	
Environmental Justice		X
Transportation	X	

3.2.1 Water and Coastal Resources

Existing Conditions

The proposed project area occurs within the Lake Pontchartrain Basin, a watershed of 4,700 square miles (mi^2) in southeast Louisiana and southwest Mississippi. The basin is within the coastal zone delineation and, therefore, is regulated under the Louisiana State and Local Coastal

Resources Management Act of 1978. The natural hydrology of the project area has been significantly altered by the IHNC, GIWW, levees of the HSDRRS, and several man-made canals created for oil exploration, flood control, and wetland restoration. The proposed project would be located along the banks of the IHNC from Lake Pontchartrain to the Mississippi River and the banks of the GIWW from the IHNC to the Michoud Canal on the north bank and Bayou Bienvenue on the south bank.

Major surface water features in the region around the project area include the IHNC, GIWW, Lake Pontchartrain, MRGO, Bayou Bienvenue, and the Mississippi River (figure 10).

Figure 10. Major Hydrologic Features of the Project Area

All of these surface water features are Waters of the United States (WoUS; as defined by 33 CFR 328) and Navigable Waters of the United States (NWUS; as defined by 33 CFR 329). This project is subject to the USACE regulatory authority under Section 404 of the Clean Water Act (CWA; 33 USC 1344) and Section 10 of the Rivers and Harbors Act (33 USC 401). Other environmental laws and regulations also apply and are discussed in section 9.0.

The majority of the deficient segments are adjacent to developed areas within New Orleans. A few sections within Reach 2 (7,300 ft total) and Reach 1 (1,200 ft total) are located in the vicinity of Bayou Bienvenue; however these segments are several miles from the portion of Bayou Bienvenue that is designated as a Natural and Scenic River (figure 11).

Aquatic resources within the study area change yearly (due to El Niño Southern Oscillation and La Niña events), seasonally (water quality, hydrology, and weather), and daily (tides and freshwater inflow). Aquatic resources that occur within the project area include habitat (open water, benthic, and submerged aquatic vegetation [SAV]) and organisms (bivalves, crustaceans, phytoplankton, and fishes) that work together synergistically to cycle nutrients and food energy through the coastal ecosystem in Louisiana.

The IHNC is hydrologically connected to the GIWW, the MRGO, the Mississippi River, and Lake Pontchartrain. The IHNC is approximately 30 ft deep, with a minimum 150 ft bottom width and 300 ft top width. The GIWW west of the Michoud Canal within the project area is authorized as 36 ft deep, 500 ft bottom width waterway. East of the Michoud Canal within the project area, the GIWW is authorized as a 150 ft width waterway. The IHNC from the GIWW/MRGO confluence to the IHNC Lock is an authorized deep draft navigation channel, 36 ft deep and 500 ft wide. The IHNC Lock is located at the southern terminus of the IHNC and allows waterborne traffic to transit to and from the Mississippi River, the GIWW, and Lake Pontchartrain. The MRGO was deauthorized as a Federal waterway on 5 June 2008, with a rock closure structure constructed at Bayou La Loutre.

The major influences on water levels within the basin are wind and tide with some localized effects by vessel traffic. Tidal ranges average approximately 1 ft and 2 ft at Lake Pontchartrain and Lake Borgne, respectively.

The historic gage record (1923 to 2006) at the IHNC Lock shows that the median range of low to high water levels is -0.79 ft to 3.71 ft National Geodetic Vertical Datum of 1929 (NGVD29). Water level reached 10.61 ft NGVD29 during Hurricane Betsy. Although there are no water level records at the IHNC Lock for Hurricane Georges, records are available for nearby locations. During Hurricane Georges, the highest recorded water level in the IHNC at the Florida Avenue Bridge was 8.35 ft NGVD (1983 adjustment) on 27 September 1998. The highest recorded water level (high water mark) at the IHNC Lock, due to Hurricane Katrina, was recorded at 14.3 ft NAVD88 2004.65. With completion of the HSDRRS in 2011 the risk of storm surge within the IHNC Basin would be reduced.

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Water and Coastal Resources

Under the no action alternative, flood risk reduction features in the subject reaches located along the IHNC and GIWW would not be restored or reinforced and there would be no in-water construction. There would be an increased risk associated with the interior floodwalls and levees (secondary protection) along the IHNC and GIWW if failure were to occur during a storm event. The segments of HSDRRS for which seepage and stability-related deficiencies were identified could potentially fail and result in flooding within the three sub-basins adjacent to the subject reaches. Minor temporary impacts to water and coastal resources could occur if debris and contaminated floodwaters were to enter the IHNC or GIWW.

Future Conditions with Proposed Action

Direct Impacts to Water and Coastal Resources

Under the proposed action, a variety of restoration/reinforcement types would be used to remediate deficient sections of flood risk reduction along the IHNC and GIWW (tables 1 through 3). Regardless of the restoration/reinforcement method, all construction would occur entirely within existing land-based ROW (appendix B) with no direct impacts to the IHNC or GIWW. No disruption of natural hydrologic and sediment transport patterns, sheet flow, or water quality would occur from the proposed project. Additionally, the proposed work would have no impact on the portion of Bayou Bienvenue that is designated a Natural and Scenic River (located over a mile from the nearest deficient section). Nine temporary staging areas, scattered around the project area and totaling approximately 3.4 acres, would be located in upland areas primarily outside of existing ROW; these staging areas would have no effect on water or coastal resources in the project area.

Indirect Impacts to Water and Coastal Resources

The existing ROW at many deficient segment locations is directly adjacent to banks of the IHNC, GIWW, Bayou Bienvenue, and the Michoud Canal (see detailed figures in appendix B). Construction activities within the ROW could potentially cause indirect impacts of increased turbidity and sedimentation within these waterways; however, construction-related runoff would be managed through the implementation of BMPs, such as structural erosion controls, and adherence to regulations governing storm water runoff at constructions sites, which would minimize the potential effects from the proposed action on water and coastal resources.

Cumulative Impacts to Water and Coastal Resources

Potential cumulative impacts on water and coastal resources would involve the combined impacts from the multiple LPV HSDRRS projects occurring in the vicinity of the project (including IERs #11 – Tier 2 Borgne and Tier 2 Pontchartrain, #4, #6, and #8). However, impacts from restoration/reinforcement activities would be limited to temporary, construction-related impacts. The proposed action would not be expected to contribute to cumulative impacts on water and coastal resources since no in-water work would occur and all construction would take place on the protected side of existing levees and floodwalls.

3.2.2 Upland Resources

Existing Conditions

For the purposes of this analysis, terrestrial or upland resources are defined as any non-marsh or non-wetland areas within the project corridor. All of the deficient flood risk reduction features in the project area are located along canal banks. Along the IHNC, the majority of terrestrial area is comprised of industrial parcels or unoccupied, formerly-industrial sites. The Port of New Orleans owns the majority of land along the IHNC. The portions of the project corridor located along the GIWW, Michoud Slip, and Michoud Canal within Reaches 2 and 3 consist of industrial areas and relatively undeveloped open space. All construction would take place within the existing ROW adjacent to the deficient floodwall/levee sections on the protected side. Existing HSDRRS ROWs are regularly mowed to limit the growth of vegetation, and most of the unpaved, upland habitat in the project corridor contains only early successional vegetation, including turf grass such as Bermudagrass (*Cynodon dactylon*) and Bahiagrass (*Paspalum notatum*); weeds such as crabgrass (*Digitaria* spp.), plantain (*Plantago major*), and common

ragweed (*Ambrosia artemissiifolia*); and small shrubs such as wax myrtle (*Myrica cerifera*), yaupon (*Ilex vomitoria*), and rattlebush (*Sesbania drummondii*). Please refer to Section 3.2.7 (Aesthetics) for representative photographs of the potentially impacted areas.

Potential temporary staging areas are located throughout the project area along the IHNC and GIWW near deficient segments (see detailed figures in appendix C). These areas vary from paved parking areas and mowed or landscaped plots to areas overgrown with weeds and shrubs such as those listed above.

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Uplands

Under the no action alternative, no construction within the previously disturbed and/or developed ROW would occur because the deficient levee/floodwall segments along the IHNC and GIWW would not be restored or reinforced. There would be an increased risk of flooding in the three sub-basins if the interior floodwalls and levees (secondary protection) along the IHNC and GIWW were to breach during a storm event. Should flooding occur, some upland areas may be inundated and experience temporary direct impacts. There could be permanent and potentially cumulative impacts to some vegetated areas if faunal populations perish as a result of extended submersion or potential contamination from floodwaters.

Future Conditions with Proposed Action

All five restoration/reinforcement methods would affect limited upland resources entirely within the existing ROW that occurs in industrial areas that have been previously disturbed. Table 7 summarizes the potential terrestrial impacts for each segment and restoration/reinforcement type. Most of the impacts designated as 'permanent' would only impact a small portion of the ROW permanently. For example, buttress walls constructed to reinforce existing I-walls or gates may increase the area that is permanently covered by concrete by less than one sq ft per LF of floodwall. The remainder of the ROW would return to its current state when construction is complete (temporary impact). The approximate acreages of impacted area are included as a total of temporary and permanent impacts. Impacts associated with specific restoration/reinforcement types are discussed in detail below.

Direct Impacts to Uplands

DSM – DSM, the proposed reinforcement method for six segments of the HSDRRS, involves mixing columns of cement or a combination of other stabilizers vertically into the existing soil. Minor, temporary impacts to upland resources would result from construction due to ground clearing to make way for the machinery and possibly a limited amount of excavation/grading related to leveling the ground for equipment transport or placement. These impacts would take place within the existing ROW, which currently consists of regularly mowed and maintained grassy areas. This area is not considered naturally occurring habitat. Additionally, DSM would occur below the ground surface; therefore, the ROW would be returned to current conditions after construction, resulting in no permanent impacts to upland resources.

Table 7.
Permanent and Temporary Upland Impacts

Reach	Station ID	Existing Structure	Proposed/Alternate Restoration or Reinforcement Type	Approximate Area of Impact (acres)	Permanent* or Temporary Impact
Deficient Segments					
1	28+85	Earthen Levee	DSM/Berm	5.4	T/T
1	17+50 to 24+00	I-wall	Concrete Slab/Buttress wall		P/P
2	Gate E-14	Gate	Concrete Slab/Buttress wall	7.0	P/P
2	3+00 to 31+00	I-walls	Buttress walls/NA		P
2	32+00	Gate	Buttress wall/NA		P
2	58+00 to 77+00	I-wall	Concrete Slab/Buttress wall	3.6	P/P
2	73+00	I-wall	Berm/DSM		
2	79+00	L-wall	Berm/DSM	4.4	T/T
2	242+00 to 260+00	Earthen Levee	Berm/DSM	12.8	T/T
2	268+00, 270+00, 278+00	T-wall and I-walls	Buttress walls/NA	6.4	P
2	406+00	I-wall	Relief wells/NA	6.5	T/P
2	430+00 to 452+00	I-walls	Relief wells/NA	22.7	T/P
2	454+00	I-wall	Concrete slab/Buttress wall		P/P
2	525+00 to 535+00	I-wall	Berm/DSM	3.4	T/T
3	268+00	I-wall	DSM/Buttress wall	9.9	T/P
3	236+00 to 264+00	I-walls	Relief wells/NA		T/P
3	251+00 to 285+00	I-walls	Concrete slab/Buttress wall		P/P
3	200+00	I-wall	Concrete slab/Buttress wall	0.3	P/P
3	Gate W-1, 0+00 to 2+00	Gate	Concrete slab/Buttress wall	0.2	P/P
			TOTAL:	**82.6**	
Reach	**Staging Area ID**	**Description of Land Use**		**Approximate Area of Impact (acres)**	**Permanent* or Temporary Impact**
Staging Areas					
1	Staging Area A	Grass/gravel median between two paved roads		0.4	T
2	Staging Area B	Mowed lot		0.5	T
2	Staging Area C	Partially mowed lot; some overgrowth		0.5	T
2	Staging Area D	Mowed and gravel lot		0.3	T
2	Staging Area E	Gravel lot, equipment lay down area		0.5	T
3	Staging Area F	Mowed lot		0.2	T
3	Staging Area G	Gravel lot		0.5	T
3	Staging Area H	Gravel and paved lot		0.4	T
3	Staging Area I	Paved lot		0.1	T
			TOTAL:	**3.4**	**T**
TOTAL UPLAND IMPACTS:				**86**	**T/P**

*Permanent = Some minor, permanent impacts to upland resources may occur, but not over the entire ROW.

Berm – The berm restoration method, proposed for five segments of the HSDRRS, consists of adding embankment material to the protected side of a levee/floodwall within existing grass-covered ROW for reinforcement. This restoration type would result in minor, temporary impacts to upland resources in the area. The uplands impacted, however, are regularly maintained ROW areas, and are not considered natural habitat. Once the berm is in place, the ROW would be reseeded with turf grass to control erosion, returning it to its current state. Therefore, construction of a berm at any of the stations where it is a proposed or alternate restoration method would not result in permanent impacts to upland resources.

Buttress Wall – Buttress walls are the proposed reinforcement method for several existing floodwall and gate segments. These existing structures already consist of a considerable amount of concrete. During construction, minor, temporary impacts to uplands within the existing ROW would occur. Heavy equipment and concrete mixers would need to drive on the ROW, potentially tearing up the grass. Additionally, some excavation would be necessary near the existing concrete in order to tie in the buttresses. This alternative could result in very minor permanent impacts, as the buttresses may extend past the existing extent of the concrete in the ROW. This upland habitat, however, is not considered naturally occurring; therefore, the permanent impacts would be very small. Once the construction is complete, the area would be reseeded to control erosion, thereby returning most of the ROW to its current state.

Concrete Slab – Concrete slabs are the proposed method for seven deficient floodwall and gate segments of HSDRRS. During construction, minor, temporary impacts would occur in the ROW due to the operation of machinery heavy equipment and minor excavation work. This reinforcement technique could also result in very minimal permanent impacts, depending on the current extent of the concrete at the deficient segments. Most of the floodwalls already have either concrete or riprap placed on the protected side, which is not considered part of upland resources. Once the construction is complete, the area would be reseeded to control erosion, returning most of the ROW to its current state. Overall, this reinforcement method would result in minor, permanent impacts to upland resources.

Relief Wells – Relief wells are the proposed reinforcement type for three deficient segments. The existing HSDRRS at most of these segments are floodwalls with adjacent grass covered berms. During construction, minor, temporary impacts to the existing ROW would occur due to heavy equipment and minimal excavation. Additionally, permanent impacts would occur to a very small portion of the ROW due to the installation of the wells (photo 3). The wells are approximately 8 inches in diameter and would be placed between 25 ft and 30 ft from the floodwall in the ROW. The ROW upland habitat impacted is not naturally occurring, and impacts would be minimal.

Photo 3. Example of a relief well in existing ROW

Staging Areas – All of the restoration/reinforcement methods would require the use of several small staging areas (primarily located outside of existing ROW), totaling approximately 3.4 acres. Many of the proposed staging areas would be located in industrial areas (under bridges, in parking lots, etc.), which are not considered uplands and would therefore not result in any

impacts to upland resources. Four of the potential staging areas would be placed in regularly mowed grasslands. Although these areas are not naturally occurring upland habitat, temporary impacts such as loss of vegetation could occur if large quantities of materials are stockpiled on site or heavy equipment is staged for long periods of time. Use of Staging Area F, which is located within the Pontchartrain Park residential neighborhood, would result in minor, temporary impacts since it is very small (approximately 0.2 acres) and there are approximately 2 acres of adjacent habitat available. Similarly, Staging Areas B and C would have minor, temporary impacts on this low-quality terrestrial habitat given that they represent approximately 1 acre of a total of approximately 17 acres of similar habitat located within 1,000 ft. Staging Area D, located near the Entergy facility on the north bank of the GIWW, would be situated on a site that was previously vegetated but is currently occupied primarily by dirt/gravel, likely due to its use as an access route to the existing HSDRRS. These impacts would be minimal because of the relatively small areas that could potentially be affected, the amount of similar habitat available nearby, and because even if a loss of vegetation did occur, the plots would eventually be re-colonized by weedy and grassy species occurring in similar, nearby areas.

Another five potential staging areas would be setup in currently paved spaces or areas that have already experienced a loss of vegetation and are occupied by dirt and/or gravel. Some of these plots have become overgrown with shrub/scrub habitat and provide some natural habitat in the area; however, they are all within a larger industrial setting, and are not likely extensively used by wildlife. The non-ROW portion of Staging Area A (appendix C), is situated entirely on dirt/gravel; therefore, staging activities would not result in any impacts to this area. Staging Areas E, G, H, and I would all be situated adjacent to existing ROW on plots currently paved or occupied by dirt/gravel. Due to their placement, and the availability of similar habitat nearby, temporary impacts to upland resources that would result from the staging areas would be minor. Since these temporary staging areas would return to their current state following construction, there would not be any permanent impacts to uplands. This process could take several months, but the types of weedy plants that currently exist on these sites, such as crabgrass and ragweed, are fast-growing and would reduce the time it would take for the sites to return to preconstruction conditions.

Indirect and Cumulative Impacts to Uplands

No indirect or cumulative impacts on upland resources would be expected to result from the proposed action.

3.2.3 Wildlife

Existing Conditions

Wildlife diversity and abundance within the project area are dependent on the quality and extent of suitable habitat available. Potential habitat areas that would be impacted by the proposed action include the man-made IHNC and GIWW, small patches of scrub-shrub community, open grassy uplands maintained along the existing HSDRRS, and marsh areas on the western side of Reach 1. The majority of terrestrial habitat within the project area occurs immediately adjacent to the existing HSDRRS. As all of the construction would take place within the ROW, the majority of potentially affected habitat is grassy uplands.

Terrestrial wildlife habitat in the project area consists principally of disturbed or early successional herbaceous communities with limited areas of shrubs and small trees. Land use in and around the project area is predominantly comprised of active and abandoned industrial properties owned by the Port of New Orleans. A small area adjacent to the ROW along the west bank of the IHNC is residential, and a few subject segments located in the eastern portion of the

project area along the GIWW are partially undeveloped. Vegetative communities associated with the existing HSDRRS and the ROW are composed of mainly turf grasses with herbs, weeds, and scattered shrubs. Grassy areas along the existing levees and floodwalls undergo routine maintenance (mowing) and landscaping, which prevents the grasses from growing tall enough to provide cover, limits vegetative diversity, and reduces habitat value. The less developed portions of the project area, along the GIWW to the east, have scrub-shrub habitat adjacent to the mowed ROW, providing some cover and plant diversity for wildlife.

The upland habitat within the project area is of relatively low quality. However, there are adjacent areas of open water and shoreline, which provide habitat for aquatic and semi-aquatic wildlife, particularly wading birds, waterbirds, and waterfowl. The IHNC and the GIWW are man-made navigational channels consisting of a main channel with several small slips branching out from both banks. The aquatic habitats of the IHNC and GIWW have been previously disturbed by dredging and construction activities related to navigation of large vessels. Due to the industrial noise, traffic, and repeated disturbance of the area, it is unlikely that many aquatic wildlife species permanently inhabit areas of the IHNC near Seabrook or the Lock, or the GIWW between the IHNC and the Michoud Canal; however, it is expected that they occasionally use these channels as a route to pass between Lake Borgne and Lake Pontchartrain.

Wildlife that typically inhabit terrestrial or brackish aquatic habitats such as those in the project area include a limited assemblage of amphibians, reptiles, birds, and mammals. Species from each of these classes that could occur in the project area can be identified based on the geographical range and habitat preference of each species. The Gulf Coast toad (*Bufo valliceps*) is an amphibian that could occur in the project area. Reptiles that may utilize habitats in the vicinity of the project include the common snapping turtle (*Chelydra serpentina*) and green anole (*Anolis carolinensis*) (Conant and Collins 1998; Felley 1992; Wigley and Lancia 1998). Potentially occurring mammals include the muskrat (*Ondatra zibethicus*), nutria (*Myocastor coypus*), wild boar (*Sus scrofa*), cotton mouse (*Peromyscus gossypinus*), and raccoon (*Procyon lotor*) (Whitaker 1998; Wigley and Lancia 1998). Marine mammals that could potentially use the IHNC or GIWW for passage include the bottlenose dolphin (*Tursiops truncatus*), the only cetacean likely to occur in the project area (NOAA 2008), and the West Indian manatee (*Trichechus manatus*) (Abadie et al. 2000).

The bottlenose dolphin has not been observed to utilize the IHNC as an important habitat or migration route, and it is not known to regularly inhabit Lake Pontchartrain (Barry et al. 2008). A large number of dolphins typically occur in the Mississippi Sound and Lake Borgne to the east of Lake Pontchartrain. These dolphins can enter Lake Pontchartrain through the two natural tidal passes at the east end of the lake, The Rigolets and Chef Menteur Pass, and groups of dolphins were observed in these passes and the eastern end of Lake Pontchartrain in 2008 (Barry et al. 2008). Dolphins could also enter Lake Pontchartrain through the IHNC via the GIWW. A NOAA study (Barry et al. 2008) of a group of dolphins that remained in the eastern end of the lake in 2008 did not record observations of dolphins in the area of the IHNC in larger-scale surveys. NOAA reported that personnel of the Louisiana Department of Wildlife and Fisheries (LaDWF) considered occurrences of bottlenose dolphins far from the eastern boundary of the lake to be uncommon (Barry et al. 2008). Thus, the bottlenose dolphin could occur in the project area, but such occurrences would be expected to be rare.

Birds that may utilize the habitats of the project area include both non-migratory residents of the region and migratory species that are present only part of the year. Non-migratory species that may forage along the shoreline and in the open water of the area include the anhinga (*Anhinga anhinga*), Caspian tern (*Hydroprogne caspia*), royal tern (*Thalasseus maxima*), Forster's tern (*Sterna forsteri*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), black-crowned night heron (*Nycticorax nycticorax*), black skimmer (*Rynchops niger*), American coot (*Fulica americana*), fish crow (*Corvus ossifragus*), and brown pelican (*Pelecanus occidentalis*). The brown pelican, which falls under the jurisdiction of U.S. Fish and Wildlife Service (USFWS), could potentially occur in the northern IHNC- Lake Pontchartrain area. This species was delisted under the Endangered Species Act in November 2009 due to its recovery. Migrant birds that may occur in the area during summer include the roseate spoonbill (*Platalea ajaja;* see photo 4) and yellow-crowned night heron (*Nyctanassa violacea*), and migrants occurring in winter include the double-crested cormorant (*Phalacrocorax auritus*), common loon (*Gavia immer*), mallard (*Anas platyrhynchos*), lesser scaup (*Aythya affinis*), laughing gull (*Larus atricilla*), ring-billed gull (*Larus delawarensis*), and herring gull (*Larus argentatus*) (Dunn and Alderfer 2006, Wigley and Lancia 1998, America's Wetland 2009).

Photo 4. Roseate Spoonbills at Station 454+00

There also is a potential for the non-migratory bald eagle (*Haliaeetus leucocephalus*) to forage for fish in the project vicinity, though the level of human activity in the area makes this unlikely. Although the bald eagle was recently delisted as a federally threatened species (August 2007), it continues to be protected under the Bald and Golden Eagle Protection Act, as well as the Migratory Bird Treaty Act. Habitats suitable for use by the bald eagle are present in St. Bernard and Orleans Parishes, and occurrences of the bald eagle have been recorded in both parishes. However, habitats in the immediate IHNC/GIWW project area do not have characteristics that would be particularly attractive to bald eagles for nesting, such as large bald cypress or other tall trees. Consequently, the bald eagle would not be expected to nest or regularly forage in the project area.

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Wildlife

Under the no action alternative, wildlife resources would not be affected by construction activities because the deficient levee/floodwall segments along the IHNC and GIWW would not be restored or reinforced. If the interior floodwalls and levees along the IHNC and GIWW were to fail during a storm event, there would be an increased risk of flooding in the three sub-basins. Should flooding occur, some upland areas may be inundated. Flooding would result in direct

impacts to wildlife that utilize flooded areas if wildlife were forced to evacuate and were unable to find other suitable habitat nearby. Indirect impacts related to habitat loss would occur as a result of flooding if wildlife that fled or avoided flooded areas were later unable to return. Both direct and indirect impacts would have cumulative aspects should flooding occur in multiple areas within the three sub-basins.

Future Conditions with Proposed Action

Direct Impacts to Wildlife

The proposed action would be compatible with the conditions for wildlife that exist today, as the features that would result from the proposed action would be similar to current features in the project area. All construction would take place within existing ROW, which is regularly mowed and maintained. This habitat is of relatively low quality for wildlife, and very few species would be expected to permanently inhabit the area. Similarly, most of the staging areas would be located in upland areas of low quality habitat. Although not all segments of the HSDRRS have the same proposed restoration/reinforcement methods, the impacts of each proposed method would be similar and are discussed together for all sites. Specific impacts are discussed below for each of the restoration/reinforcement methods and the staging areas. For all methods, wildlife inhabiting nearby terrestrial and brackish aquatic habitats could be indirectly impacted as a result of construction activities and temporarily vacate or avoid the area. Following completion of restoration/reinforcement work, it is likely any wildlife that formerly utilized or occupied these areas would return.

<u>DSM</u> – DSM is the proposed reinforcement method for Reach 1, station 28+85 and Reach 3 station 268+00 and an alternate reinforcement for Reach 2 stations 73+00, 79+00, 242+00 to 260+00, and 525+00 to 535+00. Most of these stations are immediately adjacent to industrial facilities. Stations 79+00 and 242+00 to 260+00 are in relatively isolated, natural areas. Construction work would take place on the existing ROW, which consists of regularly mowed grass. During construction, a small quantity of grassy, upland habitat would be disturbed. These areas provide limited, poor-quality habitat, and the potential impacts to wildlife would be very small and temporary. After construction, the area would return to its current state; there would be no permanent loss of terrestrial wildlife habitat with the DSM reinforcement method.

<u>Berm</u> – Berm is the proposed restoration method for Reach 2, stations 73+00, 79+00, 242+00 to 260+00, and 525+00 to 535+00. It is an alternate restoration method for station 28+85. Additional soil material would be placed on the protected side of the existing levees/floodwalls to increase stability. Potential impacts to wildlife would be similar to those described for DSM. There would be temporary impacts to a small, previously disturbed, grassy habitat during construction, and then the area would be returned to its current state.

<u>Buttress Wall</u> – Buttress walls are the proposed reinforcement method for Reach 2, stations 3+00 to 31+00, 32+00, 268+00, 270+00, and 278+00, and an alternate reinforcement method for Reach 1, station 17+50 to 24+00; Reach 2, stations E-14, 58+00 to 77+00, and 454+00; and Reach 3, stations 268+00, 256+00 to 285+00, 200+00, and W-10+00 to 2+00. Construction of buttress walls at these deficient floodwall segments would result in a temporary disturbance of ROW during construction and the permanent loss of some of the grassy areas at these stations. The potentially affected areas of mowed grass provide minimal habitat for wildlife; therefore, the loss of some of the grassy, upland habitat adjacent to the floodwalls and gates would not likely impact wildlife resources.

Concrete Slab – Concrete slabs are the proposed reinforcement method for Reach 1, station 17+50 to 24+00; Reach 2, stations E-14, 58+00 to 77+00, and 454+00; and Reach 3, stations 251+00 to 285+00, 200+00 and W-1 0+00 to 2+00. Many of the stations for which concrete slabs are the proposed reinforcement method already have at least partial concrete slabs in place, which reduced the quality of terrestrial habitat in the ROW. A small part of the remaining grassy portions of the ROW would be disturbed during construction, but would be returned to their current state following construction.

Relief Wells – Relief wells are the proposed reinforcement method for Reach 2, station 406+00 and 430+00 to 452+00, and Reach 3, stations 236+00 to 264+00. This reinforcement method would have potential temporary impacts to wildlife similar to the DSM method but potentially slightly smaller because wells would be faster to install.

Staging Areas - All proposed restoration/reinforcement methods would require the same associated staging areas (appendix C). These areas would be sited in a variety of locations, from a residential area to under bridges and overpasses. Staging areas would be used for equipment and materials storage during construction. Most of the staging areas consist of poor quality habitat and are paved, gravel lots, or mowed grass (photo 5; in a rail yard, on a parking lot, between two roads, under an overpass, etc.). A few of the staging areas are currently overgrown with weeds, providing limited habitat, but these are located within industrial areas, making them less suitable for wildlife. A small amount of existing scrub/shrub habitat would be disturbed or cleared for use as staging areas during construction. Temporary loss of this vegetation would reduce the area available to migratory birds that potentially depend on areas like these as resting spots or for cover from predators during stop-overs. Following construction, these areas would be allowed to re-vegetate, and, after a few years, they likely would return to their current overgrown condition.

Photo 5. Staging Area H
(Example of Habitat within an Industrial Area)

Indirect and Cumulative Impacts to Wildlife

It is unlikely that the proposed action would contribute to permanent indirect or cumulative wildlife impacts in the project area. Any potential impacts would occur during construction and be temporary, adding an incremental temporary impact to the disturbances caused to wildlife by construction throughout the project area.

3.2.4 Threatened and Endangered Species

Existing Conditions

The deficient HSDRRS segments in Reaches 1, 2, and 3 are located adjacent to the IHNC and GIWW. The recognized threatened and endangered species that have the potential to occur within the project area are presented in table 8. These protected species include the West Indian manatee (*Trichechus manatus*), threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*), and Kemp's ridley sea turtle (*Lepidochelys kempii*), the loggerhead sea turtle (*Caretta caretta*), and the green sea turtle (*Chelonia mydas*). All have the potential to occur adjacent to the deficient segments, specifically within the GIWW, the northern portion of the IHNC near the confluence with Lake Pontchartrain, or the Mississippi River near the IHNC Lock.

Table 8.
Federally Listed Threatened and Endangered Species Potentially Occurring in Orleans Parish, Louisiana

Common Name	Scientific Name	Status	Agency with Jurisdiction
Mammal			
West Indian Manatee	*Trichechus manatus*	Endangered	USFWS
Fish			
Gulf Sturgeon	*Acipenser oxyrinchus desotoi*	Threatened	NOAA Fisheries
Reptiles			
Kemp's Ridley Turtle	*Lepidochelys kempii*	Endangered	NOAA Fisheries
Loggerhead Turtle	*Caretta caretta*	Threatened	NOAA Fisheries
Green Sea Turtle	*Chelonia mydas*	Threatened	NOAA Fisheries

Source: USFWS 2010; NOAA Fisheries Service 2010a and 2010b.

In accordance with the provisions of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 USC 1531 et seq.), the CEMVN requested information on protected, proposed, and candidate species and critical habitat that may occur in the vicinity of the deficient segments from the USFWS office in Lafayette, Louisiana (letter dated 15 July 2010 in appendix E). In response and in accordance with the provisions of the Endangered Species Act and the Migratory Bird Treaty Act of 1918 (40 Stat. 755, as amended; 16 USC 703 et seq.), the USFWS responded via facsimile dated 24 July 2010. The USFWS determined that the proposed action is not likely to adversely affect the federally listed species that occur in the region and for which the USFWS has responsibility.

In addition, four of the federally listed species that are the responsibility of NOAA Fisheries Service have a potential to occur in the project area: the threatened Gulf sturgeon (*Acipenser oxyrinchus desotoi*), the endangered Kemp's ridley sea turtle (*Lepidochelys kempii*), the threatened loggerhead sea turtle (*Caretta caretta*), and the threatened green sea turtle (*Chelonia mydas*). The CEMVN concluded that the proposed work would have no effect on threatened or endangered species under the jurisdiction of NOAA in the project area; therefore no consultation with NOAA is required. Brief descriptions of federally listed species that could potentially occur in waterways adjacent to the project area are provided below.

West Indian Manatee

The West Indian manatee is federally and state-listed as endangered and is protected under the Marine Mammal Protection Act of 1972, under which it is considered depleted (USFWS 2001). The manatee is a subtropical species with little tolerance for cold, and it returns to and remains in the vicinity of warm-water sites in peninsular Florida during the winter (USFWS 2007a; USFWS 2007b). Thus, the manatee is not a year-round resident in Louisiana, but it may migrate there during warmer months. There were 110 reported sightings of manatees in Louisiana between 1975 and 2005 (LaDWF 2005a). Occurrences and distribution appear to be increasing and are regularly reported in the tributaries along the north shore of Lake Pontchartrain and in canals within adjacent coastal marshes. Although manatees can occur in the IHNC and GIWW, preferred food sources (submerged or floating aquatic vegetation) are absent from the project area. Given the extensive areas of relatively undisturbed wetlands in the region and the frequent passage of boats and large vessels through the IHNC and GIWW, it is unlikely that manatees would utilize this area as habitat or frequently occur in the project area.

Gulf Sturgeon

The Gulf sturgeon is federally listed as threatened throughout its range and is state-listed as threatened in Louisiana. The present range of the species extends from Lake Pontchartrain and the Pearl River system in Louisiana and Mississippi east to the Suwannee River in Florida (USFWS and NOAA 2003). Although Gulf sturgeon would not be expected to utilize the IHNC or GIWW as an important migratory route, they potentially could forage in the shallow, inshore lake habitat near the mouth of the IHNC at Seabrook in winter. Gulf sturgeon would not be expected to utilize the project areas near the IHNC or GIWW as a significant habitat component because the sediments in this area do not have the characteristics that Gulf sturgeon prefer for foraging. The IHNC and GIWW are artificial waterways with heavy boat traffic, a highly developed shoreline, and very limited habitat value for the Gulf sturgeon. The area of Lake Pontchartrain near the mouth of the IHNC similarly is a heavily trafficked and developed area. Thus, any presence of Gulf sturgeon in this segment of the project area likely would be transitory and occasional.

Kemp's Ridley, Loggerhead, and Green Sea Turtles

Sea turtles are air-breathing reptiles with large flippers and streamlined bodies. They inhabit tropical and subtropical marine and estuarine waters around the world. Of the seven species in the world, six occur in WoUS, and all are listed as threatened and endangered. The three species identified by NOAA Fisheries as potentially occurring in the vicinity of the project area are similar in appearance, though they differ in maximum size and coloration. The Kemp's ridley and loggerhead turtles potentially could find suitable foraging habitat for invertebrates and fish in the open waters of Lake Pontchartrain or the Golden Triangle. The green turtle is less likely to occur there due to the scarcity of the seagrasses on which they feed. All three species nest on sandy beaches, which are not present in the project area, and the Kemp's ridley does not nest in Louisiana. The life stages that may occur in the Lake Pontchartrain or Golden Triangle areas are likely to be older juveniles to adults (NOAA Fisheries Service 2010b). Both the IHNC and GIWW are artificial waterways with heavy boat traffic, developed shorelines, and negligible habitat value to these sea turtle species. Thus, any presence of sea turtles in the project area would be transitory and occasional.

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Threatened and Endangered Species

Under the no action alternative, flood risk reduction features in the subject reaches located along the IHNC and GIWW would not be restored or reinforced. In-water construction activities and delivery of construction materials via the IHNC or GIWW would not occur; therefore, no aquatic threatened and endangered species would be directly impacted. There would be an increased risk of flooding in the three sub-basins associated with the secondary floodwalls and levees if the deficient segments were to fail during a storm event. Indirect impacts could occur if debris and potentially contaminated floodwaters were to reach the IHNC and GIWW or upland areas and degrade potential threatened and endangered species habitat.

Future Conditions with Proposed Action

Direct, Indirect, and Cumulative Impacts to Threatened and Endangered Species

Under the proposed action, regardless of the restoration/reinforcement method, no in-water construction work would occur; therefore, no threatened or endangered species would be affected during construction or after the project has been completed. Although the project segments are located adjacent to the IHNC and GIWW, no construction would take place directly within the habitats of concern and there would be no direct, indirect, and cumulative impacts to threatened or endangered species with the potential to occur adjacent to the project areas.

3.2.5 Cultural Resources[1]

Existing Conditions

For the proposed project, the Area of Potential Effect (APE) includes 21 individual levee alignment segments totaling approximately 4.6 mi in length (shown as red segments on figure 2) and nine proposed staging areas (labeled as areas A through I in appendix C). With the exception of Staging Areas A and I, of which a small portion of each falls within the ROW, all proposed staging areas would be located nearby or adjacent to existing ROW.

The CEMVN contracted R. Christopher Goodwin and Associates, Inc. (RCGA) to conduct cultural resources evaluations of IER #11 – Tier 1 (USACE 2008c) and Tier 2 Borgne and Pontchartrain project activities (USACE 2008a and 2010a). The results of those findings are summarized below as appropriate and applicable for the current project area.

Tier 2 Pontchartrain - IHNC

RCGA utilized background research, previous cultural resource investigations review, soil and topographic analyses, and field reconnaissance information to identify high potential areas for archaeological resources and to assess any historic structures and potential historic districts that might be located in the project area (Heller and Hannah 2009).

[1] Apart from the rest of this report, which was prepared by AECOM, the Cultural Resources analysis and discussion was prepared by USACE-CEMVN. For a full list of preparers, see Table 16 in Section 10.

Background research into records on file at the Louisiana Division of Archaeology and the New Orleans District indicate no previously recorded archaeological sites are located in the Tier 2 Pontchartrain project area. However, site forms and archaeological investigation reports describe known archaeological sites within the project vicinity. Prehistoric shell midden sites have been recorded nearby on the Lake Pontchartrain shoreline along beach ridges and where bayou channels drain into the lake. Due to recent geologic development of the Mississippi delta, the earliest known archaeological sites in the project vicinity date to the Poverty Point period (1700–500 BC).

Within the greater New Orleans Metropolitan area, historic period archaeological sites and structures, such as forts, plantations, residential neighborhoods, bridges, and industrial facilities initially developed along the high ground adjacent to natural waterways and lake shorelines, and were later established along man-made canals and within drained back swamp areas. Historic period watercraft are recorded in bayous, river channels, and lakes in the region.

Background research indicates two previous cultural resources surveys were conducted within or near the IER #11 - Tier 2 Pontchartrain project area. One survey consisted of an examination of the Lake Pontchartrain and Vicinity Hurricane Protection Levee system (New World Research 1983). No cultural resources were identified in the survey area. In the second study, researchers included an evaluation of the Seabrook Railroad Bridge and determined it was eligible for listing on the National Register of Historic Places (NRHP) (Wilson et al. 2006).

Waterway development heavily influenced construction throughout project area, particularly along the IHNC. Construction of the IHNC began in 1918 and was completed in 1923. The canal provided an improved route between Lake Pontchartrain and the Mississippi River through the use of one of the largest locks in the nation at the time of its construction. In addition, a complex railroad network crosses New Orleans East along Chef Menteur Highway and Hayne Boulevard. New Orleans East subsequently developed into a significant industrial center for the City of New Orleans.

Six cultural resources have been previously documented within the immediate project vicinity, but none are located directly in the project area. These properties include 1) Camp Leroy Johnson site (16OR219), 2) U.S. Army Air Base Building, 3) Downman Road Site (16OR8), 4) Pontchartrain Park Residential Area, 5) Pine Village Residential Area, 6) Lakefront Airport, and 7) Fountain of the Four Winds.

Following the completion of archival research, soil and topographic analysis, and reconnaissance level field investigations, researchers determined that no areas in the Tier 2 Pontchartrain project area possessed the potential to contain buried archaeological deposits and no Phase 1 level investigation was conducted. Only one historic structure was identified in the project area. As mentioned previously, the Seabrook Railroad Bridge is a NRHP-eligible steel bascule structure constructed in 1920 on the Norfolk Southern railroad where it crosses over the IHNC.

Tier 2 Borgne – GIWW and MRGO

For the eastern portion of the GIWW, records on file at the Louisiana Division of Archaeology and the New Orleans District indicate numerous previously recorded archaeological and historic properties are located within, and immediately adjacent to, the eastern sections of the GIWW study area.

For the IER #11 – Tier 2 Borgne project, the cultural resources study boundaries extended 500 ft to the protected side of the existing levees that border the north bank of the GIWW and the southwest bank of the MRGO. The western boundary was located approximately 1,500 ft west

of the Paris Road Bridge. The eastern boundary at the time extended beyond the current project area across the Golden Triangle Marsh in a straight line due south from the Maxent Canal. Therefore, this study area overlaps the current project study boundaries and the findings are applicable.

Background research identified three known archaeological sites in the eastern section of the GIWW study area. Site 16OR40 (Linsley Site) was recorded in 1960 as a re-deposited shell midden extending 500 ft along the spoil bank of the GIWW. Shell, large quantities of vertebrate faunal material, Poverty Point objects, and other cultural materials were recovered. Four radiocarbon dates ranging from 2490-1590 BC were obtained from organic samples. Investigators at that time concluded that the site was buried under marsh and cultural deposits from the site were dredged and placed on the spoil bank during the construction of the GIWW. Additional testing in 1982 suggests widening of the GIWW may have destroyed additional portions of the site.

Site 16OR41 (Paris Road) was originally recorded in 1964 as a buried midden deposit exposed during drag line operations for the construction of the Paris Road Bridge. Cultural material recovered from the site dated exclusively to the Tchefuncte Period (circa 500 BC – AD 100). In 1984, a portion of the recorded site location was auger tested to a depth of 17 ft with negative results. Researchers concluded that the tested portion of the site had been destroyed.

Site 16OR55 (Atlatl Weight Site) was recorded in 1975 as a scatter of prehistoric midden material located on a spoil bank adjacent to the GIWW. Although no temporally diagnostic artifacts have been reported from the site, additional investigations have been recommended by researchers. There is a discrepancy in the site records showing two separate locations for the site, one north and one south of the GIWW.

One known historic property is recorded in the eastern side of the GIWW project area. This property is the National Aeronautics and Space Administration (NASA) Michoud Assembly Facility located immediately north of and adjacent to the GIWW between the Michoud Slip and Michoud Canal. The area was first owned by French settler Gilbert Antione de St. Maxent in 1763 and later was purchased by Antoine Michoud. The brick smokestacks from Michoud's sugar mill still exist at the entrance to the NASA facility. Beginning in 1941, Higgins Industries built Liberty ships and later wooden cargo planes at the facility. In 1961, NASA chose the Michoud facility for the production of the first stages of the Saturn rocket and continues to use the facility to the present day. A recent architectural survey of the facility determined that three buildings associated with the space program and ten buildings associated with World War II activities are eligible for listing on the NRHP.

Researchers conducted a boat survey within the eastern portion of the GIWW project area. This survey included marshes along the shorelines of the GIWW, portions of the MRGO, and a northern section of Bayou Bienvenue. During the survey, shorelines were examined for cultural material and for evidence of intact cultural deposits. Wherever possible, pedestrian survey, shovel test excavations, and/or probing were also conducted in high probability areas located on dry, high ground. Probing found no buried shell deposits and no other cultural material was identified. Due to low research potential, low artifact density, and lack of integrity, researchers determined that the locus was not significant and recommended no further work.

Researchers also evaluated the potential for submerged cultural resources in the eastern section of the GIWW area. Background research identified seven previously reported shipwreck locations in the surrounding area. Confirmed sites are modern vessels located in the channels of the MRGO and the GIWW. The likelihood for significant historic period shipwrecks and other

nautical cultural resources is considered extremely low in these man-made and maintained channels.

The following discussion of impacts is based on the information provided in the cultural resources investigation management summaries prepared by RCGA (Heller et al. 2008 and Heller and Hannah 2009).

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Cultural Resources

Under the no action alternative the deficient levee/floodwall segments along the IHNC and GIWW would not be repaired or restored. There would be an increased risk of flooding should the deficient segments fail during a high water event. Direct impacts to cultural resources associated with flooding could be submersion damage to cultural resources such as historic buildings, structures, and cemeteries. Indirect impacts could result if subsequent repairs to historic resources were conducted in such a way that the historic features of the resource were irretrievably removed or demolished. Indirect impacts to existing or undetected archaeological resources could occur should levee or floodwall failure result in scouring of an area containing such resources, thereby resulting in those resources being washed out of the subsurface and potentially being lost or damaged. Impacts to both historic and archaeological cultural resources could be cumulative should the flooding occur throughout the New Orleans Metropolitan area.

Future Conditions with Proposed Action

Direct, Indirect, and Cumulative Impacts to Cultural Resources

All proposed activities associated with restoring and reinforcing deficient portions of the existing levees and floodwalls up to the 100-year level of risk reduction would be conducted within the existing ROW and would have no direct, indirect, or cumulative impacts on significant cultural resources. The existing project ROW has been subjected to severe ground disturbing activities associated with the construction of the existing HSDRRS; excavation and construction of major canals and waterways including the IHNC, Michoud Canal, and GIWW; and the development of adjacent control structures and industrial facilities. The likelihood for intact and undisturbed cultural resources in the existing ROW is extremely minimal.

Known archaeological and cultural resources identified in the study area include: Site 16OR219 (Camp Leroy Johnson), the U.S. Army Air Base Building, Site 16OR8 (Downman Road Site), Pontchartrain Park Residential Area, Pines Village Residential Area, New Orleans Lakefront Airport, Fountain of the Four Winds, Site 16OR41 (Paris Road), Site 16OR40 (Linsley Site), Site 16OR55 (Atlatl Weight Site), and the NASA Michoud Assembly Facility. No construction or materials staging would occur on the archaeological or cultural sites identified above; therefore, these properties would not be impacted by the proposed action.

During the previous project surveys, researchers evaluated the potential for undiscovered cultural resources within sections of the eastern project area, including a 500 ft corridor on the protected side of the levee center line along the GIWW. High probability areas for cultural resources within the ROW of the proposed action were identified along bayou shorelines and these areas were surveyed by boat. No new archaeological sites were identified (Heller et al. 2008). The likelihood of undiscovered cultural resources in the existing ROW is low given the amount of

disturbance these areas have experienced in association with initial construction of the levees. Therefore, potential adverse impacts to cultural resources are not anticipated.

Erosion of ground deposits during flood events can result in severe damage and destruction of archaeological sites. Implementation of the proposed action would provide an added level of flood protection to significant historic properties located in the immediate project vicinity; therefore, potential beneficial impacts may occur as a result of the project activities.

In a 13 September 2010 letter, the Louisiana State Historic Preservation Officer (SHPO) reviewed the proposed project and concurred that should have no affect on historic properties. The project is currently under review by interested Indian Tribes. The Decision Record for this IERS will not be signed until Section 106 consultation for the proposed action has been concluded.

Implementation of the proposed action would have beneficial cumulative impacts on cultural resources in the New Orleans Metropolitan area. This alternative is part of the ongoing Federal effort to reduce the threat to property posed by flooding. The combined effects from construction of the multiple projects underway and planned for the HSDRRS would reduce flood risk and storm damage to significant archaeological sites, individual historic properties, engineering structures and nineteen historic districts.

3.2.6 Recreational Resources

Existing Conditions

This section focuses on the public recreational activities available in the project vicinity. Fishing and boating are the dominant recreational resources within the project area, though there are also a number of parks and public playgrounds. Within the project vicinity, primary public recreational activities include:

- Boating and fishing in Lake Pontchartrain, the IHNC and the GIWW;
- Fishing from Frank Davis Pier and bank fishing along the IHNC;
- Boating and fishing from Lakeshore Park;
- Passive recreation in Lakeshore Park, Pontchartrain Park, and small local playgrounds;
- Pontchartrain Landing RV Park; and
- Golfing at the Joe M. Bartholomew Sr. Golf Course.

Most of the recreational resources noted above are near the northern IHNC, near the Seabrook Bridge and on the western side of the IHNC. These are described individually in detail below. The other stations requiring restoration/reinforcement are in more industrial and isolated areas. The Bayou Sauvage National Wildlife Refuge (NWR) is nearby, south of Reach 2, stations 406+00, 430+00 to 452+00, 454+00, and 525+00 to 530+00 (figure 11).

The Bayou Sauvage NWR is a natural area consisting of 23,000 acres of fresh and brackish marsh, providing habitat for wading birds, fish, and other wildlife (USFWS 2009). Recreational activities within the refuge include boating, fishing, hiking, and bird watching (USFWS 2008). Peak waterfowl populations of 75,000 are found in the wetland areas during the fall, winter, and early spring months (USFWS 2007c). Although there is a large migratory bird population, the Bayou Sauvage NWR is not listed as an Important Birding Area (IBA) by the National Audubon Society (Audubon 2010). The nearest readily-accessible public access point within the NWR with respect to the project location is the Joe Madere Marsh Unit, which is accessible from Highway 90 to the east of the project site.

Figure 11. Map of Bayou Bienvenue and Bayou Sauvage NWR

Another potential recreational area in the eastern end of the project vicinity is Bayou Bienvenue, a portion of which is a natural and scenic water body designated by the State of Louisiana (figure 11). The official designation is from the confluence with Villeré Bayou to Lake Borgne, which is over 2 mi from the nearest deficient segment of HSDRRS. This bayou meanders from Lake Borgne, through the Golden Triangle marsh, across the MRGO, and then runs parallel to and south of the GIWW. Near stations 17+50 to 24+00 and 28+85 in Reach 1, Bayou Bienvenue merges with an outfall canal. The bayou provides boating and fishing opportunities in a natural setting and is recognized as a local recreational resource that supports local opportunities associated with wetland ecosystems including fishing, canoeing, and wildlife observation. Bayou Bienvenue is noted as an Impaired Waterbody by the U.S. Environmental Protection Agency (USEPA). It is designated as "fully supporting" fish and wildlife propagation, primary contact recreation, and secondary contact recreation; but "not supporting" oyster propagation due to probable fecal coliform impairment most likely from wildlife other than waterfowl (USEPA 2010). Although the eastern portions are used extensively, it is unlikely that the portion of Bayou Bienvenue nearest to the deficient segments in Reach 1 would be used for recreation, as this is essentially the outfall canal of a sewage treatment plant.

Five boat launches are located in the project area. The only public ramp is located within 1,500 ft of station 268+00 in Reach 3, the Seabrook Boat Launch in Lakeshore Park (a collective term for the series of parks located along the south shore of Lake Pontchartrain). Currently, the public launch at Seabrook Bridge is inaccessible due to construction work in the area. Four private ramps also occur in the vicinity of the project: Eddie Pinto's Boat Launch, located across the Paris Road Bridge from the project area (photo 6); and Seabrook Marine, Pontchartrain Landing

recreational vehicle (RV) Park, and Trinity Yachts, which are located along the west bank of the IHNC adjacent to some of the deficient HSDRRS segments but outside of the ROW and the project footprint. These features and other recreational resources in the area are illustrated in figure 12.

According to the Louisiana Department of Transportation and Development (LaDOTD), the project area contains three designated bicycle paths: the Mississippi River Trail, which is located less than 1,000 ft from the southern-most station on the IHNC, Gate W-1; and two suggested cross-state bicycle routes, one along the portion of the Chef Menteur Highway that travels west of Paris Road and across the IHNC, and another path that continues south from the Paris Road Bridge at station 260+00 (LaDOTD 2008 and Mississippi River Trail [MRT] 2008).

Photo 6. Eddie's Boat Launch
(located on the south side of the Paris Road Bridge)

Fishing and pleasure craft (including charters) launch from various facilities on the IHNC such as Seabrook Marine and Pontchartrain Landing RV Park (figure 12). As many as 65 boats per day launch from Seabrook Marine on busy summer weekends, and may return several times per day (HDR 2009a). The RV Park at Pontchartrain Landing offers the use of boat ramps for a fee and has had as many as 100 launches per day on a busy weekend (HDR 2009b).

Fishing is an important recreational resource for the State of Louisiana. In 2003, it supported 16,999 jobs and generated a total economic impact of $1.6 billion (LaDWF 2005b). The Seabrook Bridge area is well-known throughout the state for its record trout catches and is a popular fishing spot among local residents. The Frank Davis Fishing Pier extends from the shore underneath the Seabrook Bridge and is managed by the Orleans Levee Board. This pier is regionally known for catches of white trout, speckled trout, flounder, redfish, sheepshead, black drum, and croaker, primarily due to its proximity to the existing scour holes (Davis 2007). The pier is also currently inaccessible due to construction activities and materials staging under the Seabrook Bridge and along Lakeshore Drive.

Preparation and equipment/material staging for construction of a new floodgate structure on the IHNC at Seabrook (USACE 2010a) and for improvements to the Lakefront Levee and floodwalls (USACE 2009a) have impacted access to the Frank Davis pier and Seabrook Launch. During construction of the Seabrook Gate, the most significantly impacted recreational features would be expected to be boating and fishing, as a result of the placement of a cofferdam structure across the entire IHNC channel for approximately 6 months to 12 months. During this time all boat access and water flow between Lake Pontchartrain and the IHNC through the Seabrook Gate would be suspended and local fishing opportunities would be limited. Access between the IHNC and Lake Pontchartrain could be achieved using the GIWW and the Rigolets pass between Lake Pontchartrain and the Gulf of Mexico.

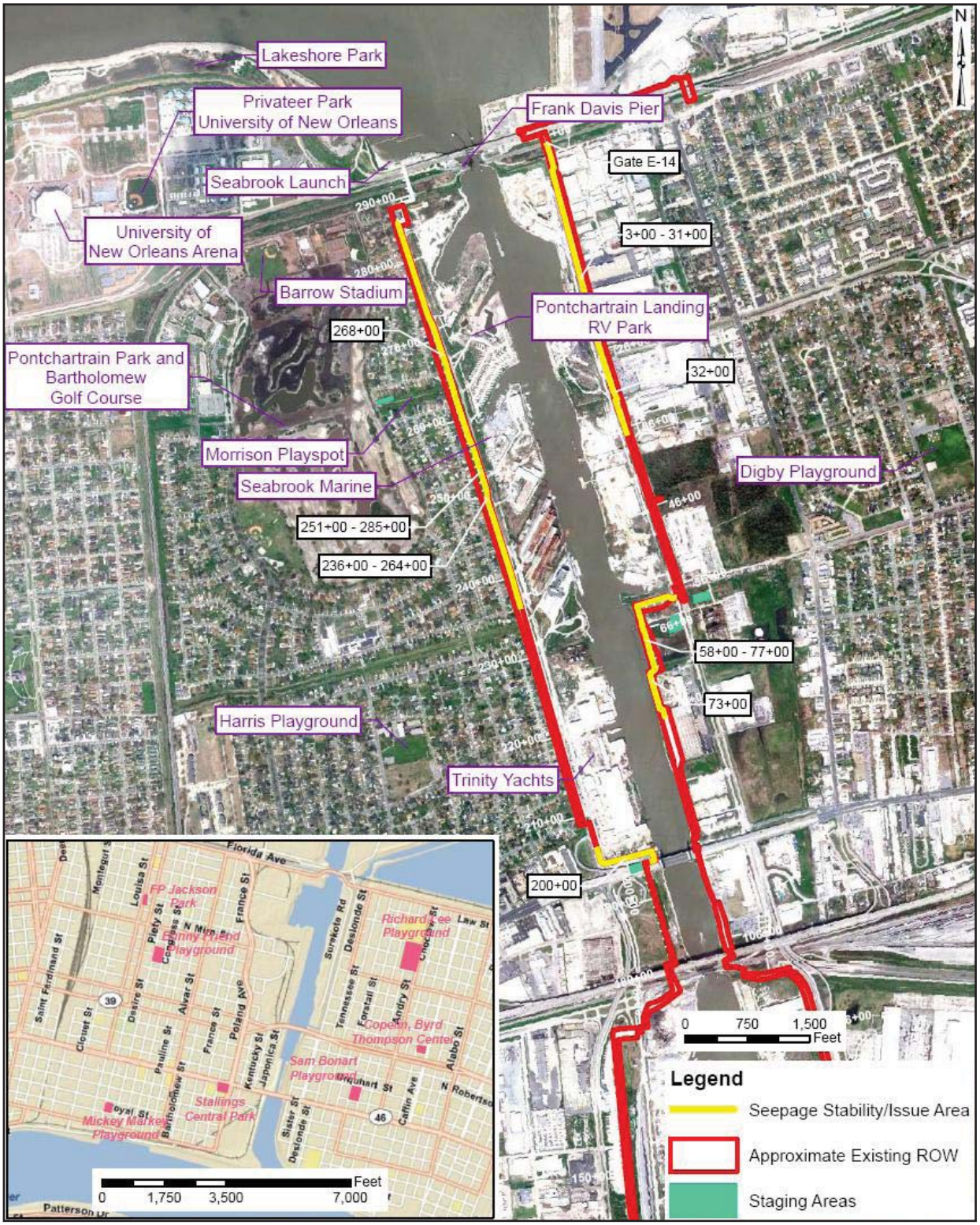

Figure 12. Recreational Areas near the Western Portion of the Project Vicinity

On 20 April 2010, an explosion occurred on the active, exploratory offshore drilling rig Deepwater Horizon in the Gulf of Mexico and on 24 April 2010, it was discovered that oil was leaking from the wellhead into the Gulf. For approximately 100 days afterwards, massive amounts of oil were released, forcing recreational and commercial fishing closures in both state and federal waters (LDWF 2010). Although recreational fishing along the Gulf Coast was severely impacted by this oil spill, the immediate New Orleans area was largely spared. The waters of Lake Pontchartrain remained open except for a small portion near the Rigolets Pass, which was closed when tar balls were observed. Recreational fishermen in Lake Pontchartrain were most likely not affected by these closures. Fishermen in the GIWW may have experienced minor, temporary effects. As of 19 August 2010, many areas closer to shore have been reopened to both commercial and recreational fishing; however, oyster and crab fisheries were two of the most heavily impacted inland resources and many inshore areas still remained closed.

Photo 7. The Morrison Playspot
(the floodwall in the background)

Bird-watching is also a popular recreational activity in and around Seabrook. The New Orleans Lakefront at Seabrook is listed as an official location (site 7-5) on the Louisiana Birding Trail (America's Wetland 2009). Public benches are provided in Lakeshore Park for bird-watching or passive recreational opportunities.

Numerous recreational areas for adults and children are located near the northern IHNC project area. As illustrated on figure 12, there are several recreational areas along the IHNC. These parks and playspots are local community facilities accessible to the public.

Photo 8. Pontchartrain Park and the Joe W. Bartholomew, Sr. Golf Course (under construction)

Relative to the project location, the closest facilities are Morrison playspot (photo 7) and Pontchartrain Park (photo 8), both on the west side of the IHNC. The 1.7-acre Morrison playspot is adjacent to stations 236+00 to 264+00, 251+00 to 285+00 and 268+00. Currently, this area is undeveloped; however, the Downtown

Neighborhood Market Consortium desires to develop the area into a community garden area, including a cypress forest, children's play area, natural wetland, amphitheater, and roadside produce stand (Goldenberg 2008). On the east side of the IHNC in Pines Village, the closest park is Digby Playground, located approximately one mile away from station 73+00. This 7-acre playground is a well-developed facility recently rehabilitated for public use (City of New Orleans [CNO] 2008a).

Prior to Hurricanes Katrina and Rita, Pontchartrain Park was a well-developed, approximately 185-acre public facility just west of the northern IHNC portion of the project area (photo 8; figure 12). At its closest point, the boundary of Pontchartrain Park is approximately 450 ft from the floodwall along France Road. The park was an important recreational resource to the community and to help ensure its continued use, the New Orleans Neighborhood Rebuilding Plan (NOLANRP) has identified numerous redevelopment projects for the park and area (NOLANRP 2006). These redevelopments and renovations are currently under construction (photo 8).

Included within Pontchartrain Park are Wesley Barrow Stadium, the Bartholomew Golf Course, and a playground area on the southern end of the park (figure 12). Prior to Hurricane Katrina, the Wesley Barrow Stadium served as the primary site for the city's Little League teams as well as for local high schools (CNO 2007).

The Joe M. Bartholomew, Sr. Municipal Golf Course, an 18-hole golf course in the Pontchartrain Park neighborhood, was damaged during Hurricane Katrina and has not re-opened. Originally named the Lake Pontchartrain Golf Course, this course was the only golf course available to African-Americans during the segregation era in New Orleans. By 1979, it had undergone renovations and was renamed the Joe M. Bartholomew Sr. Municipal Golf Course, after Joseph M. Bartholomew, one of the wealthiest African American men in New Orleans at the time. Although the golf course is not currently listed on the NRHP, neighborhood and civic organizations are pursuing its designation (Greater New Orleans Community Data Center [GNOCDC] 2008; Pontchartrain Park Neighborhood Association [PPNA] 2008).

Barrow Stadium, on the northern end of the golf course, is also slated for renovation. Plans involve the replacement of the existing stadium and the construction of a new stadium. The new stadium has been designed and bids for general contractors have been received (CNO 2010b). No work is currently being done on the stadium (photo 9).

Photo 9. The Wesley Barrow Stadium
(currently closed and fenced off)

The playground area on the southern end of the park is operational and includes swings, jungle gyms, baseball fields, soccer fields, and basketball courts.

On the southern end of the IHNC, near the lock, are several small

neighborhood playgrounds, Bunny Friend, Mickey Markey, Stallings Center, Richard Lee playground, Sam Bonart playground, and the Copelin, Byrd Thompson Center (figure 12). These recreational spaces are in various states of repair.

The Bunny Friend playground has basketball courts and a small jungle-gym play area, which is currently functional. This playground has been in operation since the early 20th century when Ida Friend donated money and land to build it in memory of her son (Pontchartrain 2010).

Mickey Markey playground does not have any amenities, but is a popular dog park where dogs are allowed both on and off leash (poopypark.com 2010).

The Stallings Center playground once had an indoor gym and pool available to the community prior to Hurricane Katrina. The buildings were demolished in March 2010, and construction of a new Community Center is slated to begin in the near future (Times Picayune 2010).

The Richard Lee playground and the Copelin Center are currently closed and the buildings are either in serious disrepair or have been demolished. The pool at the Bonart playground has not reopened since the hurricane, but there is on open grassy space for recreation (Davis 2010).

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Recreation

No construction within the previously disturbed and/or developed ROW would occur under this alternative because the deficient levee/floodwall segments along the IHNC and GIWW would not be restored or reinforced. There would be an increased risk of flooding in the New Orleans East, Orleans East Bank, and Chalmette Loop sub-basins if storm surge were to cause breaches in the interior floodwalls and levees along the IHNC and GIWW. If the secondary line of defense were to fail, some recreation areas may experience temporary, direct impacts from flooding. There could be permanent and potentially cumulative impacts to some recreation areas should submersion result in damage requiring demolition of structures, and/or if repairs to these areas are delayed over a long-term, as happened following Hurricane Katrina.

Future Conditions with Proposed Action

Direct and Indirect Impacts to Recreation

The proposed action would be compatible with recreation areas within the project vicinity since the proposed restoration/reinforcement methods would not result in alterations to existing HSDRRS structures that would require any additional space outside of the ROW once completed. Under the proposed action, recreational assets of the project corridor would be temporarily impacted by construction activities, which would last approximately 10 months. The impacts associated with each restoration/reinforcement method would be similar for all sites and are discussed together for all sites. Specific sites where the proposed restoration/reinforcement method may have different impacts from the more general impacts are discussed under each method.

None of the proposed methods would directly, physically impact the Bayou Sauvage NWR, Bayou Bienvenue, or any of the other recreational facilities in the project vicinity. Impacts to aesthetics and noise associated with construction activities and the presence of heavy equipment

in nearby recreational areas would be temporary and minor. Direct, temporary impacts related to night-time construction activities would result from noise from earthmoving and project lighting. The noise from construction operations would affect the generally placid environmental conditions that may be enjoyed by fisherman, recreational boaters or bird watchers. Additional temporary impacts to passive recreational activities such as bird watching may be experienced during construction. Minor, indirect impacts associated with construction at specific stations are described below.

DSM – DSM is the proposed reinforcement method for Reach 1, station 28+85 and Reach 3 station 268+00, and is an alternate reinforcement method for Reach 2, stations 73+00, 79+00, 242+00 to 260+00 and 525+00 to 535+00. Most of these stations are immediately adjacent to industrial facilities. Stations 79+00 and 242+00 to 260+00 are in relatively natural open areas adjacent to the GIWW. There are no recreational facilities adjacent or near station 28+85; however, station 268+00 is near several recreational facilities, including the Seabrook Boat Launch, the Frank Davis Pier, Morrison Playspot, Lakeshore Park, Pontchartrain Park, Wesley Barrow Stadium, and the Joe Bartholomew Sr. Golf Course. These recreational areas are currently non-operational or inaccessible, except for a small area on the southern end of Pontchartrain Park. Potential indirect impacts to this small park could include difficulties in reaching the areas, due to increased traffic on the roads, increased noise due to heavy machinery, and minor visual impacts. If these recreational areas were to re-open prior to completion of the proposed action, then temporary impacts associated with access and overall quality of the recreational opportunity due to noise and disturbance would occur. Following construction, no impacts to recreational resources in the area would be expected since no additional space would be required.

Berm – Berm is the proposed restoration method for Reach 2, stations 73+00, 79+00, 242+00 to 260+00 and 525+00 to 535+00. It is the alternate restoration method for Reach 1 station 28+85. These areas already consist of earthen levee or earthen levee/floodwall combination. There are no official recreational areas in the vicinity of these stations; therefore, there would be no direct impacts to recreation associated with these restoration features. Potentially, persons actively boating or fishing in the GIWW or Bayou Bienvenue could experience slight impacts due to increased noise from the heavy machinery. These indirect impacts would be temporary. Bayou Bienvenue is located to the south of several stations in Reach 2, but the designated Natural and Scenic River portion is separated from stations 525+00 to 535+00 and stations 242+00 to 260+00 by more than 3 mi and 4 mi, respectively (figure 11). Equipment may be visible during construction, but the distance would lessen any noise or other potential impacts to recreation in the bayou.

Buttress Wall – Buttress walls are the proposed reinforcement method for Reach 2, stations 3+00 to 31+00, 32+00, 268+00, 270+00 and 278+00, and the alternate reinforcement method for Reach 1, stations 17+50 to 24+00, Reach 2, stations E-14, 58+00 to 77+00 and 454+00, and Reach 3, stations 268+00, 256+00 to 285+00, 200+00 and W-1 0+00 to 2+00. There are no recreational areas near Reach 1 and recreational areas near the Reach 3 stations include those mentioned previously for the DSM alternative. No direct impacts to recreation would be associated with this reinforcement type. Potential indirect impacts would be similar to the DSM alternative, such as a temporary increase in noise and difficulty reaching the functional playground at the southern end of the park.

Concrete Slab – Concrete slabs are the proposed reinforcement method for Reach 1, station 17+50 to 24+00; Reach 2, stations E-14, 58+00 to 77+00, and 454+00; and Reach 3, stations 251+00 to 285+00, 200+00, and W-1 0+00 to 2+00. Gates E-14 and W-1 are the only stations for which this reinforcement method is proposed that are located near recreational facilities; the Seabrook Boat Launch, the Frank Davis fishing pier, and the small neighborhood parks

surrounding the IHNC Lock. Since all construction activities and the footprint of the concrete slab would occur within the existing ROW, no direct impacts would be anticipated. Temporary indirect impacts such as avoidance of nearby recreational areas due to construction noise or road closures (inaccessibility) could potentially occur. Currently, the Seabrook Launch and Frank Davis Pier are inaccessible due to construction on Lakeshore Drive and equipment staging at the boat launch. If these recreational areas were to re-open prior to completion of the proposed action, then temporary impacts associated with access and overall quality of the recreational opportunity due to noise and disturbance would occur. The parks on the southern end of the IHNC (inset on figure 12) are not immediately adjacent and are not fully functional. There are plans to rehabilitate several of these recreation areas; however, it is unlikely that this work would be completed before this project begins.

Relief Wells – Relief wells are the proposed reinforcement method for stations 406+00 and 430+00 to 452+00 (Reach 2) and stations 236+00 to 264+00 (Reach 3). Stations 430+00 to 452+00 are located on the NASA property in a highly industrial area. Stations 258+00, 256+00, and 248+00 are located along the northern IHNC, near several recreational areas; however, all work would occur in the existing ROW and no impacts to recreational activities in the vicinity would be anticipated. Potential indirect impacts to recreation in this area would be similar to those described for the concrete slab method since similar equipment would be used and the stations are adjacent. These impacts would be minor due to the distance between the proposed work and the recreational facilities and the fact that most of the facilities are not currently operational. Given that most of the recreational facilities in the area are either closed or under construction, impacts would only occur if these facilities reopened prior to completion of the proposed action.

Staging Areas – All proposed restoration/reinforcement methods would have associated staging areas (appendix C). The existing land use of these potential staging areas varies greatly, ranging from adjacent residential areas to bridge underpasses. Staging areas would be used for equipment and materials storage during construction. Temporary direct impacts to recreation could occur in the areas that are near to the staging areas. These impacts would be similar to those mentioned previously for construction activities. A portion of the western end of the Morrison Playspot is a proposed staging area (photo 7; appendix C). This recreational area is currently undeveloped land, although it is mowed and maintained regularly. There are plans to develop this plot into a community garden and a recreational area for the neighborhood. A direct impact to recreation in the area could occur if the City of New Orleans or other organization were to attempt to develop the playspot prior to completion of the proposed action. This area would experience a direct impact while in use as a staging area; however, if the restoration/reinforcement methods are completed prior to any attempts to develop this recreational area, potential impacts would be temporary. Indirect impacts to recreation from the staging area would be similar to those described for construction activities, primarily associated with a temporary decrease in recreational opportunities due to increased noise and inaccessibility.

Cumulative Impacts to Recreation

Minor cumulative impacts to recreational resources along the northern IHNC are possible due to the combined effects of the restoration/reinforcement methods along the IHNC and other projects in the area (see section 4). These impacts would be greater for people using the RV park and the private boat launching facilities in the area, particularly if construction schedules of the proposed action work overlap with the construction schedule of the Seabrook Gate. Similar cumulative impacts to recreation from the construction schedules of the deficient levee/floodwall segments near the Borgne Barrier could also be possible. These impacts would be temporary, occurring only during construction.

3.2.7 Aesthetics

Aesthetics is a measure of sentiment or taste that an environment can induce in an observer. This measure involves the visual appearance of a setting and its structures, and how they blend or contrast with their surroundings. Aesthetics with respect to this IERS includes details such as the shape and color of the levees and floodwalls, the interaction of the HSDRRS with neighboring structures or other scenery, the placement of the HSDRRS structures with respect to roads, green space and other structures nearby, and potential visual interruptions that would block or alter a person's visual perspective in the area.

There are potential aesthetic impacts from all the alternatives for the restoration/reinforcement of the deficient HSDRRS segments. These impacts vary with the segments because the existing aesthetic conditions vary by site location. For the purpose of this evaluation, aesthetically similar or adjacent sites have been grouped together because potential impacts would be the same at these sites. Additionally, aesthetic impacts during construction may vary by site and restoration/reinforcement method; however, the impacts vary so slightly that construction impacts are assumed to be similar for all methods other than the no action alternative.

Existing Conditions

Reach 1 of the HSDRRS (stations 28+85 and 17+50 to 24+00) consists of both earthen levee and floodwall, with associated joints between them. The area is relatively flat in relief with the levee and floodwalls constituting the highest ground. The general appearance is a mixture of rural and industrial. A large reclamation company, Southern Recycling, is immediately adjacent to the levee on the western side. The Southern Recycling property is intensely industrial with significant large machinery activity and massive piles of shredded metals and other materials. The levee is only partially visible from inside the plant close to the floodgates due to the presence of trees between the levee and the facility and throughout the operations yard. The levee in this area is also visible from the Florida Avenue Bridge. To the east of the levee, there is a small open area and a canal, with trees and other vegetation. Further east are railroad tracks and a drainage pump station, which do not have a direct line of sight to the levee. The aesthetics in this area therefore vary between highly industrial areas and natural settings, with the levee in the middle (photos 10 and 11).

A portion of the HSDRRS within Reach 2 (station 79+00) is aesthetically similar to the segments of HSDRRS that are adjacent to Southern Recycling. This segment consists of levee and floodwall with the associated joints. The protected side has several industrial facilities with varying operations and large equipment operating over a large area. The flood side has two abandoned barge loading docks and associated cranes and machinery (photos 12 and 13). The industrial areas are surrounded by green space, which lessens the industrial feel slightly, though at the same time making it more jarring. A disjointed feeling is produced in this area due to the mixture of the natural and industrial settings. The flood side of the levee is in disrepair, and littered with debris, trash, and dilapidated structures. On either side of this segment are much more naturally vegetated areas. The immediate lush vegetation and the open space between the levee and the taller trees calms the intensity of the human-made structures and activities, especially as one is looking down on them.

Another segment of Reach 2 (stations 242+00 to 260+00) is less industrial in quality. This segment is the most tranquil of all the stations. There is industry to the east and west of the station, along the GIWW, but none immediately adjacent (photo 14). The calming view of the grassy levee and the adjacent waters of the GIWW is interrupted by a series of pipes running over and through the area. The aesthetic impacts of these pipes are relatively minor; however, as

they are much smaller in comparison to the other more natural features. From the top of the levee, a large expanse of varied and natural vegetation is highly visible to the north, further enhancing the peaceful setting. The industrial areas in the distance are far enough away that they do not have an extensive view of the levee. An observer on or near the levee in this area cannot hear the sounds made in the industrial areas either, adding to the serenity of the area.

Stations 268+00, 270+00, 278+00 adjacent to stations 242+00 to 260+00 along Reach 2 are more industrial in setting. These stations also consist of both levee and floodwalls with associated joints and floodgates providing access to the GIWW (photo 15). The aesthetics of these segments are more industrial than the other segments in Reach 2. The Entergy Michoud Plant is very large and imposing with many pipelines, buildings, and other structures throughout the facility including vents and storage tanks; portions of the plant machinery and structures cross over the levee. These segments of the levee are visible from the Paris Road Bridge. The noise from the bridge contributes to the overall industrial nature of this area. Along stations 268+00, 270+00, 278+00 the waters of the GIWW are less influential on the overall aesthetics and natural areas are not prominent.

The segments of the HSDRRS on and adjacent to the NASA facility (stations 406+00, 430+00 to 452+00 and 454+00) are also highly industrial in nature (photo 16). The industrial appearance of the area immediately adjacent to the levee, however, is lessened by a wide expanse of grass and a drainage canal between the floodwall and the NASA facility. This segment is entirely floodwall atop an earthen levee. The wall is so high that an observer cannot see over it from inside the facility, therefore the Michoud Canal area is not visible. Access to these levee segments is restricted and there is not a large amount of activity in this back-side area of the plant. Therefore, it is relatively peaceful in nature. An observer is shielded from the intense industrial activities on the other side of the Michoud Canal by the floodwall itself, allowing a more tranquil setting. The trees throughout the NASA facility also aid in reducing the industrial nature of the area. Due to the flat topography and the grassy area, a sense of openness is experienced, with a large view of sky broken only in the distance by the adjacent facility.

The rest of the stations in Reach 2 (stations 79+00, 3+00 to 31+00, 32+00, gate E-14, and 525+00 to 535+00) and those in Reach 3 (268+00, 236+00 to 264+00, 251+00 to 285+00, 200+00, and Gate W-1) are far more densely industrial in nature than those discussed previously (photos 17 through 21). The former USCG station (station Gate W-1) is the most aesthetically unpleasant (photo 17). The floodwall is adjacent to four abandoned industrial buildings in severe disrepair. Debris, machinery, and trash litter the area both inside and around the buildings. To the northern end of the station is a more open area, still highly industrial in appearance, with concrete slabs, wooden piers, and bridges occupying most of the view. The only natural vegetation is bushy weeds, adding to the unkempt nature of the site. On the other side of the floodwall is an equally unpleasant and apparently mostly abandoned area, consisting of large warehouse-type buildings and dilapidated residential structures. Some of the houses appear to be abandoned. The roads are potholed and un-curbed and the green spaces are covered in weeds.

The stations along the flood side of the northern IHNC are aesthetically similar to Gate W-1. The area is also highly industrial in nature with abandoned industrial sites interspersed with active ones (photos 18 and 19). There are large expanses of desolate areas that create an isolated appearance though also lessen the mechanical nature of the area. Some abandoned portions appear almost natural as they have been allowed to grow over with weeds, some of which are now the size of small trees. The Pontchartrain Landing RV Park, in the center of the eastern shore of the IHNC, is a well-kept, landscaped RV camping area. This property is juxtaposed to the rest of the properties in the vicinity. Along the IHNC in this area, the normally tranquil aspects of a large body of water are only partially experienced because many portions of the water body are littered with the remains of abandoned piers and other facilities jutting out into

the water (photo 18). Overall, the flood side of the HSDRRS in the northern end of the IHNC is an aesthetically unpleasant area, with small islands of naturally vegetated and landscaped areas between the industrial or abandoned buildings.

The protected side of the HSDRRS along the northern IHNC is different in appearance as compared to the flood side. On the western shore, there is an occupied residential area, with single family homes with small yards (photo 20). The neighborhood appears generally well kept and almost sub-urban in nature as seen from the floodwall. Due to the height of the floodwall, the industrial area is partially hidden, distancing the larger buildings that are still visible. Further west from the residential neighborhood is a park and a golf course. From this vantage point, the observer experiences a peaceful suburban neighborhood, with agreeable walking and driving areas.

The eastern shore of the protected side of the northern IHNC is considerably industrial in nature (photo 21). There are many large warehouse buildings and parking areas, including a huge gypsum plant. Most of these properties are functioning with varying amounts of activity. The view of the levee from this side of the wall is restricted as there is a very small open area between the wall and the adjacent facilities. Although the area is cleaner and in working order, the lack of open space creates a constricted feeling as one can only see for short distances. The grass on the berm along this portion of the levee is often stressed, contributing to the industrial aspect. There are railroad tracks on the northern end of this stretch and a highway on the southern end, which are noisy and could exacerbate the aesthetic discontent experienced in this area.

Photo 10. Reach 1, illustrating the levee and the adjacent industrial and natural areas at these stations

Photo 11. Gate leading to levee access road (Southern Recycling to the left and a natural environment in the background)

Photo 12. Station 79+00 and surrounding industrial area, showing the asphalt company

Photo 13. Floodwall and one of the abandoned barge loading facilities on the flood side of the HSDRRS

Photo 14. Station 247+00 (natural setting near the levee with industrial areas in the distance)

Photo 15. HSDRRS adjacent to the Paris Road Bridge and the Entergy Michoud Plant, showing industrial nature of the area

Photo 16. HSDRRS adjacent to the NASA facility (wide grassy area and a canal between the facility and the floodwall)

Photo 17. Former USCG facility adjacent to the IHNC Lock (abandoned buildings, concrete/industrial features)

Photo 18. Station 73+00 floodwall (industrial nature of the area, abandoned piers/buildings in the IHNC itself)

Photo 19. Northern section of IHNC east bank (Halliburton facility and France Road)

Photo 20. Northern section of IHNC west bank (industrial area on the left and the residential area on the right)

Photo 21. View of the protected side of the eastern IHNC floodwall, illustrating the industrial nature of the area

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Aesthetics

Since no restoration/reinforcement work would occur, the deficient segments in Reaches 1, 2, and 3 could potentially fail during future high water events resulting in localized or regional flooding. The scale and degree of flooding would determine the significance of potential direct, indirect, and cumulative impacts to the aesthetics of the area. Widespread flooding could result in the accumulation of debris or significant damage to structures and resources. Such impacts would be temporary since the floodwaters would be expected to retreat and areas would return to pre-storm conditions following completion of potential reconstruction and cleanup. Should flooding occur on a regional level there would likely be cumulative impacts to aesthetics.

Future Conditions with Proposed Action

Direct and Indirect Impacts to Aesthetics

The proposed action is compatible with the natural and cultural setting that exists today, as the project features of the proposed action are of similar nature to current project features. Under the proposed action, the aesthetic value of the project corridor would be temporarily impacted by construction activities. The impacts of each proposed restoration/reinforcement method would be similar for all sites and are discussed together for all sites. Any potential site-specific impacts related to a particular restoration/reinforcement method are discussed for that method below.

DSM – DSM is the proposed reinforcement method for stations 28+85 (Reach 1) and 268+00 (Reach 3), and is an alternative reinforcement type for stations 73+00, 79+00, 242+00 to 260+00 and 525+00 to 535+00. Most of these stations are immediately adjacent to industrial facilities. During the installation of the stabilizing columns, temporary impacts to the aesthetics in the area could occur. Large machinery would be necessary to install the subterranean columns, which would intensify the industrial nature of the surroundings. This disturbance would be temporary in nature and the completed reinforcement would appear essentially the same as the current HSDRRS does.

All construction would occur on the protected side of the floodwall, which in the case of station 268+00 is adjacent to a residential area. As this area is relatively sheltered from the industrial aspects of the flood side of the HSDRRS, impacts during construction would be more noticeable here. Depending on the size of the equipment, temporary impacts to the aesthetics environment of the residential area could occur. Construction would be expected to take less than 3 months. The machinery required for this work would be large and very conspicuous, and could also be noisy. Other vehicles carrying workers and materials would be parked behind the homes during the day, adding to the visual disturbance. Station 28+85 is not in a residential area and is adjacent to a very large reclamation facility. There would be direct impacts to aesthetics during construction in this area. Stations 79+00 and 242+00 to 260+00 are located in a more natural environment with open areas. No indirect impacts would be anticipated with this reinforcement method.

Berm – Berm is the proposed restoration method for stations, 73+00, 79+00, 242+00 to 260+00, and 525+00 to 535+00. Berm is an alternate restoration method for station 28+85. Additional soil material would be placed on the protected side of the existing levees to increase stability and control seepage. Stations 79+00 and 242+00 to 260+00 are either in industrial areas or in

relatively open space. Temporary impacts to aesthetics would occur during construction due to the heavy machinery required to import and compact soils. These impacts would be minor; however, as these areas are both isolated from general public view and already experience this type of activity. Once construction is complete, no permanent impacts to aesthetics would occur because the additional soils would resemble the existing conditions and the USACE would reseed the levee to restore the grasses to maintain soil stability.

Station 73+00 is in a somewhat more industrial area than stations 79+00 and 242+00 to 260+00. Impacts to aesthetics during construction would be slightly greater in this area. Temporary impacts during construction would be short. Only one facility would be impacted during construction, Dupuy Storage. The short-term construction would occur behind the buildings on the protected side, hiding most of the equipment from view of both employees and passers-by. Earthmoving activities would also take place behind the facility at this station. After construction is complete, there would be no aesthetic impacts, as the area would appear very similar to the existing conditions.

Buttress Wall – Buttress walls are the proposed reinforcement method for Reach 2, stations 3+00 to 31+00, 32+00, 268+00, 270+00, and 278+00. They are the alternate reinforcement method for Reach 1, station 17+50 to 24+00, Reach 2 stations E-14, 58+00 to 77+00, and 454+00, and Reach 3, stations 268+00, 256+00 to 285+00, 200+00, and W-1 0+00 to 2+00. There would be minor aesthetic impacts during construction due to the large machinery required to construct the buttresses. Reinforcement would be conducted in existing industrial areas, thereby lessening the visual impacts. Once construction is complete, there would be a minimal aesthetic impact to these stations as the buttress walls would be slightly larger than the existing floodwalls. The structures, however, would retain their existing color and general footprint and would not result in overall changes to the viewshed in the area. Reinforcement features would either be located behind existing industrial facilities or adjacent to very large facilities.

Concrete Slab – Concrete slabs are the proposed reinforcement method for Reach 1, station 17+50 to 24+00+00, Reach 2, stations E-14, 58+00 to 77+00, and 454+00 and Reach 3, stations 251+00 to 285+00, 200+00, and W-1 0+00 to 2+00. Aesthetic impacts during construction would be similar to those associated with the buttress walls, as similar equipment would be used. These stations are all in industrial or relatively isolated areas. Only three facilities would experience impacts at Gate E-14: Halliburton, an industrial facility that already has large earthmoving equipment and piles of material on site; Catholic Charities Archdiocese of New Orleans, occupying a warehouse with minimal activity on the protected site; and another warehouse facility to the south on the protected side, currently for lease. After construction is complete, there would be no permanent visual impacts, as the structures would appear similar to the existing conditions.

Relief Wells – Relief wells are the proposed reinforcement method for Reach 2, stations 406+00 and 430+00 to 452+00 and Reach 3, stations 236+00 to 264+00. This method would consist of installing wells on the protected side of the HSDRRS to reduce seepage. The stations in Reach 3 are adjacent to a residential area on the protected side. There would be moderate, direct aesthetic impacts in this area during construction due to the heavy machinery used to drill the relief wells. Stations 406+00 and 430+00 to 452+00 are in a relatively isolated area with restricted access behind the NASA facility. Minor aesthetic impacts during construction in this area would be expected due to the industrial location and the lack of public access. After construction is complete, there would be no permanent aesthetic impacts, as the area would appear similar to existing conditions. Several relief wells have already been installed in these areas (photo 20). These wells are small structures that have little visual impact.

Staging Areas – All proposed restoration/reinforcement methods would have associated staging areas (appendix C). These areas are all in variable locations, from adjacent to residential areas to under bridges and overpasses. Staging areas would be used for equipment and materials storage during construction. Minor and temporary aesthetic impacts would occur in these areas. Visual aspects of these impacts would include heavy machinery and variable quantities of materials such as soils, metal concrete supports and timber. These impacts would be temporary, for the duration of the construction. In some areas, such as those adjacent to residential areas (Morrison playspot), impacts would be slightly greater. No indirect impacts to aesthetics would be expected to result from the proposed action's use of the staging areas.

Cumulative Impacts to Aesthetics

Cumulative aesthetic impacts related to the IHNC/GIWW restoration/reinforcement methods and other projects in the area (see section 4 for detailed descriptions of other projects in the area) would be minor and temporary. These projects include the Seabrook and Lake Borgne HSDRRS projects (IER #11 Tier 2 Borgne and Pontchartrain), renovations/improvements to the LPV lakefront HSDRRS and outfall canal closures (IERs #4, #5, and #6), the rebuilding of the Bartholomew golf course, the construction of a pump station on Dwyer Road, and various other small scale infrastructure improvements being done by the City of New Orleans. During construction of the proposed action and other projects in the vicinity, the presence of large machinery and equipment and the related noise and vibrations would contribute to aesthetic impacts. These effects would be most strongly felt in the Pontchartrain Park residential area, where several other projects are located in close proximity and could occur simultaneously.

3.2.8 Noise

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise metric recommended by USEPA and has been adopted by most Federal agencies (USEPA 1974). A DNL of 65 weighted decibels (dBA) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like construction. The A-weighted sound level, used extensively in this country for the measurement of community and transportation noise, represents the approximate frequency response characteristic of an average young human ear. Areas exposed to a DNL above 65 dBA are generally not considered suitable for residential use. A DNL of 55 dBA was identified by USEPA as a level below which there is no adverse impact (USEPA 1974).

Due to decreased levels of activity at night, background noise is generally about 10 dBA lower compared to daytime noise levels. Because of this quieter environmental setting, night-time noise levels are perceived as being louder than the same noise during the day and thus, generally produce a greater level of annoyance (University of South Carolina 1998). It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than the same level of noise during the day. This perception is largely because background environmental sound levels at night in most areas are about 10 dBA lower than those during the day.

Existing Conditions

The project is located in an industrial portion of the New Orleans Metropolitan Area. Existing noise in the area results from not only vehicle and boat traffic (horns), train activity, and nearby airport traffic, but also from the heavy industrial uses of the shoreline property. Noise levels surrounding the project corridor vary depending on climatic conditions and the time of day (typically, traffic is heavier at specific times and industries operate during normal business hours). Areas to the northwest of the project corridor primarily consist of open water (Lake Pontchartrain) and parkland with minimal noise generated by recreational users. Areas lining Reach 2 (figure 2) are primarily industrial immediately adjacent to the levees; therefore, noise levels can be slightly elevated, but can vary depending on what activities, equipment, and vehicles are running at any specific time of day. A few hundred feet from the levees along the IHNC, the area becomes residential with lower average noise levels. The majority of the southern boundary of the project corridor (Reach 1) is undeveloped marsh with some industrialization along the southern portions of the IHNC. Bayou Bienvenue and Lake Borgne line the western side of the project area. These two areas are relatively quiet and dominated more by natural noises and occasional ship traffic.

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Noise

Under the no action alternative, no construction would occur; therefore, no direct noise-related impacts would occur. However, since no restoration/reinforcement work would occur, the deficient levee/floodwall sections could potentially fail during future storm events, potentially resulting in localized or regional flooding. Temporary indirect and possibly cumulative impacts to the noise environment may occur during the subsequent clean-up and rebuilding process.

Future Conditions with Proposed Action

Direct Impacts to Noise

Noise levels related to construction activities vary with the type of equipment being used. Table 9 describes noise emission levels for construction equipment that would be expected to be used during project construction activities, regardless of the restoration/reinforcement method.

Table 9.
Weighted (dBA) Sound Levels of Construction Equipment and Modeled Attenuation at Various Distances[1]

Noise Source	50 ft	100 ft	200 ft	500 ft	1,000 ft
Backhoe	78	72	66	58	52
Crane	81	75	69	61	55
Dump Truck	76	70	64	56	50
Excavator	81	75	69	61	55
Front end loader	79	73	67	59	53
Concrete mixer truck	79	73	67	59	53
Auger drill rig	84	78	72	64	58

Table 9.
Weighted (dBA) Sound Levels of Construction Equipment and Modeled Attenuation at Various Distances[1]

Noise Source	50 ft	100 ft	200 ft	500 ft	1,000 ft
Dozer	82	76	70	62	56
Generators	81	75	69	61	55
Flatbed Trucks	74	68	62	54	48
Rollers	80	74	68	60	54
Graders	85	79	73	65	59
Portable Air Compressors	78	72	66	58	52
Welding Machines	74	68	62	54	48
Soil Mix Drill Rig	80	74	68	60	54

Source: Highway Construction Noise Handbook (FHWA 2006).
Notes: The dBA at 50 ft is a measured noise emission. The 100- to 1,000-ft results are modeled estimates.

The anticipated noise levels at 50 ft range from 76 dBA to 85 dBA based on data from the Federal Highway Administration (FHWA) (FHWA 2006). As not every type of equipment is used at a given time, noise levels would vary over the duration of a construction project.

Although the operation of several pieces of construction equipment at a particular time are likely to contribute to the actual noise levels at a specific receptor location, the resulting noise levels would be dominated by the noisier source (e.g., 85 dB + 76 dB = 101 dB).

Noise associated with the project would be regulated in accordance with the City of New Orleans Ordinance 23263, Chapter 66, Article IV regarding noise. For the purposes of this analysis, it is assumed that construction could occur on a round-the-clock basis.

Table 10 presents the equipment that would be used during construction of each restoration/reinforcement method. Potential impacts to the noise environment associated with construction of each restoration/reinforcement methods are discussed below. Table 10 presents a summary of the equipment that would be used for each alternative and the maximum and minimum estimated dBA at the 200 ft and 500 ft distances. These distances were selected because in general the ROW is generally 200 ft or less and for all restoration/reinforcement methods, the noise levels would be at or below 65 dBA at 500 ft.

All equipment would not be operating simultaneously at all times. Most construction activities would generate noise levels above 65 dBA within 200 ft of the project area (62 to 73 dBA). Within 500 ft all noise should be at or below 65 dBA (54 to 65 dBA). There are some residences and businesses located within 200 ft of the levee that may, therefore, experience minor elevated noise levels during construction periods. These impacts would be anticipated to be a temporary, minor annoyance. For the more remote areas, while elevated noise levels may be more noticeable during construction, potential impacts would be minor. Any nearby wildlife could move away from noise disturbances, and there are few recreation resources in the vicinity to impact human activities. Construction vehicle traffic would not be anticipated to impact the noise environment in association with most alternatives as the majority of the noise would occur during initial delivery and then removal of the equipment.

Table 10.
Restoration/Reinforcement Method Construction Equipment Requirements

Restoration or Reinforcement Method	Equipment	200 ft		500 ft	
		Min dBA	Max dBA	Min dBA	Max dBA
DSM	auger drill rig, dozer, generators, flatbed trucks, graders, portable air compressors, and the soil mix drill rig	62	73	54	65
Berm	dump trucks, excavators, dozers, flatbed trucks, and graders	62	67	54	59
Buttress Wall	concrete mixer trucks, excavators, dozers, and flatbed trucks	62	70	54	62
Concrete Slab	concrete mixer trucks and flatbed trucks	62	73	54	65
Relief Wells	auger drill rig, dozer, generators, flatbed trucks, portable air compressors, welding machines and a drill rig	62	72	54	64

For construction of the berm, potential adverse impacts to the noise environment may result from the regular flow of dump trucks delivering the borrow material. All three stations are located adjacent to industrial areas. It is estimated that the proposed action for these levee/floodwall segments would require approximately one truck load of borrow material every 30 minutes for a total of 16 truck loads per day. Allowing extra time to accommodate rain days on which construction activities would not occur, this work would be completed within approximately 50 days total.

All proposed restoration/reinforcement methods would have associated staging areas (appendix C). These areas would be placed in a variety of locations near the deficient segments. Some staging areas are located adjacent to residential areas while others are in open areas or under bridges and overpasses. Staging areas would be used for equipment and materials storage during construction. Minor and temporary impacts to the noise environment could occur during transportation of equipment to and from the staging areas during construction, particularly when the staging areas are located in or adjacent to residential areas. Overall, the noise impacts associated with the staging areas should be minor and temporary.

The overall direct impacts to the noise environment associated with construction of the various alternatives would be minor and temporary. After completion of construction, there would be no impacts to the noise environment at any stations or in the surrounding area associated with the resumption of normal levee operations.

Indirect Impacts to Noise

Potential indirect noise impacts include those related to recreation, wildlife, and emotional and mental stress that could result from increased noise levels in the area during construction. There are few recreational resources located within 500 ft of the construction areas; therefore, significant impacts to human activities in these areas would not be anticipated. Pontchartrain Landing RV Park is located just east of station 255+00 on the west bank of the IHNC across France Road. The RV Park would be expected to experience noise impacts during construction along this portion of HSDRRS, but these impacts would be minimal because all work would be

conducted on the protected side of the existing I-wall and approximately 60% of the RV Park rental sites are greater than 500 ft from the project area. Wildlife potentially occurring in the area could avoid or move away from the noise, but would be expected to return following construction. Emotional and mental stress created by elevated noise levels would be minor and temporary and compensated by the relief associated with the hurricane risk reduction provided by the project. Therefore, significant indirect impacts associated with noise produced during construction of the proposed action would not be anticipated.

Cumulative Impacts to Noise

Cumulative noise resulting from ongoing and planned construction projects and rebuilding/restoration activities following Hurricanes Katrina and Rita would not likely generate noise levels in the project area which would surpass the maximum levels of noise described above. Although, concurrent projects would likely extend the length of time people would be exposed to increased noise levels. This would be most significant along the northern reaches of the IHNC where there are multiple deficient segments and adjacent residential neighborhoods and businesses, all within range of the proposed new gate structure at Seabrook. Construction of the Seabrook Gate is anticipated to occur at the same time as the proposed action; therefore, it would be likely that noise associated with Seabrook Gate construction (including pile driving) would be louder than the noise generated by these restoration/reinforcement methods. Therefore, cumulative noise impacts associated with the proposed action would be temporary.

3.2.9 Air Quality

The USEPA, under the requirements of the Clean Air Act of 1963 (CAA), has established National Ambient Air Quality Standards (NAAQS) for six contaminants, referred to as criteria pollutants (40 CFR 50). These are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (less than 10 microns in diameter [PM_{10}] and particulate matter less than 2.5 microns in diameter [$PM_{2.5}$]), lead (Pb), and sulfur dioxide (SO_2). The NAAQS include primary and secondary standards. The primary standards were established at levels sufficient to protect public health with an adequate margin of safety. The secondary standards were established to protect the public welfare from the adverse effects associated with pollutants in the ambient air. The primary and secondary standards are presented in table 11.

<u>Existing Conditions</u>

Areas that meet the NAAQS for a criteria pollutant are designated as being “in attainment;” areas where a criteria pollutant level exceeds the NAAQS are designated as being “in non-attainment.” The proposed action evaluated in this IERS would occur in Orleans and St. Bernard Parishes, Louisiana, and are areas currently designated as “in attainment” for all criteria pollutants. Further analysis required by the CAA general conformity rule (Section 176(c)) would not be required.

Table 11.
National Ambient Air Quality Standards

Pollutant and Averaging Time	Primary Standard		Secondary Standard	
	micrograms per cubic meter ($\mu g/m^3$)	parts per million (ppm)	$\mu g/m^3$	ppm
Carbon Monoxide				
8-hour concentration	10,000[1]	9[1]	-	
1-hour concentration	40,000[1]	35[1]	-	
Nitrogen Dioxide				
Annual Arithmetic Mean	100	0.053	Same as primary	
Ozone				
8-hour concentration	147	0.075[2]	Same as primary	
Particulate Matter				
$PM_{2.5}$:				
Annual Arithmetic Mean	15[3]	-	Same as primary	
24-hour Maximum	35[4]	-		
PM_{10}:				
Annual Arithmetic Mean	50	-		
24-hour concentration	150[1]	-		
Lead				
Quarterly Arithmetic Mean	1.5	-	Same as primary	
Sulfur Dioxide				
Annual Arithmetic Mean	80	0.03[1]	-	-
24-hour concentration	365[1]	0.14[1]	-	-
3-hour concentration	-	-	1300[1]	0.50[1]

Source: 40 CFR 50.
Notes:
[1] Not to be exceeded more than once per year.
[2] 3-year average of the 4th highest daily maximum 8-hour concentration may not exceed 0.075 ppm, effective as of 27 March 2008.
[3] Based on 3-year average of annual averages.
[4] Based on 3-year average of annual 98th percentile values.

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Air Quality

Under the no action alternative, no construction would occur; therefore, no direct air quality-related impacts would occur. However, since no restoration/reinforcement activities would be performed, the deficient levee/floodwall sections could potentially fail during future high water events, thereby resulting in localized or regional flooding. Temporary indirect, and possibly

cumulative, air quality impacts may occur during the subsequent clean-up and rebuilding process.

Future Conditions with Proposed Action

Direct and Indirect Impacts to Air Quality

Under the proposed action, a variety of restoration/reinforcement methods would be used to remediate deficient segments of flood risk reduction along the IHNC and GIWW (tables 1 through 3). During construction of all restoration/reinforcement methods, increases in air emissions near the project area would be expected during the construction period of approximately 300 days (10 months). These emissions could include: (1) exhaust emissions from operations of various types of non-road, on-site construction equipment such as loaders, excavators, cranes, etc.; (2) exhaust emissions from operations of on-road trucks and private vehicles used to access the work area; and (3) fugitive dust due to earth disturbance. The exhaust emissions from construction equipment would be from mobile sources for which emissions performance standards would be applicable to source manufacturers, and they are not regulated under the CAA air permit regulations. Given the small scale of the individual restoration/reinforcement projects, exhaust emissions associated with construction employees private vehicles to access the work site would be minor in comparison to the existing emissions associated with vehicle traffic in the area, therefore impacts to air quality would not be anticipated.

Construction related air emissions for the proposed action may result in an increase in criteria pollutant emissions at and near the proposed project sites. These effects would be temporary; related principally to fugitive dust mobilization by construction activities. Dust emissions would be controlled by natural conditions (most of the project would occur in wet areas, which would help control dust) and by standard BMPs. Additional impacts to air quality may be associated with the transport of construction supplies and equipment for certain restoration/reinforcement alternatives.

The highest potential for air quality impacts associated with construction of the proposed action or other alternatives would be for those stations immediately adjacent to neighborhoods and recreational areas (Gates E-14 and W-1 0+00 to 2+00, and stations 3+00 to 31+00, 32+00, 268+00, 236+00 to 264+00, 251+00 to 285+00, 73+00, 58+00 to 77+00, and 200+00). However, site-specific construction effects would be temporary and dust emissions would be controlled using BMPs when necessary. Construction activities within Reaches 1, 2, and 3 would occur concurrently throughout the 10-month construction duration and would be similar to those activities that have been ongoing throughout New Orleans since Hurricane Katrina. Therefore, overall potential impacts to air quality in association with construction of the proposed action or other alternatives would be temporary and minor.

Specific air quality impacts associated with the five restoration/reinforcement methods are discussed below.

<u>DSM</u> – DSM is the proposed reinforcement alternative for Reach 1, station 28+85 and Reach 3 station 268+00 and the alternate reinforcement method for stations 73+00, 79+00, 242+00 to 260+00, and 525+00 to 535+00. These stations are immediately adjacent to industrial facilities and stations 268+00 and 73+00 are located near residential neighborhoods. Dust mobilization would not be anticipated in association with DSM construction. The soil being mixed has a high water content, which would bind particles together and resist airborne mobilization. Most of the activity would take place beneath the surface presenting a barrier to airborne dust mobilization.

Construction vehicle emissions would not be anticipated to impact air quality in association with this reinforcement alternative as the majority of the emissions would occur during initial delivery and then removal of the equipment. Minor dust emissions could occur as a result of movement of construction vehicles on the site. After completion of the reinforcement features, there would be no direct impacts to air quality at any stations or in the surrounding area associated with the resumption of normal levee operations. No indirect impacts to air quality would be expected as a result of this method.

Berm – Berm is the proposed restoration method for stations 73+00, 79+00 and 242+00 to 260+00 and 525+00 to 535+00. Current HSDRRS features at these stations are an I-wall, T-wall, and earthen levee, respectively. The berm would build up these existing embankments. Fugitive dust mobilization would be expected under this restoration method. Borrow material would be transported to the project site using dump trucks. A single dump truck would transport about 18 cubic yards of embankment material. Deficient segments proposed to be restored with a berm would require approximately one truckload of borrow material every 30 minutes for a total of 16 truckloads per day. Allowing extra time to accommodate rain days on which construction activities would not occur, this work would be completed within approximately 50 days total. To control dust emissions during transportation of the borrow material the dump truck bed would be wet down and/or covered. During on-site construction, a sprinkler truck would wet the borrow material as it was installed on the existing embankments to control dust emissions. All three stations are located adjacent to industrial areas. A residential neighborhood is located a few blocks from station 73+00. Stations 242+00 to 260+00 are adjacent to undeveloped areas near Bayou Bienvenue. With the use of BMPs potential direct air quality impacts associated with the berm construction would be minor and temporary.

Potential for indirect impacts to air quality could include temporary visual and health impairments created by airborne dust and vehicle and construction equipment emissions. Visual impairments could occur in the immediate project area or along transportation routes as a result of the mobilization of fugitive dust during construction or transportation of berm material. Health impairments to allergy and/or asthma sufferers could occur for residents or workers in the immediate project vicinity as a result of mobilization of fugitive dust. These potential impacts would only occur during the construction period and would be expected to be controlled with the use of BMPs during construction. Therefore, indirect impacts associated with the berm method would be minor and temporary.

Buttress Wall – Buttress walls are the proposed reinforcement method for Reach 2, stations 3+00 to 31+00, 32+00, 268+00, 270+00 and 278+00. Buttress walls are an alternative reinforcement method for Gates E-14 Gate W-1 0+00 to 2+00, Reach 1 stations 17+50 to 24+00, Reach 2 stations 58+00 to 77+00 and 454+00, and Reach 3 stations 268+00, 256+00 to 285+00, and 200+00. At each location where buttress walls are installed, approximately 600 cy of material would be excavated to allow for installation. This excavated material would be used for backfill and the remainder of the material would be spread on the existing levee. Mobilization of fugitive dust would not be anticipated due to the existing moist condition of the excavated material though sprinkler trucks would be available should dust mobilization become an issue. Air quality impacts from dust emissions associated with this reinforcement method would therefore be minor and temporary. Construction vehicle emissions would not be anticipated to impact air quality in association with this reinforcement alternative as the majority of the emissions could occur during initial delivery and then removal of the equipment. Minor dust emissions could occur as a result of movement of construction vehicles on the site. Direct air quality impacts from dust emissions associated with this reinforcement method would be minor and temporary. There would be no anticipated indirect impacts to air quality as a result of this method.

Concrete Slab – Concrete slabs are the proposed reinforcement method for Gates E-14 and W-1 0+00 to 2+00; Reach 1stations 17+50 to 24+00; Reach 2 stations 58+00 to 77+00 and 454+00; and Reach 3 stations 251+00 to 285+00 and 200+00. The concrete slabs would be installed on the existing ground and no excavation would be required. Construction vehicle traffic would not be anticipated to impact air quality in association with this reinforcement method as the majority of the emissions would occur during initial delivery and then removal of the equipment. Minor dust emissions could occur as a result of movement of construction vehicles on the site. Sprinkler trucks would be utilized to control mobilized dust during construction of the concrete slabs if needed. Therefore, direct air quality impacts associated with this reinforcement method would be anticipated to be minor and temporary. No indirect impact would occur as a result of this method.

Relief Wells – Relief wells are the proposed reinforcement method for Reach 2 stations 406+00 and 430+00 to 452+00, and Reach 3 stations 236+00to 264+00. Stations 406+00 and 430+00 to 452+00 are located on or adjacent to the NASA property in a highly industrial area. Stations 236+00to 264+00 are located adjacent to an industrial area and close to a residential neighborhood. Approximately 2 cy of excavated material would be associated with each drilled well. This excavated soil would be spread on the existing levee and supporting embankments. The excavated soil is naturally wet; therefore, dust mobilization associated with this reinforcement method should be minor. Construction vehicle traffic would not be anticipated to impact air quality in association with this alternative, as the majority of the emissions would occur during initial delivery and then removal of the equipment. Minor dust emissions could occur as a result of movement of construction vehicles on the site. Therefore, potential direct impacts associated with this reinforcement method would be expected to be minor and temporary. There would be no anticipated indirect impacts to air quality as a result of this method.

Staging Areas – All proposed restoration/reinforcement types would have associated staging areas (appendix C). These areas would be placed in a variety of locations near the deficient segments. Some staging areas are located adjacent to residential areas while others are in open areas or under bridges and overpasses. Staging areas would be used for equipment and materials storage during construction. Minor and temporary impacts to air quality could occur during transportation of equipment to and from the staging areas during construction, particularly when the staging areas are located in an area with exposed soil or are accessed along dirt, gravel, or shell roads. Given the naturally damp nature of the soil in this area, the fugitive dust impacts associated with transportation of equipment to and from the staging areas would be anticipated to be minor and temporary. BMPs would be used if necessary to control fugitive dust. Direct air quality impacts from dust emissions associated with the staging areas would be minor and temporary. Proposed action activities performed at the staging areas would not result in any indirect impacts to air quality.

Cumulative Impacts to Air Quality

Potential cumulative impacts to air quality could occur from concurrent and ongoing construction projects in the New Orleans Metropolitan Area and immediate project vicinity. Other construction activities occurring during the same timeframe and within the vicinity of the proposed action would likely occur incrementally throughout the construction period.

Standard BMPs would likely be used for other activities or projects occurring within the vicinity the project area that could potentially create dust emissions. For instance, application of water to control dust and periodic street sweeping and/or wetting down of paved surfaces would aid in preventing fugitive dust from becoming airborne. Therefore, cumulative impacts to air quality in

the project area from the proposed action would be minor and would last only during construction.

3.2.10 Transportation

Orleans Parish and St. Bernard Parish are densely developed with residential, commercial, and light to medium industrial land uses. Throughout the project area are facilities, docks, and slips for the Port of New Orleans. The Port of New Orleans is one of the world's busiest ports with many intersecting transportation modes: river and sea vessels, rail, and highway (Port of New Orleans 2009). Navigational resources in the project area are associated with the IHNC, GIWW, and the associated slips in the project vicinity.

Existing Conditions

The existing conditions of Orleans and St. Bernard Parishes related to transportation are discussed in the following sections.

3.2.10.1 Navigational Resources

Inner Harbor Navigation Canal (IHNC)

The IHNC was completed in 1923 to provide navigation between the Mississippi River and Lake Pontchartrain, a distance of approximately 5 mi. The channel where the IHNC connects to Lake Pontchartrain is maintained at an elevation of -16 ft. The IHNC consists of approximately 30 acres of open water (including the slips and Turning Basin). Depths in the IHNC within and around the project vicinity range from 30 ft to 41 ft. The channel is approximately 95 ft wide at its most narrow point and serves as an active navigation route for the Port of New Orleans and other vessels.

Gulf Intracoastal Waterway (GIWW)

The GIWW is a 1,300 mile long constructed canal that runs from Brownsville, Texas to St. Marks Florida and links all the major ports along the Gulf Coast to the U.S. inland waterway systems. The GIWW was conceived with the Rivers and Harbors Act of 1873, which set aside funds for a survey for a canal connecting inland waterways from Donaldson, Louisiana to the Rio Grande River in Texas. As the canal was built, a series of congressional acts resulted in expansion of the canal both in length and depth. Construction of the final expanse of the canal was completed in 1949 (Texas Department of Transportation [TxDOT] 2004).

3.2.10.2 Airports

On the east side of the IHNC, the New Orleans Lakefront Airport extends into Lake Pontchartrain. The airport is designated as a general aviation airport, but also serves military and commercial aircraft.

3.2.10.3 Railroads

There are several rail lines in the New Orleans Metropolitan Area. There is a major rail line that runs parallel to Interstate 10 (I-10), and a Norfolk Southern-owned rail line crosses the IHNC at Seabrook. The New Orleans Public Belt Railroad operates two rails running north/south along the east and west banks of the IHNC, but their lines do not join with the Norfolk Southern line.

3.2.10.4 Surface Roads

I-10 and Highway 90 are the major east-west highways that cross this area (figure 13). I-10 is a six-lane divided freeway that connects the New Orleans Metropolitan Area with Baton Rouge to the west and Mississippi to the east. Baton Rouge, the state capital and second largest city in Louisiana, is a major traffic generator to the west of the project area. In addition, I-10 is a major east-west route along the northern Gulf Coast. Highway 90 is a six-lane divided highway with no access control. It runs parallel to I-10 in this area, and primarily serves local travel, while I-10 serves regional travel.

Figure 13. Major Roads and Highways near the Project Area

Operational conditions on a surface road can be described with "level-of-service" (LOS). LOS is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures such as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. The "Highway Capacity Manual" (Transportation Research Board 2000) defines six LOS levels, designating each level with the letters A to F. LOS "A" represents the best operating condition, and LOS "F" represents the worst operating condition. LOS "C" or "D" is generally considered acceptable.

The most recent traffic volumes available from the LaDOTD are from 2008 (LaDOTD 2009a). Due to a population shift and additional construction activity that occurred in the aftermath of Hurricane Katrina, these traffic volumes may not be suitable for finitely determining the existing

LOS of area highways; however, they provide an order-of-magnitude baseline for comparison when trucks associated with construction of the floodgates and floodwalls are added. The latest traffic counts for I-10 in its closest proximity to the project area are 58,800 to 74,400 vehicles a day. The two traffic counts for Highway 90 (Chef Menteur Highway) in the project area are 19,900 and 25,200 vehicles a day.

Hayne Boulevard, which provides access to the project area from the north, is classified as an "urban collector" (LaDOTD 2009b). Roads classified as principal arterials that connect I-10 and Highway 90 to the project area include France Road, Paris Road, Jourdan Road, Florida Ave, and N. Claiborne Ave; Old Gentilly Road also serves as a connection to the east side of the project area near Michoud Canal (LaDOTD 2009b). I-10 and Highway 90 are likely routes into the project area (figure 13), although transportation routes for delivering construction materials have not yet been determined.

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Transportation

No construction within the previously disturbed and/or developed ROW would occur because the deficient levee/floodwall segments along the IHNC and GIWW would not be restored or reinforced. There would be an increased risk of flooding in the three sub-basins if the interior floodwalls and levees (secondary protection) along the IHNC and GIWW were to fail during a storm event. Direct impacts could occur to the roadways in the area as a result of flood-related damage. Indirect impacts to local traffic would be expected should re-routing or lack of access result from flood damage to local roadways. Direct and indirect impacts could be cumulative if flooding were to occur on a regional level.

Future Conditions with Proposed Action

Direct Impacts to Transportation

Regardless of the restoration/reinforcement method, construction activities could result in increased traffic and potential increased congestion. Following project completion, there would be no additional impacts to transportation resources.

Construction traffic, including, but not limited to, generators, cranes, trucks, bulldozers, excavators, graders, and front-end loaders (table 4), would use a number of surface roads to reach the various project segments. Figure 7 shows the major surface roads that would be used by construction equipment, delivery vehicles, and construction personnel to access the project locations. Delivery of equipment or supplies to the project sites by rail or barge would not be anticipated, although use of these forms of transportation could be required once designs have been finalized.

Equipment and materials would most likely come from outside the project area. The only major roads that connect the project area to the larger metropolitan and regional area are I-10, Highway 90, and SR-47 north of the GIWW. Construction traffic would likely not use SR-47 to the south of the project area, because the I-10 and Highway 90 are more economically attractive transportation facilities for hauling equipment and materials than any facilities south of the area.

Heavy trucks adversely affect the LOS of a highway. "Heavy trucks" are vehicles that have more than four tires touching the pavement. Heavy vehicles adversely affect traffic in two ways:

(1) they are larger than passenger cars and occupy more roadway space; and (2) they have poorer operating capabilities than passenger cars, particularly in respect to acceleration, deceleration, and the ability to maintain speed on grades. The second impact is more critical. The inability of heavy vehicles to keep pace with passenger cars in many situations creates large gaps in the traffic stream, which are difficult to fill by passing maneuvers. The resulting inefficiencies in the use of roadway space cannot be completely overcome.

DSM – This method employs multiple pieces of heavy equipment along with support vehicles (table 4). The equipment would need to be mobilized to the project site, staged, and mobilized between stations during the project. Additionally cement, lime, slag, and other materials would need to be transported and staged for use at the various stations. Implementing DSM as part of the proposed action would be expected to take approximately 12 weeks per location; therefore, if proposed DSM work was not conducted concurrently at the various stations, DSM construction-related impacts on transportation could last approximately 6 months. Therefore, implementation of DSM as a reinforcement method could result in minor to moderate transportation impacts throughout the construction period.

Berm – Under the proposed action, approximately 16,000 cy of borrow material would be used in berm construction. This quantity would require approximately 16 to 18 dump truckloads per day for approximately 50 working days. Additionally, heavy equipment such as front-end loaders and bulldozers would be used to build the berms from the delivered borrow material. Mobilization of the equipment between stations would be required during the project, which would result in minor to moderate transportation impacts along the roads used to access the staging areas and project site during construction of the berms.

Buttress Wall – Mobilization of concrete trucks is the primary transportation impact associated with this method. Under the proposed action, increased construction traffic would be localized to Reach 2 and impacts to transportation along these roads should be minor to moderate.

Concrete Slab – As with buttress walls, mobilization of concrete mixing trucks would be expected to be the primary transportation-related impact. Between 8 sq ft and 16 sq ft of concrete would be poured for every LF of floodwall to be reinforced using concrete slabs (approximately 8,200 ft total). Approximately 2,430 cy to 4,860 cy of concrete would be required. Therefore, approximately 270 to 540 truckloads using 9-cy capacity concrete mixer trucks would be required over the construction period. Impacts associated with the increased construction traffic would be minor to moderate on the access roads used to reach the project area throughout the course of the project.

Relief Wells – As with DSM, this reinforcement method requires mobilization of heavy equipment, specifically drilling rigs, and associated support vehicles (table 4). Mobilization of equipment between stations would be required during the project. Therefore, implementation of relief wells as a reinforcement method could result in minor to moderate transportation impacts throughout the construction period.

Staging Areas - Staging areas for the project would be located in close proximity to the levee segments, but outside the existing ROW. Staging areas are located in immediate proximity to access roads. Periodic isolated traffic associated with mobilization of equipment and delivery of materials would be the primary transportation impact associated with the staging areas. Once initial mobilization and materials delivery is completed for each reach, traffic impacts would be primarily contained to intra-project material transport between stations. With work in various reaches occurring concurrently and work duration varying with restoration/reinforcement type, transportation impacts would vary by time and location depending on the stage of the project. The greatest impacts would be anticipated during project start-up with impacts decreasing as

work is completed at individual stations and reaches. Impacts associated with staging areas would therefore be anticipated to be minor to moderate throughout the course of construction.

Indirect Impacts to Transportation

Increased use of heavy trucks on roadways in the project area would contribute to roadway degradation. The additional truck traffic resulting from the proposed action would contribute to additional wear-and-tear on roads within the project vicinity. Impacts to dirt, gravel, or shell roads could potentially be significant depending on the level of construction traffic and amount of rainfall during the construction period. Dirt, gravel, and shell roads would be more susceptible to vehicle-induced erosion during high precipitation periods. The berm restoration method would require up to 16 trucks carrying borrow material per day. Once these trucks leave the major thoroughfares, some of the minor roads used to reach the project sites could experience wear and tear from increased traffic; however, USACE construction vehicles and equipment are not the only vehicles using these roadways, which are rated to handle construction traffic. The condition of these roadways would be inspected prior to construction of the proposed action and haul routes would be maintained for construction access during the period of construction; therefore, indirect impacts associated with roadway damage would not be expected to occur.

The Gulf Coast storm season begins in June, but typically storm activity peaks in August and September. Depending on whether or not construction efforts would be considered during hurricane evacuation planning, the increased level of truck traffic within the project vicinity could contribute to delays during potential hurricane evacuations since the roads within the project area could potentially be used as hurricane evacuation routes. Because construction of the proposed action would not likely begin before October 2010, thereby avoiding peak hurricane season for southeastern Louisiana, no impacts to hurricane evacuation routes would be anticipated. Similarly, there would be no indirect impacts to transportation if construction-related traffic was halted during an evacuation.

Overall, indirect impacts to transportation because of the proposed action could occur depending on the nature of the roadways, amount of precipitation during construction activities, and amount of construction vehicle traffic.

Cumulative Impacts to Transportation

Additional wear-and-tear of pavement on roads within the project's vicinity could occur due to increased truck traffic under the proposed action. On-going construction related to other projects and rebuilding efforts in Orleans and St. Bernard Parishes could also contribute to the increase of truck traffic and could, therefore, increase the wear-and-tear on the pavement of the roads and add to area congestion. Corresponding cumulative impacts to socioeconomics because of the increased roadway degradation would be similar to those discussed previously.

3.3 SOCIOECONOMICS

Existing Conditions

The project area is located along the IHNC and GIWW within Orleans Parish and adjacent to St. Bernard Parish, from the IHNC Lock to the Seabrook Bridge at Lake Pontchartrain and along the GIWW from the IHNC to the IHNC Barrier, which is near the Michoud Canal in eastern New Orleans. Following construction of the IHNC in 1923, the canal physically separated the New Orleans East area and the Lower Ninth Ward from the rest of Orleans Parish. Most of St. Bernard Parish is surrounded by and composed of water and is generally bounded by the MRGO and the Mississippi River. The urbanized portions are located adjacent to New Orleans along the

banks of the Mississippi River within the levee system. Within the project vicinity, St. Bernard Parish consists of marshlands. Land use along the project corridor in Reach 1 is predominantly residential along the IHNC (in the Lower Ninth Ward), with some industrial areas at the western end of the GIWW, and vacant marshland for the remainder of the corridor along the GIWW. Land use within Reach 2 consists of industrial and vacant parcels along the GIWW and industrial and commercial uses along the IHNC, with predominantly residential development farther inland from these waterways. Within Reach 3, along the western bank of the IHNC, industrial and commercial parcels border the canal; residential areas are located farther inland, with a concentration of commercial development near where I-10 crosses the IHNC.

Socioeconomic conditions in the project area have changed dramatically since the 2000 Census. Most of the housing, businesses, and community infrastructure in the three sub-basins (figure 1) were damaged by Hurricane Katrina in 2005. Hurricane Katrina displaced significant portions of the population and the extensive property damage and recovery to pre-hurricane conditions continue. The information is presented here for Orleans Parish and St. Bernard Parish because socioeconomic data for the years since Hurricane Katrina are available only at the parish level.

Table 12 illustrates the population count for Orleans and St. Bernard Parishes in 2000 and the pre- and post-Katrina estimates through July 2009, which is the latest date for which Census Population Estimates Program data are currently available. Both Orleans and St. Bernard Parishes were estimated to have experienced a major change in population between 2005 and 2009 with estimated decreases of 27 and 40 percent, respectively, because of Hurricane Katrina.

Table 12.
Estimated Change in Population 2000-2009

Geographic Area	Population	Estimated Population			
	2000	July 2005 (Pre-Katrina)	July 2009 (Post-Katrina)	Percent (%) Change 2000 – 2005	Percent (%) Change 2005 – 2009
State of Louisiana	4,468,976	4,497,691	4,492,076	0.64%	-0.13%
Orleans Parish (City of New Orleans)	484,674	455,188	354,850	-6.08%	-26.79%
St. Bernard Parish	67,229	64,951	40,655	-3.39%	-39.53%

Source: U.S. Census Bureau (USCB) 2000; USCB 2010

According to the 2000 Census, there were 215,091 housing units in Orleans Parish and 26,790 in St. Bernard Parish. The vacancy rate in Orleans Parish was 12.5 percent and it was 6.2 percent in St. Bernard Parish. Of the occupied units, 46.5 percent in New Orleans were occupied by owners. In St. Bernard Parish, the owner-occupancy rate was much higher at 74.6 percent (USCB 2000).

Data from Federal Emergency Management Agency (FEMA) Individual Assistance Registrants and Small Business Administration Disaster Loan Applications were analyzed by the HUD Office of Policy Development and Research in February 2006 and revised in April 2006. This study estimates that approximately 71.5 percent of the year 2000 occupied housing units in Orleans Parish were damaged; 55.9 percent severely. In St. Bernard Parish, 80.6 percent were estimated to be damaged; 78.4 percent severely (HUD 2006).

The demographic profiles for Orleans and St. Bernard Parishes for the years 2000, 2006, and 2009 are provided in table 13. In 2000, approximately two-thirds of the Orleans Parish population was Black or African-American; 85 percent of St. Bernard Parish residents were White. Table 13 demonstrates the changes to these populations after Hurricane Katrina and during the ongoing recovery. Because of the post-hurricane population losses, the racial and ethnic composition of the two parishes has changed notably. Between 2000 and 2009, the Black or African American population of Orleans Parish experienced the greatest decline, losing an estimated 105,938 individuals. In St. Bernard Parish, the White population lost the greatest number of individuals, declining by an estimated 27,679 persons. During the same time period, persons of Hispanic ethnicity increased by an estimated 13.4 percent in Orleans Parish and 2.1 percent in St. Bernard Parish. The number of Native Hawaiian and Other Pacific Islanders, a small component of the populations of the two parishes, increased by approximately 100 percent between 2000 and 2009.

Table 13.
Population Changes by Race and Ethnicity

Race or Ethnicity	Orleans Parish				St. Bernard Parish			
	2000 Census	2006 Estimate	2009 Estimate	Percent (%) Change 2000-2009	2000 Census	2006 Estimate	2009 Estimate	Percent (%) Change 2000-2009
Total Population	484,674	223,388	354,850	-26.8%	67,229	15,514	40,655	-39.5%
Non-Hispanic								
White	128,871	65,270	105,977	-17.8%	56,723	10,861	29,044	-48.8%
Black or African American	323,392	125,600	217,454	-32.8%	5,095	1,684	6,320	24.0%
American Indian	852	360	845	-0.8%	309	137	306	-1.0%
Asian	10,919	6,173	10,253	-6.1%	872	244	814	-6.7%
Native Hawaiian and Other Pacific Islander	88	115	178	102.3%	6	5	12	100.0%
Some Other Race Alone	961	NA	NA	NA	37	NA	NA	NA
Two or More Races	4,765	1,325	3,331	-30.1%	762	235	662	-13.1%
Hispanic								
Any Race	14,826	9,705	16,812	13.4%	3,425	1,327	3,497	2.1%

Sources: USCB 2000; USCB 2010

According to the 2000 Census, the median household income in Orleans Parish was $27,133. Of the 188,365 households in Orleans Parish, there were almost 40,000 households with annual incomes of less than $10,000. This was the largest group of all pre- Hurricane Katrina income categories. After Hurricane Katrina, the Louisiana Health and Population Survey indicates that the population losses were most pronounced in households in the lower income brackets, raising the median household income of the households who responded to this question to somewhere between $35,000 and $49,999. The median income in St. Bernard Parish was $35,939 in 2000

and the largest groups fell in the mid-range of household incomes. After Hurricane Katrina, the survey reported that median income for respondent households in 2006 was slightly lower than in 2000, ranging between $25,000 and $34,999 (USCB 2000; Louisiana Public Health Institute 2006).

Poverty status was determined by the USCB in 2000 for Orleans and St. Bernard Parishes for most of the residents. Persons below the poverty level at that time represented 27.9 percent and 13.1 percent of Orleans and St. Bernard Parish populations, respectively, compared to 19.6 percent of the Louisiana population (USCB 2000).

In Orleans Parish, the number of people in the labor force declined by 26.9 percent between 2000 and 2006. The number of employed persons dropped by about the same percentage, but the number of unemployed persons dropped slightly more, bringing the overall unemployment rate in 2006 down to 4.7 percent compared to 5.1 percent in 2000. In St. Bernard Parish, the labor force was reduced by about 25.4 percent between 2000 and 2006. Notably, the number of unemployed persons in 2006 was 54.6 percent less than in 2000. This explains the decline in unemployment by 2 percentage points (from 5.1 percent to 3.1 percent). The need for workers resulting from the hurricanes of 2005 also had an impact on state unemployment, which declined between 2000 and 2006 from 5.0 percent to 4.0 percent (USACE 2008c). Between 2006 and 2008, the labor force grew in both parishes while the unemployment rate increased, to 6.1 percent in Orleans Parish and 5.2 percent in St. Bernard Parish (Louisiana Department of Labor 2009).

A review of the Monthly Employment by Industry Sector data provided by the Louisiana Department of Labor revealed that Orleans Parish had sustained a loss of 11.1 percent of its employers in the third quarter of 2006 compared to the first quarter of 2001. This loss translated into a 41.7 percent decrease in jobs in the same period. Although the number of establishments in the two sectors of Educational Services and Accommodation Services increased, the actual number of employed persons decreased significantly. St. Bernard Parish lost almost half its jobs in the 2001 to 2006 period and 15.8 percent of its employers. Mining and Construction were the only sectors to show a positive percent change in the number of jobs, although the increase of 691 did little to compensate for the overall losses. The Retail Trade Sector, which had been the parish's largest employer in terms of the number of establishments as well as the number of jobs, experienced the greatest losses (USACE 2008c). Between the third quarters of 2006 and 2009, the number of jobs in Orleans Parish increased by 9.2 percent, although the number of employers declined by 8.6 percent. The Accommodation and Food Service sector and the Health Care and Social Assistance sector experienced the largest growth in number of jobs. In St. Bernard Parish during the same period, the number of jobs grew by 2.1 percent while there was a 21.6 percent loss in employers. The Health Care and Social Assistance sector lost the greatest number of employers (Louisiana Department of Labor 2010).

Three neighborhoods and a variety of businesses are located within the project area (figure 14). Two of the residential areas and many of the businesses located near the northern portion of the IHNC are discussed in detail in IER #11 – Tier 2 Pontchartrain, the Final Individual Environmental Report for Improved Protection on the Inner Harbor Navigational Canal, Orleans Parish, Louisiana (USACE 2010a). A summary of these neighborhoods and businesses, with details on additional neighborhoods and businesses in other portions of the project area is provided below.

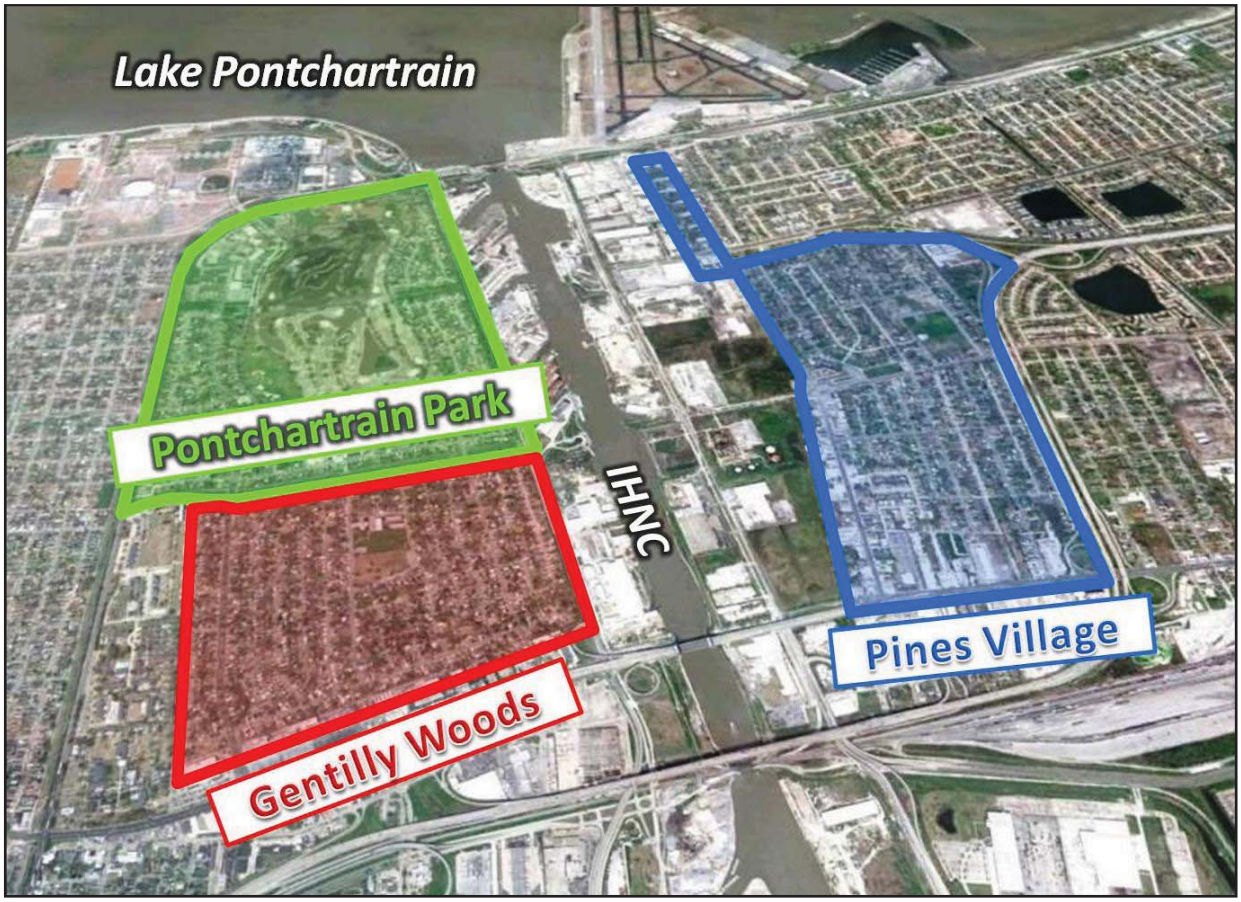

Figure 14. Neighborhoods Located in the Northern Portions of Reaches 2 and 3

Pontchartrain Park Neighborhood

Approximately 70 homes in the Pontchartrain Park neighborhood back up to the existing HSDRRS on the west bank of the IHNC, with distances ranging from approximately 50 ft to 80 ft from the levee to the rear of individual houses. The height of the levee wall is generally well-above the existing rooftops of the houses which are primarily one-story. A narrow industrial buffer bordered by Hayne Boulevard to the north and Highway 90 to the south (approximately 145 acres) stands between the HSDRRS and the IHNC in this area.

Pontchartrain Park is a suburban neighborhood developed in the 1950s. It is one of the first areas in New Orleans designed to provide home ownership to middle and upper income African Americans and one of the last Gentilly neighborhoods to be developed. FEMA, in consultation with the Louisiana SHPO, has identified the Pontchartrain Park National Register Historic District, which incorporates Pontchartrain Park and portions of streets on the east side of the park including Prentiss Avenue, Congress Drive, Madrid Street, DeBore Drive, Morrison Road, and Frankfort Street, as eligible for listing in the NRHP (FEMA 2006).

The neighborhood is rebuilding following the damages caused by Hurricane Katrina (CNO 2006a). The neighborhood has a number of active civic organizations such as the Pontilly Neighborhood Association and Pontchartrain Park Home Improvement Association. Redevelopment efforts are being supported by the New Orleans Redevelopment Authority (NORA), The Road Home, and Pontchartrain Park Community Development, LLC (WDSU 2008). Additional support is provided by the state-administered Economic Development/Economic Zone program (CNO 2006a).

Five projects are identified within the Pontchartrain Park neighborhood for redevelopment (CNO 2006a):

- Renovate and re-open the Pontchartrain Park Senior Community Center,
- Restore Pontchartrain Park, Bartholomew Golf Course, and Barrow Stadium,
- Create a pedestrian/bike path around Pontchartrain Park,
- Renovate and reopen the Coghill Elementary School,
- Enclose Dreux Canal and create a walking path.

The following long-term key projects and initiatives were presented in the New Orleans Master Plan (CNO 2008b):

- Create a long-term framework for transformation of the Industrial Canal into a waterfront incorporating mixed-use development, boating, parkland, and neighborhood access.

- Restore Pontchartrain Park as the District's signature public space.

Pines Village Neighborhood

Pines Village is generally bordered by the IHNC on the west, I-10 to the east and south, and Morrison Road to the north. The Pines Village neighborhood was one of the first to be developed in New Orleans East. In the 1950s, the neighborhood's namesake, Sigmund Pines, purchased a large piece of marsh land adjacent to the IHNC and proceeded to develop it with residences. In the 1950s and early 1960s, substantial numbers of dwellings, both doubles and single-family detached, were built in the Pines Village Subdivision. Pines Village contains one neighborhood park, several churches, two schools and commercial/industrial development. There are no local, state, or Federal historic districts designated in the neighborhood. Over 300 acres of industrial/commercial use property are located between the IHNC and the residential areas of Pines Village. The residential areas in Pines Village are located approximately a quarter of a mile east of the HSDRRS.

The Pines Village neighborhood is not within the NORA jurisdiction. The industrial portions of the neighborhood are, however, within an Economic Development/Enterprise Zone. Redevelopment goals of the neighborhood include improving residential conditions by setting maximum density limits for residential units (CNO 2006b).

Redevelopment projects as identified by the City of New Orleans for the Pines Village neighborhood include (CNO 2006b):

- Street repairs (Downman Road),
- Replace street trees,
- Repair signage and signals,
- Dwyer Road drainage improvements,
- Digby Park improvements,
- Develop new school and community center at Ray Abrams Elementary,
- Bus shelters on Dwyer and Downman Roads.

The following long-term key projects and initiatives were presented for the Pines Village Neighborhood with respect to the Master Plan and Comprehensive Planning Ordinance Process:

- Maintain the Industrial Canal Employment/Industrial Development Zone,
- Enhance buffer area between industrial and residential areas along Downman Road,
- Extend Dwyer Road into the Industrial zone with a buffer area,

- Expand low-density residential infill areas north of Morrison Road with ground-level parking.

Gentilly Woods Neighborhood

Gentilly Woods is a 385-acre neighborhood comprised of primarily bricked, single-family residences. The City Planning Commission defines the boundaries of this residential area as Dreux Avenue to the north, the IHNC to the east, Highway 90 to the south, and People's Avenue to the west. Approximately 30 homes back up to the existing HSDRRS on the west bank of the IHNC, with distances ranging from approximately 50 ft to 80 ft from the levee to the rear of individual houses. Gentilly Woods became a residential development in the 1950s and was designed and marketed as post-war housing (GNOCDC 2002).

Public Facilities

Within the project area, there are currently two District Police Stations, seven Fire Engine Stations, and 14 public schools, (CNO 2010c and GNOCDC 2010). None of these facilities are adjacent to the floodwalls, levees, floodgates or staging areas, and are at least 1000 feet from any activities related to the proposed action (figure 15). Potential impacts to these facilities are discussed in section 3.3.3 below.

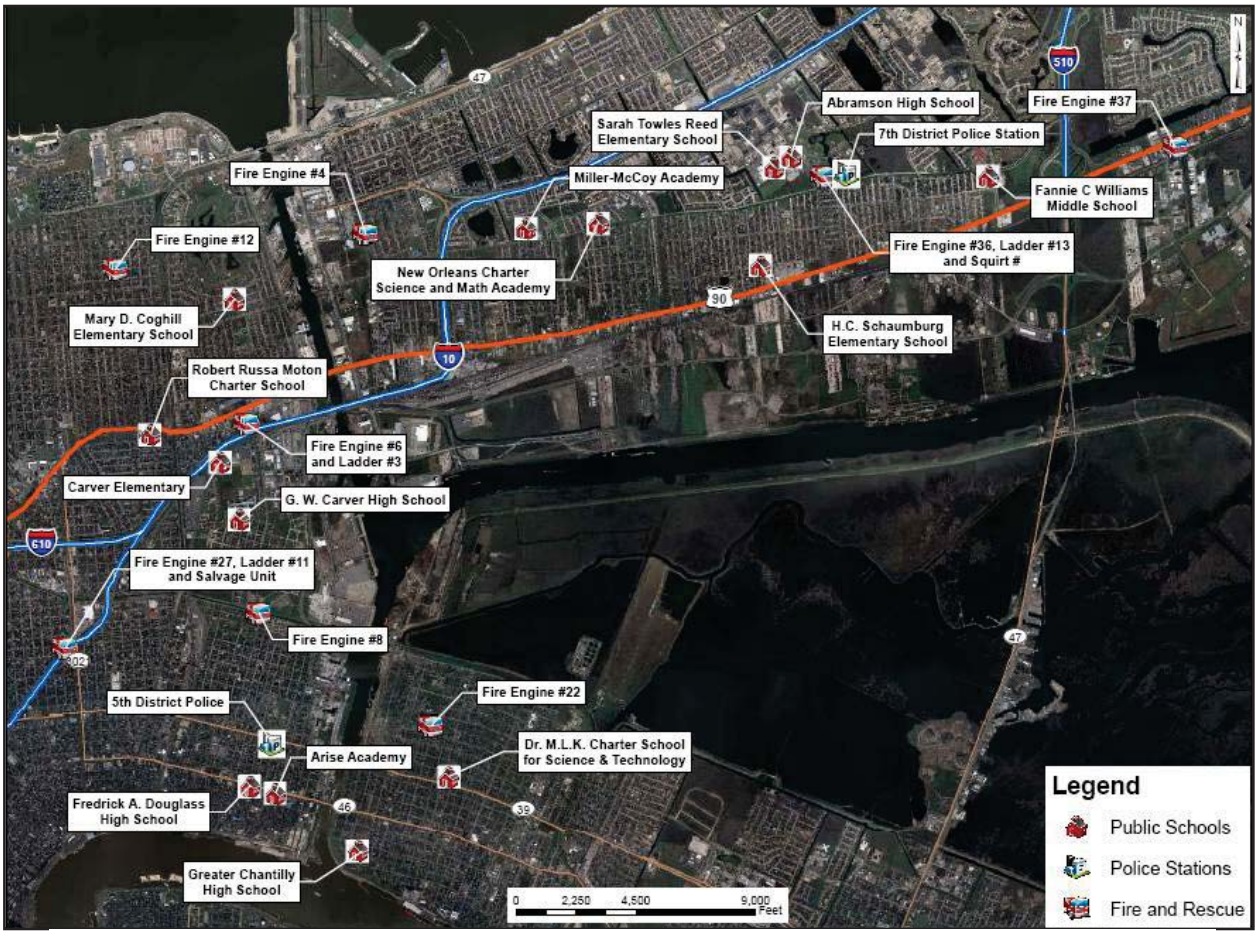

Figure 15. Public Facilities in the Project Area

Industrial and Commercial Resources

The banks of the IHNC and GIWW provide land for industrial uses. Some industrial resources decided not to return after Hurricane Katrina and the closure of the MRGO at Bayou La Loutre (DeGregorio 2008). However, several industrial and commercial resources remain within the project area or vicinity (figure 16).

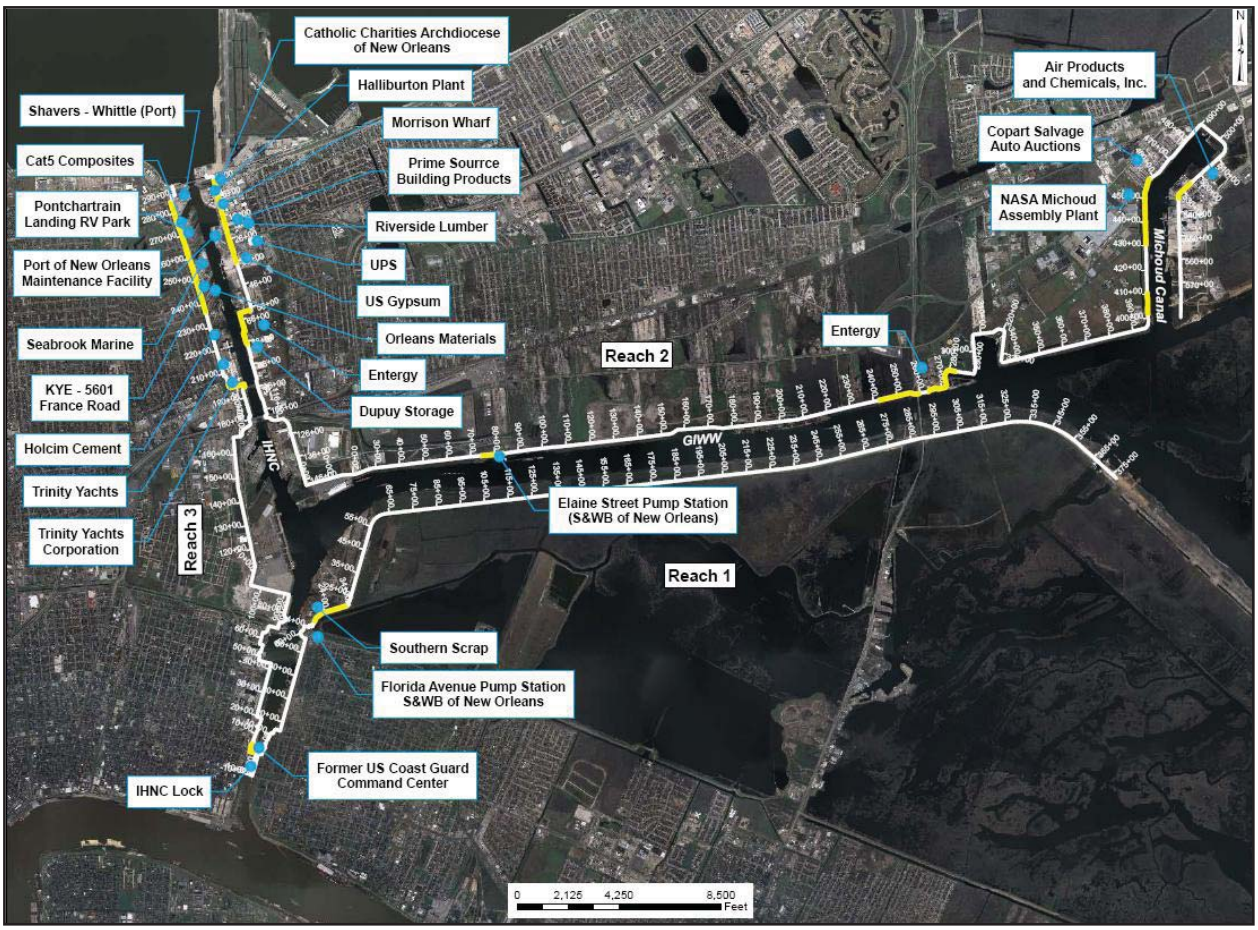

Figure 16. Industrial and Commercial Resources in the Project Area

The western bank of the IHNC is characterized by approximately 125 acres of industrial property between the IHNC and France Road with residential homes backing up to the existing levee west of France Road. Most of the industrial lands on the western side of the IHNC are vacant or cleared. Among the industrial users on the west bank is an RV park. The eastern bank of the IHNC is characterized by approximately 150 acres of industrial property between the IHNC and Jourdan Road with approximately 240 acres of additional industrial use located between the existing levee and the residential homes of Pines Village.

The following is a discussion of industrial users along the IHNC and GIWW beginning with the northernmost business on the west bank of the IHNC. For IER #11 – Tier 2 Pontchartrain, interviews were conducted with representatives of several businesses to collect specific operational information (USACE 2010a).

New Orleans Public Belt Railroad - New Orleans Public Belt Railroad operates both rails running north/south along the east and west banks of the IHNC. Current operations are generally at night or early morning, about three times a week, with approximately 10 to 12 rail cars, based on needs. The existing rail lines on the west side of the IHNC terminate approximately 3,500 ft from the northern-most endpoint of the line.

Shavers-Whittle Construction Material Yard (former) – The property at 6401 France Road is approximately 144,000 square ft and is owned by the Port of New Orleans. It extends into the IHNC along Slip Number 6. The current lease has expired. At the time IER #11-Tier 2 Pontchartrain was completed, the Port had plans to use the property as a laydown yard for a period of about 4 months to 6 months starting in the spring of 2010 to construct a new dredge assembly; however, currently this property is being used as a staging area for the construction of the Seabrook Closure (USACE 2010a).

Cat 5 Composites – Cat5, located on 3.2 acres at 6201 France Road, holds various government contracts for ship repairs. The current lease with the Port of New Orleans has expired. The business would likely remain, but would enter into a new sub-lease to Pontchartrain Landing when that organization expands their holdings to the north. Cat5 Composites has plans to add docks and ramps to facilitate their sea trials. Currently, Cat5 uses both Lake Pontchartrain and the GIWW for sea trials. Speed runs are conducted in the GIWW. When conducting sea trials in the lake, they rely on access to the lake through Seabrook.

Pontchartrain Landing Waterfront RV Park – The property at 6001 and 6101 France Road is an approximately 20-acre RV park owned by the Port of New Orleans and leased to Pontchartrain Properties. Pontchartrain Landing identifies itself as the newest and largest waterfront RV park in New Orleans. The site fronts the IHNC approximately 2,500 ft south of Lake Pontchartrain and borders Slip Number 5 with the Seabrook Marina. The park's capacity is 152 RV parking slips (105 were currently available in January 2009) in various price ranges. Tenants often bring their boats and can pay to use the onsite public launch for quick access to the lake. The RV park site plan illustrates that the facility either currently provides, or plans to provide: boat launches, boat trailer parking, houseboat parking, houseboat rentals, and RV storage. The RV park provides services supportive of recreational uses, consistent with long-range plans for the west bank of the IHNC. The RV park states it has long-term plans to expand their operations north along the IHNC to include mixed-use facilities.

Port of New Orleans – The open water of the IHNC and adjacent land is owned by the Port of New Orleans. Parcels are leased to tenants who may need water access for their operations.

Seabrook Harbor/Seabrook Marine, LLC – Located at 5801 France Road, this 7.81 acre facility provides services to refurbish and repair boats, including dockage and dry storage. Additional facilities include a store, showers, fuel, bait sales, and fish cleaning facilities. Dry storage is available for up to 200 vessels in a stacked configuration in a warehouse. There are eight in-water slips with 250 ft dockage. Approximately 80 spaces are available for storage for boats up to 80 ft. The property is owned by the Port of New Orleans and leased to Seabrook Harbor LLC which is operated by a local family. The current lease extends through 2018.

Trinity Yachts, Inc. – Located at 4325 France Road, Trinity Yachts is a builder of custom yachts of steel and aluminum construction for vessels up to 160 ft and 300 tons. The France Road yard constructs modules for shipment to the Gulfport yard for larger vessels. The France Road yard receives construction materials on barges. Delivery of completed yachts is made through the GIWW. At any given time, they typically have about five yachts in their production process. Approximately every 90 days, a yacht comes off the production line. They run trials about four times a year.

Holcim Cement – Holcim Cement is a distributor of cement products. Their product is made in Theodore, Alabama and received at this location via barge from the GIWW and rail. Product is distributed from this facility by way of rail and truck.

Catholic Charities Archdiocese of New Orleans – Catholic Charities Archdiocese of New Orleans operates a warehouse on the eastern shore of the IHNC, adjacent to the floodgate across Hayne Boulevard.

Halliburton/Baroid Drilling Fluids Inc./Dresser Industries – For approximately 50 years, Halliburton has performed grinding operations at their plant on the IHNC, immediately south of the Seabrook bridge on the eastern bank off Jourdan Road. The facility grinds barite and bentonite for use in drilling muds for petroleum drilling operations. This processing plant is located at 8000 Jourdan Road on 12.19 acres owned by the Port of New Orleans and leased to Halliburton Energy Services currently through 2011 (USACE 2010a).

Halliburton utilizes rail, truck, and water for materials transport. Materials for grinding/crushing operations are barged in from the Mississippi River on the GIWW. They have a rail spur that enters their facility from the line that runs north/south along the eastern shore of the IHNC.

Morrison Yard Wharf and Turning Basin – Owned by the Port of New Orleans, and located in the 7300 block of Jourdan Road, this site houses pile driving equipment and is used for top-side repair of Port vessels. Fender piles are stored on the east side of the Turning Basin. They are delivered by rail and loaded on vessels for installation along their various wharfs. The wharf structure is leased for lay-berthing third-party vessels and on occasion for cargo unloading. The large warehouse was leased for storage pre-Hurricane Katrina. The approximately 8-acre Turning Basin is used by the Port, Halliburton, and Trinity Yachts. Industrial resources along the IHNC also recognize that the Turning Basin is used as a temporary safe haven for boats to stop overnight or as conditions on the lake warrant need for temporary shelter. The warehouse is currently still in disrepair following Hurricane Katrina, the site appears abandoned, but the turning basin and lay down areas may still be in use.

PrimeSource Building Products – PrimeSource Building Products is a wholesaler and distributor of fasteners and building materials (PrimeSource 2005). The New Orleans facility located near the project area is one of the company's distribution centers.

Riverside Lumber Company, Inc. – Riverside Lumber stocks and supplies domestic and imported lumber and fine woods. Additionally, Riverside manufactures molding, flooring, and custom millwork (such as wooden appliqués, corbels, dowels, finials, post caps, and rosettes) to customer specifications. Established in 1920, the company is family owned and operated (Riverside Lumber 2010).

United Parcel Service (UPS) – UPS operates a warehouse and shipping facility on the eastern shore of the IHNC at 5700 Morrison Road. Facilities include a warehouse, a large truck and car parking lot, and a truck washing station.

US Gypsum – US Gypsum previously produced both wallboard and mineral wool ceiling tile such as SHEETROCK® brand gypsum panels and DUROCK® brand cement board. Sheetrock production was suspended in December 2007 but the plant still produces cement board. US Gypsum utilizes the GIWW for shipments to their plant. They also receive trucked shipments of cement from the Holcim plant on the west bank of the IHNC and rely on rail operations of New Orleans Public Belt Railroad to send out their finished product.

Orleans Materials – The France Road yard of Orleans Materials fabricates various materials from steel. Currently, the yard is producing 60-ft deck barges. The yard receives steel by both barge and rail.

Dupuy Storage and Forwarding, LLC – Established in 1936, Dupuy Storage maintains approximately 1 million sq ft of warehouse and yard space with a focus on the transportation and storage of general cargo, coffee, tea, sugar, and other commodities. Dupuy transports materials via the New Orleans Public Belt Railroad and the IHNC (Dupuy 2010).

Entergy – The Entergy power generating station located on the eastern shore of the IHNC, across Jourdan Road from Dupuy Storage has not been operational since Hurricane Katrina; there are no plans to reopen the facility.

Southern Recycling – Established and headquartered in New Orleans in 1900, Southern Recycling's "core business involves the high volume recycling of metal-based consumer products, construction and infrastructure debris, blue and brown water vessels, and marina structures" (Southern Recycling 2010). Additional activities include "vessel, platform, and bridge deconstruction, industrial clearance, total metallic debris and natural disaster debris management, and consumer product and regulatory compliance services" (Southern Recycling 2010). Through the recycling process, the company produces over 100 grades of recycled products. These materials are distributed along rail, roads, and along the IHNC and GIWW (Southern Recycling 2010).

U.S. Coast Guard (USCG) – The USCG facility on Urquhart Street, adjacent to the IHNC Lock has not been operational since Hurricane Katrina. New facilities were built adjacent to NASA on the Michoud Canal after Hurricane Katrina.

New Orleans Sewerage & Water Board Florida Avenue Pump Station – The pump station adjacent to the Florida Avenue Bridge in the lower ninth ward is not currently operational. The New Orleans Sewerage and Water Board and the USACE are planning on renovating this station (USACE 2009b).

IHNC Lock – The IHNC lock is fully operational. The lock provides access between Lake Pontchartrain, the IHNC, the GIWW, and the Mississippi River. The USACE is replacing the existing IHNC Lock with a new, larger lock to be located within the IHNC and north of Claiborne Avenue. The new lock will be tied in to the floodwalls and levees on each side of the IHNC. No construction work is expected on this project in the foreseeable future due to a lack of funding.

New Orleans Sewerage & Water Board Elaine Street Pump Station – The pump station operated by the New Orleans Sewerage and Water Board on the end of Elaine Street has been renovated. It has been operational since 16 August 2010 (USACE 2010c).

NASA Michoud Assembly Facility – Established in 1961 to construct components of the Saturn moon rockets, the NASA Michoud Assembly Facility supported the construction of external fuel tanks for NASA's space shuttle fleet (NASA 2008). This facility no longer constructs external fuel tanks as production has been officially shut down after nearly four decades. Michoud continues to provide support for other NASA programs including oversight of shuttle launches and landings, as well as NASA's smaller Constellation Program. Stages of the Ares rockets and Orion crew exploration vehicle are scheduled to be constructed at Michoud in the future (NASA 2010). NASA utilizes the Michoud canal to transport the rocket parts and external tanks to the GIWW and then to the Gulf of Mexico. On 17 August 2010, NASA and New Orleans Mayor Mitch Landrieu announced that Blade Dynamics would be establishing their headquarters at

Michoud where they will "manufacture the world's most advanced wind turbine blades" (NASA 2010). This is expected to bring over 600 new jobs to New Orleans.

Copart Salvage Auto Auctions – Copart buys and sells a variety of vehicles (automobiles, SUVs, trucks, motorcycles, industrial vehicles, RVs, classic cars, boats, jet skis, and snowmobiles) through internet-based auctions. The New Orleans facility is one of the company's nationwide storage and shipping facilities (Copart 2010).

Air Products and Chemicals, Inc. - Air Products maintains and operates an industrial gas complex, producing primarily liquid hydrogen, along the IHNC in New Orleans. This facility utilizes the railroad and IHNC for shipping needs in addition to pipeline transport (Air Products 2005 and 2008).

Discussion of Impacts

In the sections below, potential direct, indirect, and cumulative impacts to socioeconomics associated with the no action and proposed action alternatives are discussed with respect to a) displacement of population and housing, b) employment, business, and industry, c) availability of public facilities and services, d) transportation, e) disruption of community and regional growth, f) tax revenues and property values, and g) changes in community cohesion.

3.3.1 Displacement of Population and Housing

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Population and Housing

Under the no action alternative, the deficient levee/floodwall segments along the IHNC and GIWW would not be restored or reinforced. The indirect impacts associated with displacement of population and housing would contribute to adverse cumulative impacts to the New Orleans Metropolitan area. Without improvements to the deficient levee/floodwall segments along the IHNC and GIWW, this portion of the HSDRRS would provide a lower level of risk reduction that would leave parts of Orleans and St. Bernard Parishes more vulnerable to storm-related flooding and potential displacement of population and housing. The secondary line of defense provided by these flood risk reduction structures in Reaches 1, 2, and 3 would continue to have potential seepage and stability issues. This would present an increased risk of storm-related flooding in the low-lying portions of these reaches and associated damage to housing and displacement of residents. Costs would be incurred for such items as evacuation, clean up, debris removal, building and infrastructure repair, damaged vehicles, and reoccupation of homes. Indirect impacts could be cumulative should flooding occur across the region.

Future Conditions with Proposed Action

Direct Impacts to Population and Housing

Restoring/reinforcing portions of the levees and floodwalls would have beneficial impacts on population and housing within the three sub-basins, and specifically for several residential neighborhoods in Orleans Parish. All five methods of restoration/reinforcement types would be built entirely within existing ROWs; therefore, adjacent housing in the Pontchartrain Park/Gentilly Woods/Pines Village neighborhoods would not be directly impacted by construction activities. No population or housing in these neighborhoods would be displaced during construction. Following completion of construction, residents of all three neighborhoods would receive improved protection and a reduced flood risk from the restored/reinforced

HSDRRS. The increased protection has the potential to increase homeowner confidence and, therefore, could promote an increase in population in the area.

Indirect Impacts to Population and Housing

Indirect impacts to residents in the Pontchartrain Park and Gentilly Woods neighborhoods would occur as a result of elevated noise levels experienced during the construction process for restoring and/or reinforcing the deficient segments. These elevated noise levels would constitute a temporary and minor annoyance. Elevated noise is not anticipated to cause impacts to the Pines Village neighborhood. Increased traffic congestion during the construction period may also constitute a minor and temporary adverse indirect impact to the local population. There would be no permanent adverse impacts to population and housing in any of the adjacent neighborhoods as a result of the proposed action.

Cumulative Impacts to Population and Housing

Implementation of the proposed action would have beneficial cumulative impacts within the three sub-basins protected by Reaches 1, 2, and 3. In the long-term, the proposed levee/floodwall restoration/reinforcement methods, in conjunction with other proposed or ongoing infrastructure and HSDRRS projects in the vicinity, would improve the HSDRRS and reduce the risk of storm-related flooding and thus of displacement of population and housing within the area. Cumulatively, the increased protection would likely instill confidence in residents desiring to return to the area, thus resulting in local and regional population increases.

3.3.2 Impacts to Employment, Business, and Industry

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Employment, Business, and Industry

With no action, the current reduced level of flood risk reduction provided by the subject reaches of HSDRRS would present an increased risk of storm-related flooding in the low-lying portions of the three sub-basins and associated damage to businesses and industries located on the protected side, disruption of economic activity, and, correspondingly, employment. Indirect impacts include the costs that would be incurred for such activities and items as evacuation, clean up, debris removal, building and infrastructure repair, damaged vehicles, and reoccupation of businesses. The increased risk would constitute an adverse and potentially cumulative impact to employment, business, and industry. Businesses and industries located between the HSDRRS and the IHNC or GIWW would not experience indirect beneficial or adverse impacts from the no action alternative. The no action alternative would have additional adverse, indirect and cumulative impacts on employment, business, and industry in the area in that it could reduce the community confidence level in the HSDRRS.

Future Conditions with Proposed Action

Direct Impacts to Employment, Business, and Industry

Restoring/reinforcing portions of levees and floodwalls along the IHNC and GIWW that do not meet the HSDRRS seepage and stability criteria would have beneficial impacts on employment, business, and industry within the three sub-basins that are protected by the existing flood risk reduction system. All five methods of restoration/reinforcement would be built entirely within existing ROWs; therefore, land use on adjacent industrial and commercial property would not be directly impacted by construction activities. There would be temporary, beneficial

socioeconomic impacts from construction activities associated with the proposed action, including purchase of materials, equipment, and services and a temporary increase in employment and income. This impact would be local or regional, depending on where the goods, services, and workers would be obtained.

Indirect Impacts to Employment, Business, and Industry

Businesses and industries immediately adjacent to the HSDRRS would experience indirect impacts associated with elevated noise levels during construction of the proposed action. These impacts would be minor and temporary and would not be anticipated to impact operations.

During construction, there would be temporary indirect adverse impacts as a result of increased traffic on local roads which could potentially increase congestion and adversely affect access to businesses. However, road closures are not anticipated as a result of the proposed action; therefore, these potential impacts would be minor and temporary. If local roadways are damaged during construction and diversion of traffic becomes necessary, this would temporarily impact nearby businesses by increasing or decreasing the number of drop-in customers. However, these effects would be localized and temporary.

Cumulative Impacts to Employment, Business, and Industry

In the long-term, the proposed levee/floodwall restoration/reinforcement methods in conjunction with other proposed or ongoing infrastructure and HSDRRS projects in the vicinity would improve the HSDRRS and reduce the risk of storm-related flooding within the study area. This would enhance business and industry owner confidence, which could lead to expansion and growth within the area.

3.3.3 Availability of Public Facilities and Services

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Public Facilities and Services

Under the no action alternative, the deficient levee/floodwall segments along the IHNC and GIWW would not be restored or reinforced. The secondary line of defense provided by the structures in Reaches 1, 2, and 3 would continue to have potential seepage and stability issues. This would present an increased risk of storm-related flooding in the low-lying portions of these reaches and associated damage to buildings and infrastructure, disruption of economic activity, and displacement of residents. Public services including police stations, fire and rescue stations, and schools potentially could be damaged if this line of defense were to fail during a major storm event. Costs would be incurred for such activities and items as evacuation, clean up, debris removal, building and infrastructure repair, and damaged vehicles.

The no action alternative would have an adverse indirect impact on socioeconomic resources in the area in that it could reduce the confidence level in the HSDRRS to the extent that a second line of defense is not performing to its highest potential. Lack of confidence in the defense system could encourage people to move out of the area, which, in turn, would reduce the tax base used to pay for maintenance and upkeep of the public services and facilities in the area. The no action alternative would contribute to adverse cumulative impacts on socioeconomic resources in the New Orleans Metropolitan area. Without improvements to the deficient levee/floodwall segments along the IHNC and GIWW, this portion of the HSDRRS would provide a lower level of risk reduction that would leave parts of Orleans and St. Bernard Parishes more vulnerable to storm-related flooding and potential damage to public facilities in the project area.

Future Conditions with Proposed Action

Direct Impacts to Public Facilities and Services

Under the proposed action, beneficial impacts to public services and facilities within the three sub-basins that are protected by the existing flood risk reduction system would be expected. All five methods of restoration/reinforcement would be built entirely within existing ROWs; therefore, nearby public facilities would not be directly impacted by construction activities. Public facilities in the area would be less likely to be damaged by flooding with the upgraded HSDRRS in place, resulting in a positive, direct impact.

Indirect Impacts to Public Facilities and Services

As discussed in section 3.2.10.4, Surface Roads, indirect impacts to transportation resulting from wear and tear to minor roads would occur. Corresponding indirect socioeconomic impacts to public facilities in the area would occur while the repairs to the roads were underway. Police and fire vehicles could have difficulty accessing certain portions of the project area, and repairs to roads near schools could slow traffic in the vicinity. These impacts would be localized and temporary. In the long-term, the proposed action would improve the HSDRRS and reduce the risk of storm-related flooding within the study area, including public services and facilities. This would reduce the likelihood of associated damage to buildings and infrastructure and the reduction in availability of public facilities and services.

Cumulative Impacts to Public Facilities and Services

Implementation of the proposed action would have beneficial cumulative impacts on socioeconomic resources within the three sub-basins that are protected by the subject HSDRRS. In the long-term, the proposed levee/floodwall restoration/reinforcement methods in conjunction with other proposed or ongoing infrastructure and HSDRRS projects in the vicinity would improve the HSDRRS and reduce the risk of storm-related flooding within the study area.

3.3.4 Effects on Transportation

In this section, those transportation impacts that have direct, indirect, and cumulative effects on socioeconomic resources are discussed. A complete analysis of impacts associated with transportation resources is included in section 3.2.10.

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Transportation

Without restoration or reinforcement to the levee/floodwall segments, continued seepage and stability deficiencies would increase the risk of storm-related flooding in low-lying areas, which could result in damage to local roadways. Indirect socioeconomic-related transportation impacts could occur from the expenditure of funds to repair such damaged roadways. Socioeconomic related transportation impacts could be cumulative should flooding occur throughout the regional area.

Future Conditions with Proposed Action

Direct Impacts to Transportation

Restoring/reinforcing portions of levees and floodwalls would likely reduce the number of road repairs required as a result of seepage and flooding damage. This would have a beneficial impact on local transportation and on the local economy.

Indirect Impacts to Transportation

As discussed in section 3.2.10.4, Surface Roads, indirect impacts to transportation resulting from wear and tear to minor roads would occur. Corresponding indirect socioeconomic impacts would occur as the community absorbs the cost of maintaining/repairing these roads. Additional indirect transportation-related socioeconomic impacts would result from non-project traffic avoiding these damaged roadways and thus creating new wear and increasing traffic and congestion on other local roads. During construction, increased traffic could potentially increase congestion and adversely affect access to businesses and residences. Diversion of traffic could temporarily impact businesses along the damaged roadways through loss or increase of drop-in customers. However, these effects would be localized and temporary.

Cumulative Impacts to Transportation

In the long-term, the proposed levee/floodwall restoration/reinforcement methods, in conjunction with other proposed or ongoing infrastructure and HSDRRS projects in the vicinity, would improve the HSDRRS and reduce the risk of storm-related flooding. This would, in turn, reduce transportation-related socioeconomic impacts in the New Orleans Metropolitan area.

3.3.5 Disruption of Community and Regional Growth

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Community and Regional Growth

Under the no action alternative, direct impacts consist of a lack of construction related to restoration or reinforcement. No sections of existing HSDRRS would be restored or reinforced to the 100-year level of risk reduction; therefore, no time or funds would be allocated to this project. The deficient sections of HSDRRS would continue to experience potential seepage and stability issues, and therefore, increase the risk of storm-related flooding in the low-lying portions of Reaches 1, 2, and 3. Indirect impacts include a continued risk of flood-related damage to buildings and infrastructure, disruption of economic activity, and displacement of residents. In the event of such damages, costs would be incurred for such activities and items as evacuation, clean up, debris removal, building and infrastructure repair, damaged vehicles, and reoccupation of homes and businesses. Such flooding events would significantly impact community and regional growth in a similar manner to the disruption that followed the flooding associated with Hurricane Katrina. These indirect impacts could also be cumulative if such flooding occurred on a regional level.

The no action alternative could have an adverse indirect impact on socioeconomic resources in the area in that it would be expected to reduce the community confidence level in the HSDRRS. Lack of confidence would likely result in continued delays in population and business resettlement in the areas protected by these reaches, which may influence existing residents or businesses to move out of the area. Such delays in resettlement and relocations would constitute an adverse impact to community and regional growth, especially if residents or businesses

choose to relocate out of the New Orleans Metropolitan area. These indirect impacts could also be cumulative should other planned HSDRRS projects be delayed or canceled.

Future Conditions with Proposed Action

Direct Impacts to Community and Regional Growth

Restoring/reinforcing the HSDRRS would have beneficial impacts on socioeconomic resources within the three sub-basins that are protected by the existing flood risk reduction system. All five methods of restoration/reinforcement would be built entirely within existing ROWs; therefore, adjacent land use would not be directly impacted by construction activities. Following completion of the proposed action, land use patterns in the three sub-basins would not be expected to change since restoring and reinforcing the existing levees and floodwalls would not encourage one type of land use over another. In the long-term, the proposed action would improve the HSDRRS and reduce the risk of storm-related flooding to the study area. Increased risk reduction would reduce the likelihood of disruption of community and regional growth during future storm events. The additional security would likely encourage community and regional growth in the areas protected by Reaches 1, 2, and 3.

Indirect Impacts to Community and Regional Growth

As discussed in section 3.2.10.4, Surface Roads, indirect impacts to transportation resulting from wear and tear to minor roads would occur. Corresponding indirect socioeconomic impacts would occur as the community absorbs the cost of maintaining/repairing these roads. However, these effects would be localized and temporary and would not be expected to have a permanent adverse impact on community or regional growth.

Cumulative Impacts to Community and Regional Growth

In the long-term, the proposed levee/floodwall restoration/reinforcement methods in conjunction with other proposed or ongoing infrastructure and HSDRRS projects in the vicinity would improve the HSDRRS and reduce the risk of storm-related flooding within the study area. This cumulative effect would encourage community and regional growth in Orleans and St. Bernard Parishes.

3.3.6 Impacts to Tax Revenues and Property Values

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Tax Revenues and Property Values

Under the no action alternative, the increased risk of storm-related flooding in the low-lying portions of Reaches 1, 2, and 3 and the associated damage to buildings and infrastructure would result in adverse impacts to tax revenues and property values. Indirect impacts would result from costs incurred for certain activities, such as evacuation, clean up, debris removal, building and infrastructure repair, and reoccupation of homes and businesses. Lack of confidence in the system could cause residents and businesses to move out of the area, thus reducing potential tax revenues and creating indirect impacts. Additionally, should lots stand abandoned or in disrepair, property values could potentially experience stagnation or even decrease within the local affected area. These direct and indirect impacts would also be cumulative given the number of levee and floodwall segments in need of restoration and reinforcement.

Future Conditions with Proposed Action

Direct Impacts to Tax Revenues and Property Values

All five methods of restoration/reinforcement would be built entirely within existing ROWs; therefore, adjacent land use would not be directly impacted by construction activities. There would be temporary, beneficial socioeconomic impacts from construction activities, including purchase of materials, equipment, and services and a temporary increase in employment and income and associated tax revenues. This impact would be local or regional, depending on where the goods, services, and workers would be obtained. Once construction is complete, there could be an increase in tax revenues if residents and businesses from out of the region move into the area due to an increase in confidence regarding flood risk reduction. Any potential positive impact on property values cannot be quantified due to the influence of numerous other factors of supply and demand.

Indirect Impacts to Tax Revenues and Property Values

As discussed in section 3.2.10.4, Surface Roads, indirect impacts to transportation resulting from wear and tear to minor roads would occur. Corresponding indirect socioeconomic impacts would occur as the community absorbs the cost of maintaining/repairing these roads. Depending on the level of repairs required, this could impact tax revenues and, if repairs are delayed, nearby property values. Additional indirect transportation-related impacts on socioeconomics could result from non-project traffic avoiding these damaged roadways and thus creating new wear and increasing congestion on other roads. During construction, increased traffic on local roads would potentially increase congestion and adversely affect access to businesses and residences. Diversion of traffic could potentially temporarily impact any businesses along the damaged roadways through loss or increase of drop-in customers, potentially impacting tax revenues. However, these effects would be localized and temporary.

Cumulative Impacts to Tax Revenues and Property Values

Implementation of the proposed action would have beneficial cumulative impacts on socioeconomic resources within the three sub-basins that are protected by the existing flood risk reduction system in the project area. In the long-term, the proposed levee/floodwall restoration/reinforcement methods in conjunction with other proposed or ongoing infrastructure and HSDRRS projects in the vicinity would improve the HSDRRS and reduce the risk of storm-related flooding within the study area. This increased risk reduction would lead to additional community and regional growth and thus to increased in tax revenues and property values.

3.3.7 Changes in Community Cohesion

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Community Cohesion

Under the no action alternative, the deficient levee/floodwall segments along the IHNC and GIWW would continue to have potential seepage and stability issues that reduce their level of risk reduction. The potential risk could result in community anxiety and lack of confidence. Residents may relocate from or decide not to return to the community, thus further disrupting community cohesion beyond that caused by Hurricane Katrina. Indirect impacts to community cohesion could result from the no action alternative if residential relocations result in new populations settling into these neighborhoods, particularly should potential racial or ethnic

conflicts arise. These impacts would be cumulative as a result of the number of deficient segments along Reaches 1, 2, and 3.

Future Conditions with Proposed Action

Direct Impacts to Community Cohesion

Restoring/reinforcing portions of levees and floodwalls along the IHNC and GIWW that do not meet the HSDRRS seepage and stability criteria would have beneficial impacts on socioeconomic resources within the three sub-basins that are protected by the existing flood risk reduction system. All five methods of restoration/reinforcement would be built entirely within existing ROWs; therefore, adjacent land use would not be directly impacted by construction activities. No populations would be displaced and changes in community cohesion would not be expected to occur.

Indirect and Cumulative Impacts to Community Cohesion

The increased sense of security and confidence in the risk reduction provided by the HDRRS would encourage continued community growth and recovery. The continued growth would likely increase community cohesion as the neighborhoods recover and prosper. This increased community cohesion would be a cumulative impact as well throughout the three sub-basins and the New Orleans Metropolitan area as the region continues to recover.

3.4 ENVIRONMENTAL JUSTICE

Executive Order 12898 of 1994 (59 FR 7629) directs Federal agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects of Federal actions on minority and low-income populations. In 1995, the DoD issued a *Strategy on Environmental Justice* that lays out its approach to meet the intent of the Executive Order and provides an implementation plan to execute that strategy (DoD 1995). The USEPA defines environmental justice (EJ) as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (USEPA 1998).

The methodology to accomplish this analysis includes identifying low-income and minority populations within the study area using up to date economic statistics, aerial photographs, 2000 Census data (USCB 2000), and Environmental Systems Research Institute, Inc. (ESRI) estimates (ESRI 2007), as well as conducting community outreach activities such as small neighborhood focus meetings. The smallest political unit(s) containing an EJ project area is/are considered the reference community of comparison, whose population is therefore considered the reference population for comparison purposes. A potential disproportionate impact may occur when the percent minority and/or percent low-income population in an EJ study area are greater than those in the reference community. References cited in this EJ section explain this rationale in more detail.

The sources for the data used in the analysis include aerial imagery and the 2000 U.S. Census and 2007 estimates from ESRI. Although it has been nine years since the 2000 U.S. Census was conducted, it serves as a logical baseline of information for the following reasons:

- The 2000 Census is the most accurate source of data available due to the sample size of the Census decennial surveys; with one of every six households surveyed, the margin of error is negligible;

- The Census reports data at a much smaller geographic level than other survey sources, providing a more defined and versatile option for data reporting; and
- Census information sheds light upon the demographic and economic framework of the area, pre-Hurricane Katrina. By accounting for the absent population, the analysis does not exclude potentially low-income and minority families that wish to return home.

Due to the considerable impact of Hurricane Katrina upon the New Orleans Metropolitan Area and the likely shift in demographics and income, the 2000 Census data are supplemented with more current data, including 2007 estimates provided by ESRI (2007).

Existing Conditions

According to the 2000 Census and 2007 ESRI estimates, the area within a one-mile radius of the project's footprint, in the three reaches of the project work, includes low-income or minority populations, particularly in the areas of the IHNC and vicinity in Orleans Parish. The minority population in the area is greater than 50 percent, and is not substantially different than the percentage of minorities within Orleans Parish, the reference community for the project area. Similarly, the percentage of the population living below the poverty level in the area was comparable to the Orleans Parish percentage and significantly lower than the State of Louisiana percentage for 2000. Areas in St. Bernard Parish within a one mile radius of the project footprint are uninhabited. Based on the available descriptions of the project and work site locations, residential areas within a one-mile radius of the project footprint, for the three reaches of the work in Orleans Parish, are located along the IHNC in the Lower Ninth Ward portion of Reach 1 and farther inland, behind waterfront industrial and commercial uses, along the IHNC and GIWW in Reach 2 and Reach 3.

Discussion of Impacts

Future Conditions with No Action

Direct, Indirect, and Cumulative Impacts to Environmental Justice

Under the no action alternative, the deficient levee/floodwall segments along the IHNC and GIWW would not be restored or reinforced. The secondary line of defense provided by these flood risk reduction structures in Reaches 1, 2, and 3 would continue to have potential seepage and stability issues. This could present an increased risk of storm-related flooding in the low-lying portions of these reaches and associated damage to buildings and infrastructure, disruption of economic activity, and displacement of residents. These impacts could be borne by significant minority and low-income populations residing within a one-mile radius of the project, as well as within the remainder of the three reaches. However, although the no action alternative would have adverse direct, indirect, and cumulative impacts on minority and low-income residents in the project area, the impacts would not be considered to be disproportionately borne by such populations. Therefore, no EJ issues would be anticipated for this alternative.

Future Conditions with Proposed Action

Direct, Indirect, and Cumulative Impacts to Environmental Justice

Restoring and/or reinforcing portions of levees and floodwalls along the IHNC and GIWW that do not meet the HSDRRS seepage and stability criteria would have beneficial impacts on the populations within the three sub-basins that are protected by the existing flood risk reduction

system. All populations groups within the HSDRRS would benefit from completion of the proposed action. All five methods of restoration/reinforcement types would be built entirely within existing ROWs; therefore, the proposed action would not require any takings of residential properties and no populations would be displaced. There would be temporary indirect impacts resulting from construction activities, such as noise, air quality, and traffic associated with construction equipment, material deliveries, and other related activities. However, these impacts would be temporary in nature and would equally impact non-minority and non-low-income communities as well as minority and low-income communities. Thus, disproportionately high and adverse effects on minority and low-income populations would not be expected to occur.

Implementation of the proposed action would not result in significant adverse effects on environmental resources that individuals involved in subsistence fishing or hunting utilize. Also, restoration/reinforcement activities on levees and floodwalls would not be anticipated to involve the release of hazardous, toxic, or radioactive materials to which minority or low-income populations could be exposed. Accordingly, the proposed action would not create disproportionately high and adverse environmental or human health effects on minority and low-income populations.

Implementation of the proposed action would have beneficial cumulative impacts on all populations within the three sub-basins that are protected by the existing flood risk reduction system in the project area. That is, the cumulative reduced risk of storm-related flooding would benefit all residents of the project area, regardless of income or race. Thus, disproportionately adverse effects on minority and low-income populations would not be expected to occur.

3.5 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

The USACE is obligated under ER 1165-2-132 to assume responsibility for the reasonable identification and evaluation of all hazardous, toxic, and radioactive waste (HTRW) contamination within the vicinity of the proposed action. ER 1165-2-132 identifies CEMVN HTRW policy to avoid the use of project funds for HTRW removal and remediation activities. Costs for necessary special handling or remediation of wastes (e.g., Resource Conservation and Recovery Act [RCRA] regulated), pollutants, and other contaminants, which are not regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), would be treated as project costs if the requirement is the result of a validly promulgated Federal, state, or local regulation.

An American Society for Testing and Materials (ASTM) International E 1527-05 Phase I Environmental Site Assessment (ESA) was completed for the project area(s). The *Final Phase I ESA, Inner Harbor Navigation Canal (IHNC) Levees and Floodwalls, IHNC and Gulf Intracoastal Waterway (GIWW)*, dated 27 July 2010 and prepared by AECOM Technical Services, Inc. included 23 deficient HSDRRS levee/floodwall segments and nine staging areas, and documented the Recognized Environmental Conditions (RECs) for the proposed action areas in Reaches 1, 2, and 3. If a REC cannot be avoided, due to construction requirements, the CEMVN may further investigate the REC to confirm the presence or absence of contaminants, and actions to avoid possible contaminants. Federal, state, or local coordination may be required. The Phase I ESA referenced below will be maintained on file at the office of the CEMVN and is incorporated herein by reference. A copy of the report is available upon request from the CEMVN, or by accessing www.nolaenvironmental.gov.

The Phase I ESA found two Recognized Environmental Conditions, several adjacent properties with histories of spills or other environmental conditions and other general environmental concerns (Table 14). The two RECs were associated with activities at adjacent facilities.

Table 14.
Recognized Environmental Conditions in the Project Area

Site	Location	REC Site Description
W-1 0+00 to 2+00 Former USCG operations	Former USCG Facility at 4640 Urquhart Street, New Orleans, Louisiana 70117 Lat: 29° 58' 1.65"N, Long: 90° 1' 38.77"W	Soils potentially impacted by hazardous substances or petroleum products by adjacent facility.
28+85 and 17+50 to 24+00 Southern Recycling	Southern Scrap/Southern Recycling at 4801 Florida Avenue, New Orleans, LA 70117; Lat: 29° 57' 23.47957" N, Long: 90° 07' 40.63540" W	Soils potentially impacted by hazardous substances or petroleum products by adjacent facility.
Segments along the IHNC	Port of New Orleans, 6201 France Road; UPS, 5700 Morrison Road; Southern Recycling, 4801 Florida Avenue; Baroid Drilling Fluids (currently Halliburton), 8000 Jourdan Road; NASA, 03800 Old Gentilly Road; and Seabrook Marine, 5801 France Road.	Adjacent properties which have had historical leaks or spills which could have impacted the soils under the HSDRRS. Soils potentially impacted by hazardous substances or petroleum products by adjacent facilities.
79+00	End of Elaine Street	Soils potentially impacted by hazardous substances or petroleum products by historical and adjacent facilities.
242+00 to 260+00	Adjacent to the Paris Road Bridge	Soils potentially impacted by hazardous substances or petroleum products by a liquid gas pipeline or the maintenance thereof.

At the former USCG operations facility, there was evidence of possible underground storage tanks (USTs) or other underground equipment and there was previously a hazardous materials storage area adjacent to the floodwall. This facility was abandoned following the hurricane, and the area is currently in a state of disrepair. There are multiple drums, containers and pipelines on site whose contents are not identified. Some of these containers were actively leaking at the time of the site visit. The potential for impacts to the soil in the ROW exists.

At Southern Recycling, large quantities of materials are recycled, including cars, refrigerators and other metal appliances. The condition of these materials while being recycled or stored on site is unknown. The cars are reported to be drained of fluids prior to being stored on site. However, there are records of leaks from the fuel tanks of ships which were being cut up for recycling. Therefore, not all fluids from all appliances and vehicles are removed. Additionally, this facility operates a 'fluff' landfill on the protected side of the levee where all the soft materials are placed. The potential for hazardous materials and/or petroleum products in this landfill exists. Additionally, both Southern Recycling and the former USCG facility were heavily flooded during Hurricane Katrina and any materials stored on site would have spilled

during this flooding. The other environmental concerns found were regarding the previous or ongoing use of many of the adjacent properties.

The HSDRRS segments are mostly in heavy industrial areas, which have been used in this manner for many decades. Many adjacent facilities have records of historical spills or other environmental conditions which could have impacted the soils under the HSDRRS. Many of the adjacent facilities were observed to store hazardous materials and/or petroleum products on site, in various conditions. Due to the nature of the project, site visits were not performed for all adjacent properties. Containers and their conditions had to be observed generally from the HSDRRS ROW. Additionally, housekeeping and regular maintenance issues were not addressed at these facilities. The potential for spills and leaks to have impacted the soils in the HSDRRS is present, but unlikely, due to the nature of the soils, the small sizes of the containers and distance from the ROW.

Generally, although the potential exists for impacted soils in the ROW of the HSDRRS in the project area, it is unlikely that these impacts would necessitate any remediation. Additionally, the types of restoration/reinforcement methods proposed would not remove these soils from their current placement. Therefore, during the restoration/reinforcement processes these soils would not be expected to impact areas outside of the ROW. Soils and other materials imported to complete the restoration/reinforcement methods would be tested prior to placement in the project area.

The CEMVN intends to conduct Phase II investigations adjacent to Southern Recycling. These investigations would involve soil and/or groundwater sampling (within the ROW) in the vicinity of the facility in areas which may have been impacted by the adjacent use. The results of this sampling effort would dictate future actions with respect to disposal of any excavated soils at the nearest deficient segments (stations 17+50 to 24+00 and 28+85). The CEMVN does not intend to conduct Phase II investigations at the USCG facility, as they would not be disturbing any soils in this area.

There is a low probability of encountering HTRW associated with the cleaning chemicals (degreasers, etc.) that are currently being stored in the maintenance building near Gate W-1 on the west bank of the IHNC. Before this building would be re-located or demolished, all chemical contents would be carefully removed or properly disposed of. It is possible that small chemical spills or leaks have occurred within the shed (from maintenance equipment) and maintenance building historically, but given the small size of the buildings and the small amounts of equipment and cleaning compounds that are housed within them, it is unlikely that spills or leaks large enough to impact the underlying soils would have occurred.

4.0 CUMULATIVE IMPACTS

4.1 METHODOLOGY

NEPA requires a Federal agency to consider not only the direct and indirect impacts of a proposed action, but also the cumulative impacts of the action. A cumulative impact is defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

To successfully assess cumulative impacts, a broad range of activities and patterns of environmental changes that are occurring in the vicinity of the project were considered. The following items were guidelines for the cumulative impact analyses in this document:

- The proximity of the projects to each other, both geographically and temporally.
- The probability of actions affecting the same environmental resource, especially systems that are susceptible to development pressures.
- The likelihood that the project would lead to a wide range of effects or lead to a number of associated projects.
- Whether the effects of other projects are similar to those of the project under review and the likelihood that the project would occur.

4.2 DESCRIPTION OF PROJECTS CONSIDERED

There are several Federal projects and/or federally funded projects currently underway in the project vicinity. The largest of these is the upgrading of the HSDRRS. Construction is currently ongoing and in various stages throughout the project area. Types of projects include earthen levee raising, floodwall rebuilding/raising, construction of gates and access roads, and the two closure structures on the IHNC and GIWW (the Seabrook closure and the Borgne closure). These construction projects can result in road closures, increased traffic and noise, and general aesthetic impacts nearby. For example, Lakeshore Drive is currently inaccessible near the IHNC due to construction of various portions of the HSDRRS. This work is scheduled to be completed in 2011 and, therefore, would likely be underway at the same time as the proposed action. Preparation and equipment/material staging for construction of a new floodgate structure on the IHNC at Seabrook (USACE 2010a) and for improvements to the Lakefront Levee and floodwalls (USACE 2009a) have impacted access to the Frank Davis pier and Seabrook Launch. During construction of the Seabrook Gate, the most significantly impacted recreational features would be expected to be boating and fishing, because of the placement of a cofferdam structure across the entire IHNC channel for approximately 6 months to 12 months. During this time all boat access and water flow between Lake Pontchartrain and the IHNC would be suspended and local fishing opportunities would be limited.

The USACE is currently engaged in drainage pump station storm proofing projects. These projects will storm proof 22 pump stations, the Carrollton water treatment plant, the old and new river intakes and the power plant, all operated by the Sewerage and Water Board of New Orleans. Some of these pump stations are immediately adjacent to some of the deficient levee segments. The Elaine Street pump station is adjacent to segment 79+00, the Grant Avenue station is near segment 242+00 to 260+00, pump station #5 is adjacent to segments 17+50 to 24+00 and 28+85, and pump station #19 is on the west bank of the IHNC immediately to the north of the Florida Avenue Bridge. The Elaine Street pump station is currently being replaced by an automated system. Upgrade and construction activities at these locations associated with the proposed action could minimally contribute to cumulative impacts through temporary increases in traffic and noise levels and aesthetic impacts in these areas.

Another Federal/state project in the region involves the USACE and the Southeast Louisiana (SELA) Flood Control Program. This project has many individual construction areas across New Orleans. The remaining three drainage projects still to be completed are the Florida Avenue Canal, the Broad Street pump station, and the Prichard Place pump station. The Broad Street and Prichard Place pump stations are not located in the IHNC/GIWW project area. The

Florida Avenue Canal improvements are currently under construction, immediately adjacent to the Florida Avenue Bridge, on the west bank of the IHNC. Traffic is currently limited to one lane in each direction leading to and from the bridge. Another ongoing SELA project is the construction of a pump station at the end of Dwyer Road. This pump station is immediately adjacent to the potential staging area in the center of the east bank of the IHNC. IHNC/GIWW restoration/reinforcement work in these areas could minimally contribute to cumulative impacts through temporary increases in traffic and noise levels and aesthetic impacts.

The USACE is replacing the existing IHNC Lock with a new, larger lock to be located within the IHNC and north of Claiborne Avenue. The new lock will be tied in to the floodwalls and levees on each side of the IHNC. No construction work is expected on this project in the foreseeable future due to a lack of funds necessary to continue construction. Therefore, there would be no cumulative impacts associated with this project.

Due to the damage from Hurricane Katrina, general rebuilding of both private and public facilities, commercial properties, and residences is ongoing throughout the area. These activities may contribute to noise, traffic, and aesthetic impacts in the project vicinity. Several of these rebuilding projects are adjacent to the Pontchartrain Park residential area on the west bank of the IHNC. The city's recovery program includes improvements to the Joe Bartholomew, Sr. golf course and the other facilities in Pontchartrain Park. These improvements are currently under construction. If they are not completed before the start of the proposed action, the levee/floodwall work could add to traffic, noise, air quality, and aesthetic impacts in the area.

In an effort to repair roads damaged because of Hurricanes Katrina and Rita, the Regional Planning Commission, CNO, LaDOTD, and FHWA formed a partnership to create the South Louisiana Submerged Roads Program. This comprehensive program funded entirely by the FHWA and administered by LaDOTD, identifies and repairs/resurfaces hurricane-damaged streets throughout south Louisiana. It began in July 2007 and includes more than 50 street projects in Orleans, Jefferson, and St. Bernard Parishes. Roadwork related to the Submerged Roads Program including road closures and/or detours could potentially occur in the project vicinity during the duration of the proposed action. Alternate access routes for the proposed action work in Reaches 1, 2, and 3 may be required if unanticipated roadwork occurs as part of the Submerged Road Program.

The Claiborne Avenue Bridge is currently undergoing repairs and has frequent closures, requiring traffic to reroute to either the Florida Avenue Bridge or the St. Claude Avenue Bridge. This project should be complete prior to the commencement of the proposed action, resulting in no cumulative impacts to traffic and noise.

The Port of New Orleans has plans to repair the dolphins and fenders at the Seabrook, Almonaster, and Florida Avenue bridges. This work would be mainly in the waterways, resulting in no cumulative impacts to traffic and very minor cumulative impacts to aesthetics, air quality, and noise.

Overall, the proposed restoration/reinforcement work along the IHNC and GIWW would contribute minimally to cumulative impacts to transportation, noise, air quality, and aesthetics in the immediate project vicinity. These impacts would be temporary and only extend for the duration of the construction, which is approximately 10 months. These impacts would be more noticeable in adjacent residential areas, such as Pontchartrain Park, as opposed to the more industrialized portions of the three reaches.

Concurrent projects would likely extend the amount of time people are exposed to the increased noise levels resulting from construction activities. This would be most significant along the

northern reaches of the IHNC where there are multiple project segments in close proximity to each other and to the adjacent neighborhoods, and within range of the proposed new gate structure at the IHNC outlet to Lake Pontchartrain. Should construction of the Seabrook Gate occur at the same time as the activities associated with the proposed action, it is likely the noise associated with gate construction would be higher than the noise generated by the levee/floodwall work. Therefore, it is anticipated that cumulative noise impacts associated with the proposed levee/floodwall restoration/reinforcement activities along the northern portion of the IHNC would be minor.

It is expected that standard air quality BMPs would be used for other activities or projects occurring within the project vicinity that could potentially create dust emissions. For instance, application of water to control dust and periodic street sweeping and/or wetting down of paved surfaces would aid in preventing fugitive dust from becoming airborne. Other construction activities occurring during the same timeframe and within the vicinity of the proposed action would likely occur incrementally throughout the construction period. Therefore, cumulative impacts to air quality in the project area from the proposed action and other concurrent construction activities in the area would be temporary and minor. Once construction of the proposed action is complete, there would be no continuing impacts to air quality; therefore, no contribution to cumulative air quality impacts in the area would be expected.

The multiple projects potentially ongoing simultaneously in the area may contribute to transportation impacts. These impacts would be minor and temporary, for the duration of the construction only. Restoration/reinforcement of levee/floodwall segments are relatively small projects with nearby staging areas, reducing the need for large and frequent deliveries. It is anticipated that cumulative transportation impacts would be minimal.

Cumulative aesthetic impacts due to the proposed action would be minor and temporary. These impacts would only last for the duration of the construction and resultant structures would closely resemble the existing ones. During construction, the presence of large machinery and equipment and the related noise and vibrations could add to the aesthetic impacts associated with other projects in the vicinity. These effects would be most strongly felt in the Pontchartrain Park residential area, where several other projects are located in close proximity and could occur simultaneously.

Minor cumulative impacts to recreational resources and socioeconomics along the northern IHNC are possible, particularly for people using the RV park and the private boat launching facilities, if the construction activities associated with the proposed action take place concurrent with the building of the Seabrook closure structure. Cumulative impacts to recreation from restoration/reinforcement of levees/floodwalls near the Borgne closure structure would also be possible. These impacts would be temporary in nature, occurring only during active construction of the proposed action.

Implementation of the proposed action would have beneficial cumulative impacts on socioeconomic resources within the three sub-basins that are protected by the existing flood risk reduction system in the project area. In the long-term, the proposed action in conjunction with other proposed or ongoing infrastructure and HSDRRS projects in the vicinity would improve the HSDRRS and reduce the risk of storm-related flooding within the study area. Associated damage to buildings and infrastructure, disruption of economic activity, and displacement of residents would be less likely. There would also be cumulative beneficial impacts on population, long-term employment, and income levels in Orleans Parish.

The cumulative impacts identified above would equally affect non-minority and non-low-income communities as well as minority and low-income communities. Thus, disproportionately adverse

effects on minority and low-income populations would not be expected to occur. The cumulative reduced risk of storm-related flooding would benefit all residents of the project area, regardless of income or race.

4.3 CEMVN HSDRRS IERs

Federal hurricane damage risk reduction for the greater New Orleans area is referred to as the HSDRRS and is divided into three USACE authorized projects: (1) LPV; (2) West Bank and Vicinity (WBV); and (3) New Orleans to Venice (NOV). The NOV and WBV projects have no or limited discussion in this IER because their alignments are not located within the project region and, with the exception of some positive cumulative impacts to socioeconomics, these projects would not greatly increase cumulative impacts. The various projects that make up the LPV projects include the construction of 125 mi of levees, concrete floodwalls, and other structures. Many of these projects are broken out by area and referred to by their IER document number. Figure 17 shows LPV and WBV IER projects. A summary of the projects that fall within the New Orleans Metropolitan Area is provided below:

- **IER #1, LPV, La Branche Wetlands Levee, St. Charles Parish, Louisiana** – evaluates the potential impacts associated with raising approximately 9 mi of earthen levees; replacing over 3,000 ft of floodwalls; rebuilding, modifying or closing five drainage structures; and modifying one railroad gate along the existing levee system on the north side of U.S. 61 (Airline Highway) between the Bonnet Carré Spillway and the northwest end of the Louis Armstrong New Orleans International Airport near the St. Charles/Jefferson Parish line.

- **IER #2, LPV, West Return Floodwall Jefferson and St. Charles Parishes, Louisiana** – evaluates the potential impacts associated with the proposed replacement of 17,900 ft (3.4 mi) of floodwalls along the line between Jefferson Parish and St. Charles Parish in the northeastern portion of the Mississippi River deltaic plain. The project area is adjacent to the Parish Line Canal from the north side of the Louis Armstrong New Orleans International Airport to the south shore of Lake Pontchartrain.

- **IER #3, LPV, Lakefront Levee, Jefferson Parish, Louisiana** – evaluates the potential impacts associated with the proposed rebuilding of 9.5 mi of earthen levees, upgrading of the foreshore protection, the replacement of two floodgates, the construction of fronting protection, and construction or modification of breakwaters at four pumping stations just east of the St. Charles Parish and Jefferson Parish line to the western side of the 17th Street Canal.

- **IER #4, LPV, New Orleans Lakefront Levee, Orleans Parish, Louisiana** – investigates improvement of the levee, floodwall, and Bayou St. John Sector Gate extending from the 17th Street Canal to the IHNC.

- **IER #5, LPV, Permanent Protection System for the Outfall Canals Project on 17th Street, Orleans Avenue, and London Avenue Canals, Jefferson and Orleans Parishes, Louisiana** – evaluates the impacts of a new permanent pump station and closure (i.e., gates) at or near the mouth of each of the outfall canals operating in series with the existing Sewerage and Water Board of New Orleans pump stations.

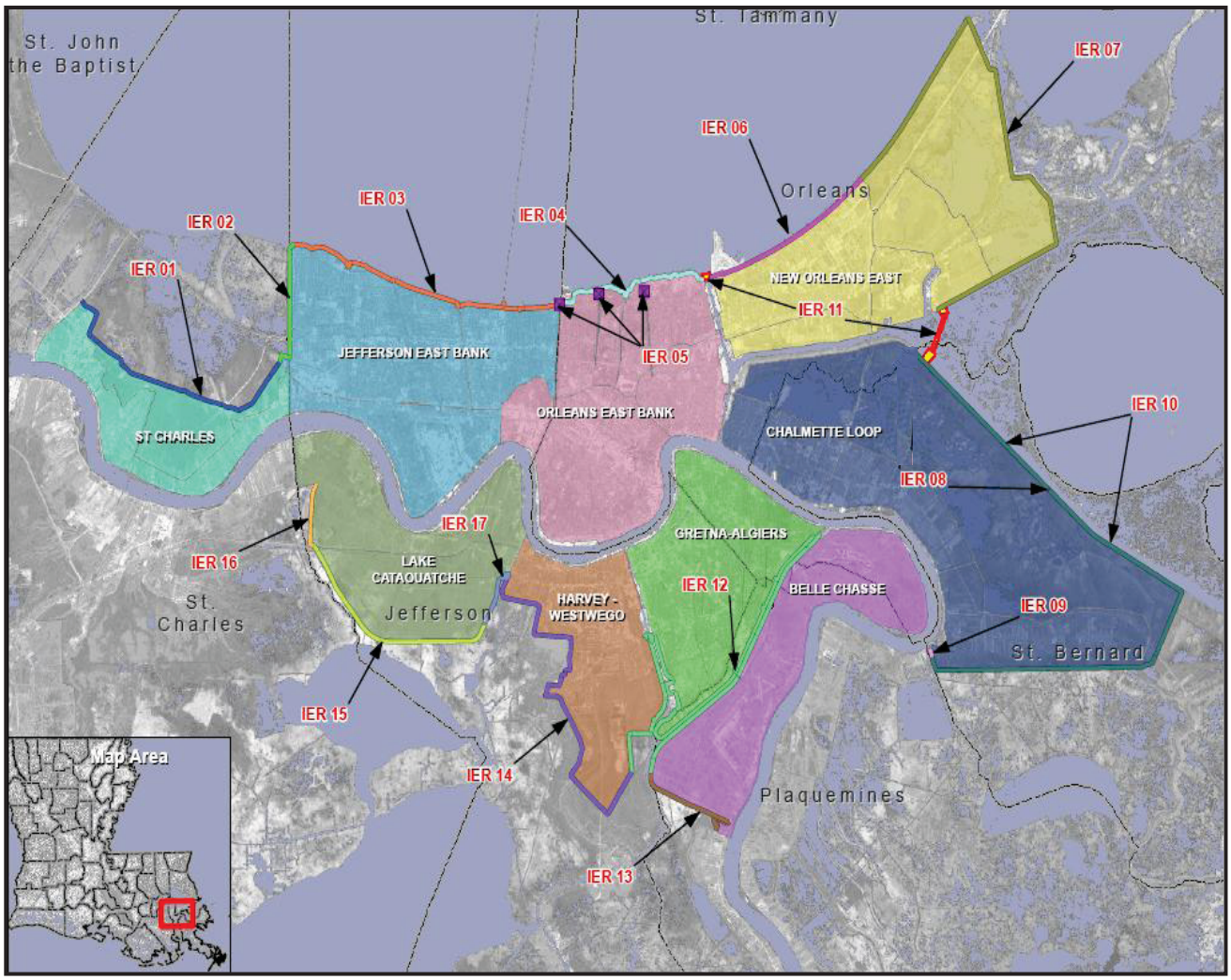

Figure 17. HSDRRS LPV and WBV IER Projects

- **IER #6, LPV, New Orleans East, Citrus Lakefront Levee, Orleans Parish, Louisiana** – investigates improvement of approximately 6 mi of levees, floodwalls, and floodgates that extend from the IHNC and the New Orleans Lakefront Airport east to Paris Road – locally known as the Citrus Lakefront. Foreshore protection enhancements along this reach could include the dredging of access channels in Lake Pontchartrain.

- **IER #7, LPV, New Orleans East, New Orleans East Lakefront to Michoud Canal, Orleans Parish, Louisiana** – investigates improvement of approximately 19.3 mi of levee and three floodgates stretching from the New Orleans East Lakefront Levee to New Orleans East Back Levee – CSX Railroad to Michoud Canal. This portion of the LPV HSDRRS encompasses a large portion of the Bayou Sauvage National Wildlife Refuge (NWR). The northern portion of this reach could include foreshore protection enhancements requiring dredged access channels in Lake Pontchartrain.

- **IER #8, LPV, Bayou Dupre Control Structure, St. Bernard Parish, Louisiana** – evaluates the impacts of the construction of a new flood control structure on Bayou Dupre

with steel sector gates and floodwall tie-ins, constructed on the floodside of and adjacent to the existing structure.

- **IER #9, LPV, Caernarvon Floodwall, St. Bernard Parish, Louisiana** – evaluates the impacts of replacing two floodgates and constructing approximately 1,500 ft of floodwall, and a levee tie-in at the southwest terminus of the Chalmette Loop levee.

- **IER #10, LPV, Chalmette Loop Levee, St. Bernard Parish, Louisiana** – evaluates the impacts of constructing a T-wall on top of the existing Chalmette Loop levee.

- **IER #11 - Tier 2 Borgne, Improved Protection on the IHNC, Orleans and St. Bernard Parishes, Louisiana** – evaluates the potential impacts associated with constructing surge barriers on Lake Borgne. This is the Tier 2 review for alternatives to protect against storm surge from the IHNC originating from Lake Borgne. This project was initially evaluated in IER #11 Tier 1 (USACE 2008c). Currently, this project is under construction; dredging and piles tests are complete and approximately 1.2 million cy of dredged material has been beneficially used for marsh nourishment within 205 acres of open water ponds near the project area.

- **IERS #11 - Tier 2 Borgne Supplemental, Improved Protection on the IHNC, Orleans and St. Bernard Parishes, Louisiana** – evaluates the potential impacts associated with constructing a vertical lift gate on Bayou Bienvenue in lieu of a sector gate, which was evaluated in the original Tier 2 Borgne document.

- **IER #11 - Tier 2 Pontchartrain, Improved Protection on the IHNC, Orleans Parish, Louisiana –** evaluates the potential impacts associated with the proposed construction of a storm surge risk reduction structure on the IHNC where it meets Lake Pontchartrain (Seabrook area). This IER was prepared as a second tier evaluation to IER #11 for the portion of the flood risk reduction project that occurs near Lake Pontchartrain and is referred to as "Tier 2 Pontchartrain."

- **IER #12, GIWW WCC, Harvey, and Algiers Levees and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes, Louisiana** – includes a sector gate across the GIWW and levee tie-ins to the adjacent Hero Canal levee to the east and the V-line levee to the west. Approximately 3 mi of levee and floodwall would be constructed, along with a closure complex across the GIWW, a pump station, fronting protection, and a bypass channel. Levees would generally be raised to 14 ft, requiring 3.1 million cy of earthen material and 310,000 tons of stone.

- **IER #13, WBV, Hero Canal Levee and Eastern Terminus, Plaquemines Parish, Louisiana –** evaluates 22,000 LF of levee improvements and the construction of 1,500 LF of floodwalls.

- **IER #14, WBV, Westwego to Harvey Levee, Jefferson Parish, Louisiana –** evaluates 12 mi of levee, construction of 7,013 LF of floodwalls, and modifications to three pump stations.

- **IER #15, WBV, Lake Cataouatche Levee, Jefferson Parish, Louisiana –** evaluates 8 mi of levee and fronting protection modifications for one pump station.

- **IER #16, WBV, Western Tie-In, Jefferson and St. Charles Parishes, Louisiana –** evaluates construction of a new levee section to complete the western terminus of the West Bank and Vicinity Hurricane Protection Project.

- **IER #17, WBV Company Canal Floodwall, Jefferson Parish, Louisiana –** evaluates 442 LF of floodwalls and fronting protection modifications to two pump stations.

- **IER #18 - Government Furnished Borrow Material, Jefferson, Orleans, Plaquemines, St. Charles, and St. Bernard Parishes, Louisiana and IER #19 – Pre-Approved Contractor Furnished Borrow Material, Jefferson, Orleans, St. Bernard, Iberville, and Plaquemines Parishes, Louisiana, and Hancock County, Mississippi** – The purpose of these two IERs is to identify borrow areas that contain suitable material that can be excavated to supply clay material to Federal HSDRRS levee and floodwall projects.

- **IER #20, LPV Hurricane Protection Project – Mitigation: Manchac Wildlife Management Area Shoreline Protection Modification, St. John the Baptist Parish, Louisiana** – This mitigation IER will be completed to document the mitigation plan for unavoidable impacts from the resulting actions of the aforementioned IERs #1 to #11.

- **IER #22, Government Furnished Borrow Material #2, Jefferson and Plaquemines Parishes, Louisiana and Hancock County, Mississippi** – evaluates the potential impacts associated with the actions taken by the USACE while excavating borrow areas for use in construction of the HSDRRS.

- **IER #23, Pre-Approved Contractor Furnished Borrow Material #2, St. Bernard, St. Charles, Plaquemines Parishes, Louisiana, and Hancock County, Mississippi** – evaluates the potential impacts associated with the actions taken by commercial contractors as a result of excavating borrow areas for use in construction of the HSDRRS.

- **IER #24, Stockpile Sites for Borrow Material, Orleans and St. Bernard Parishes, Louisiana** – evaluates the potential impacts associated with the actions taken by commercial contractors as a result of stockpiling borrow material for use in construction of the HSDRRS.

- **IER #25, Government Furnished Borrow Material #3, Orleans, Jefferson, and Plaquemines Parishes, Louisiana** – evaluates the potential impacts associated with the actions taken by the USACE while excavating borrow areas for use in construction of the HSDRRS.

- **IER #26, Pre-Approved Contractor Furnished Borrow Material #3, Jefferson, Plaquemines, and St. John the Baptist Parishes, Louisiana, and Hancock County, Mississippi** – evaluates the potential impacts associated with the actions taken by commercial contractors as a result of excavating borrow areas for use in construction of the HSDRRS.

- **IER #27, Outfall Canal Remediation on the 17th Street, Orleans Avenue, and London Avenue Canals Jefferson and Orleans Parish, Louisiana –** evaluates the potential impacts associated with the proposed remediation of approximately 7 miles of floodwalls that have been examined for stability, seepage, settlement, and deflection along the 17th Street, Orleans Avenue, and London Avenue Outfall Canals.

- **IER #28, Government Furnished Borrow Material #4, Plaquemines, St. Bernard, and Jefferson Parishes** – evaluates the potential impacts associated with the possible excavation of two government furnished borrow areas, and an access road to a previously-approved government furnished borrow area.

- **IER #29, Pre-Approved Contractor Furnished Borrow Material #4, Orleans, St. John the Baptist, and St. Tammany Parishes -** evaluates the potential impacts associated with the actions taken by commercial contractors as a result of excavating borrow areas for use in construction of the HSDRRS.

- **IER #30, Contractor-Furnished Borrow Material #5, St. Bernard and St. James Parishes, Louisiana, and Hancock County, Mississippi -** evaluates the potential impacts associated with the actions taken by commercial contractors as a result of excavating three proposed borrow areas for use in construction of the HSDRRS.

- **IER #32, Contractor-Furnished Borrow Material #6, Ascension, Plaquemines, and St. Charles Parishes, Louisiana** – evaluates the potential impacts associated with the actions taken by commercial contractors as a result of excavating seven proposed borrow areas for use in construction of the HSDRRS.

Table 15 provides a summary of the cumulative impacts to be mitigated for the HSDRRS based on the IERs completed (draft or final) to date. In addition to the impacts shown in table 15, approximately 170.5 acres of impacts to forested habitats requiring mitigation would occur as part of projects for the raising of the Mississippi River Levee.

Table 15.
HSDRRS Impacts and Compensatory Mitigation to be Completed

IER	Parish		Non-wet BLH	Non-wet BLH	BLH (acres)	BLH AAHUs	Swamp (Acres)	Swamp AAHUs	Marsh (Acres)	Marsh AAHUs	Water Bottoms (Acres)
			acres	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*
1 LPV, La Branch Wetlands Levee	St. Charles	Protected Side	-	-	-	-	137.50	73.97	-	-	-
		Flood Side	-	-	11.33	8.09	143.57	110.97	-	-	
1 Supplemental LPV, La Branch Wetlands Levee	St. Charles	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
2 LPV, West Return Floodwall	St. Charles, Jefferson	Protected Side	-	-	-	-	-	-	-	-	75.00
		Flood Side	-	-	-	-	-	-	17.00	9.00	
2.a Supplemental LPV, Jefferson East Bank	Jefferson, St. Charles	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	2.00	1.55	16.50	11.45	
3 LPV, Jefferson Lakefront Levee	Jefferson	Protected Side	-	-	-	-	-	-	-	-	26.40
		Flood Side	-	-	-	-	-	-	-	-	
3.a Supplemental LPV, Jefferson East Bank	Jefferson	Protected Side	-	-	-	-	-	-	-	-	277
		Flood Side	-	-	-	-	-	-	-	-	
4 LPV, Orleans Lakefront Levee	Orleans	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
5 LPV, Lakefront Pump Stations	Jefferson, Orleans	Protected Side	-	-	-	-	-	-	-	-	3.29
		Flood Side	-	-	-	-	-	-	-	-	
6 LPV, Citrus Lands Levee	Orleans	Protected Side	-	-	-	-	-	-	-	-	6.90
		Flood Side	-	-	-	-	-	-	4.00	-	
7 LPV, Lakefront Levee	Orleans	Protected Side	-	-	151.70	79.30	-	-	100.40	36.80	106.00
		Flood Side	-	-	30.00	11.90	-	-	70.00	37.20	
7 Supplemental LPV, Lakefront Levee	Orleans	Protected Side	-	-	17.00	9.90	-	-	18.60	6.10	12.49
		Flood Side	-	-	2.80	0.30	-	-	56.00	29.80	
8 LPV, Bayou Dupre Control Structure	St. Bernard	Protected Side	-	-	-	-	-	-	-	-	0.30
		Flood Side	-	-	-	-	-	-	-	-	
9 LPV, Caernarvon Floodwall	Orleans, St. Bernard	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	10.00	4.65	1.16	0.66	-	-	1.90	1.20	

Table 15.
HSDRRS Impacts and Compensatory Mitigation to be Completed

IER	Parish		Non-wet BLH	Non-wet BLH	BLH (acres)	BLH AAHUs	Swamp (Acres)	Swamp AAHUs	Marsh (Acres)	Marsh AAHUs	Water Bottoms (Acres)
			acres	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*
10 LPV, Chalmette Loop	St. Bernard	Protected Side	-	-	38.32	16.44	-	-	106.55	57.31	95.00
		Flood Side	-	-	35.31	15.22	-	-	323.04	209.94	
11 Tier 2 Borgne IHNC	Orleans, St. Bernard	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	15.00	2.59	-	-	122.00	24.33	
11 Tier 2 Borgne Supplemental IHNC	Orleans, St. Bernard	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
11 Tier 2 Pontchartrain IHNC	Orleans	Protected Side	-	-	-	-	-	-	-	-	7.00
		Flood Side	-	-	-	-	-	-	-	-	
12 GIWW, Harvey, Algiers	Jefferson, Orleans, Plaquemines	Protected Side	-	-	251.70	177.3	-	-	-	-	-
		Flood Side	-	-	2.30	1.90	74.90	38.50	-	-	
13 Hero Canal and Eastern Tie-In	Plaquemines	Protected Side	-	-	13.00	7.80	-	-	-	-	-
		Flood Side	-	-	19.00	10.59	39.00	28.27	-	-	
14 WBV, Westwego to Harvey Levee	Jefferson	Protected Side	-	-	45.00	30.00	-	-	-	-	-
		Flood Side	-	-	45.50	37.17	29.75	17.02	-	-	
14 Supplemental WBV, Westwego to Harvey Levee	Jefferson	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	42.00	24.00	-	-	
15 WBV, Lake Cataouatche Levee	Jefferson	Protected Side	-	-	23.50	6.00	-	-	-	-	-
		Flood Side	-	-	3.60	1.35	-	-	-	-	
16 WBV, Western Tie-in	Jefferson	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	78.60	36.20	-	-	137.80	66.30	
16 Supplemental WBV, Western Tie-in	Jefferson	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	79.10	34.18	-	-	-	-	
17 Company Canal Floodwall	Jefferson	Protected Side	-	-	5.50	2.69	-	-	-	-	-
		Flood Side	-	-	-	-	19.00	17.09	-	-	
18 GFBM	Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles	Protected Side	276.90	89.29	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	

Table 15.
HSDRRS Impacts and Compensatory Mitigation to be Completed

IER	Parish		Non-wet BLH	Non-wet BLH	BLH (acres)	BLH AAHUs	Swamp (Acres)	Swamp AAHUs	Marsh (Acres)	Marsh AAHUs	Water Bottoms (Acres)
			acres	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*	*AAHUs*	*acres*
19 CFBM	Hancock County, MS; Iberville, Jefferson, Orleans, Plaquemines, St. Bernard	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
22 GFBM	Jefferson, Plaquemines	Protected Side	86.93	28.90	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
23 CFBM	Hancock County, MS; Plaquemines, St. Bernard, St. Charles	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
25 GFBM	Jefferson, Orleans, Plaquemines	Protected Side	854.70	243.10	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
26 CFBM	Jefferson, Plaquemines, St. John the Baptist; Hancock County, MS	Protected Side	-	-	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
28 GFBM	Jefferson, Plaquemines, St. Bernard	Protected Side	19.10	11.60	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
29 CFBM	Orleans, St. Tammany, St. John the Baptist	Protected Side	107.30	48.60	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
30 CFBM	St. Bernard and St. James; Hancock, MS	Protected Side	225.00	189.40	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
32 CFBM	Ascension, Orleans, Plaquemines, St. Charles	Protected Side	195.00	96.20	-	-	-	-	-	-	-
		Flood Side	-	-	-	-	-	-	-	-	
Totals		Protected Side	1764.93	707.09	545.72	329.43	137.5	73.97	225.55	100.21	609.38
		Flood Side	10	4.65	323.7	160.15	350.22	237.4	748.24	389.22	
		Both	1774.93	711.74	869.42	489.58	487.72	311.37	973.79	489.43	609.38

- = Not applicable to the IER or number impacted is 0
GFBM: Government Furnished Borrow Material // CFBM: Contractor Furnished Borrow Material

5.0 SELECTION RATIONALE

Under the proposed action, remedial work would be conducted on some of the walls and levees of the IHNC and GIWW in order to ensure compliance with current HSDRRS design criteria (USACE 2008b) to provide 100-year risk reduction. The proposed action, a combination of DSM, berms, buttress walls, concrete slabs, and relief wells, is the alternative most responsive to the project's purpose and need. It is an effective engineering solution that would minimize uncertainty and risk to acceptable levels in a reasonable period of time. The proposed action is compatible and would work in concert with other projects that have been completed, are in progress, or will be implemented, to improve the damage reduction provided by the HSDRRS.

The no action alternative would result in the least impacts to water and coastal resources, uplands, wildlife, and recreational resources, causing less noise and dust impacts. However, the impacts that would occur under the proposed action would all be temporary in nature, during construction of the proposed action, with the exception of the limited upland resources impacted by the proposed action. The no action alternative does not meet the project's purpose and need of providing full HSDRRS 100-year level of risk reduction to the project area, thereby having a greater potential socioeconomic and human impact. Benefits from the reduced risk of storm damage to socioeconomics experienced under the proposed action would not result from the no action alternative. The risk associated with the no action alternative outweighs the limited and temporary resource impacts that would occur under the proposed action. Therefore, it did not compare favorably with the proposed action, which is necessary to ensure that walls and levees of the IHNC and GIWW comply with current HSDRRS design guidelines.

6.0 COORDINATION AND CONSULTATION

Preparation of this draft IERS has been coordinated with appropriate Congressional, Federal, state, and local interests, as well as environmental groups and other interested parties. The following agencies, as well as other interested parties, are receiving copies of this draft IERS:

U.S. Department of the Interior, Fish and Wildlife Service
U.S. Environmental Protection Agency, Region VI
U.S. Department of Commerce, National Marine Fisheries Service
U.S. Natural Resources Conservation Service, State Conservationist
Advisory Council on Historic Preservation
Governor's Executive Assistant for Coastal Activities
Louisiana Department of Wildlife and Fisheries
Louisiana Department of Natural Resources, Coastal Management Division
Louisiana Department of Natural Resources, Coastal Restoration Division
Louisiana Department of Environmental Quality
Louisiana State Historic Preservation Officer

The Louisiana Department of Natural Resources (LaDNR) reviewed the proposed action for consistency with the Louisiana Coastal Resources Program (LaCRP). The proposed action was found to be consistent with the LaCRP, as per a letter dated 23 July 2010 (appendix E).

The proposed action was coordinated with and reviewed by the USFWS via a letter dated 15 July 2010. As a result of this review, the CEMVN and USFWS jointly concluded that the proposed action would not be likely to adversely affect any threatened or endangered species or their critical habitat (USFWS facsimile dated 24 July 2010).

Section 106 of the National Historic Preservation Act, as amended, requires consultation with the Louisiana SHPO and Native American tribes. Eleven federally-recognized tribes that have an interest in the region were given the opportunity to review the proposed action. In a Section 106 letter to the SHPO dated 30 July 2010, the CEMVN provided project documentation, evaluated cultural resources potential in the project area, and found that the proposed action would have no impact on cultural resources. The SHPO concurred with the CEMVN's "no historic properties affected" finding in a letter dated 13 September 2010. The Decision Record for this IERS will not be signed until Section 106 consultation is concluded.

A Water Quality Certificate (WQC) was not required. A Section 404(b)(1) Public Notice and a Section 404(b)(1) Evaluation were not required because no work would impact wetlands or WoUS.

A modified Fish and Wildlife Coordination Act (FWCA) Report was provided by the USFWS on 5 August 2010. The 5 August 2010 FWCA Report along with the 9 October 2008 and 29 March 2010 Final FWCA Reports for IERs #11-Tier 2 Borgne and Tier 2 Pontchartrain, respectively, addresses the study area and the project construction to be conducted along the IHNC and GIWW. The Final and Modified FWCA Reports concluded that the proposed project does not require mitigation and will not impact high quality fish or wildlife habitat; therefore, the USFWS still does not object to the construction of the proposed action provided that fish and wildlife conservation recommendations are implemented concurrently with project implementation.

7.0 MITIGATION

To minimize potential impacts to air quality, contractors would be instructed to conduct proper and routine maintenance of all vehicles and other equipment. These actions ensure that emissions would be within the design standards of all construction equipment. Contractors would be instructed to conduct proper and routine maintenance of all vehicles and other equipment. These actions ensure that emissions would be within the design standards of all construction equipment. Dust suppression methods would be implemented to minimize fugitive dust emissions. Additionally, all construction equipment and vehicles would be required to be kept in good operating condition to minimize exhaust emissions. No jurisdictional wetlands or bottomland hardwoods would be impacted by the proposed action; therefore, compensatory mitigation would not be required.

8.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

Construction of the proposed action would not commence until the proposed action achieves environmental compliance with all applicable laws and regulations, as described below.

Environmental compliance for the proposed action will be achieved upon coordination of this IERS with appropriate agencies, organizations, and individuals for their review and comments. This includes USFWS confirmation that the proposed action would not be likely to adversely affect any endangered or threatened species, or completion of ESA Section 7 consultation (appendix E); LaDNR concurrence with the determination that the proposed action is consistent, to the maximum extent practicable, with the LaCRP (appendix E); receipt of a WQC from the State of Louisiana (appendix E); public review of the Section 404(b)(1) Public Notice and signature of the Section 404(b)(1) Evaluation; coordination with the Louisiana SHPO (appendix E); receipt and acceptance or resolution of all USFWS Coordination Act recommendations

(appendix E); and receipt and acceptance or resolution of all Louisiana Department of Environmental Quality (LaDEQ) comments on the air quality impact analysis documented in the IERS.

9.0 CONCLUSION

The proposed action consists of restoring and reinforcing a total of approximately 4.6 mi of non-contiguous IHNC and GIWW levees and floodwalls in Orleans Parish, Louisiana. The CEMVN has assessed the environmental impacts of the proposed action and has determined that the proposed action would have the following impacts:

- **Water and Coastal Resources** - There would be no direct impacts to water and coastal resources in the area (including the IHNC, GIWW, and the portion of Bayou Bienvenue designated a Natural and Scenic River). Indirect impacts could include increased turbidity and sedimentation within these waterways. These impacts would be minor and minimized through use of BMPs and adherence to state and federal regulations governing stormwater runoff at constructions sites.

- **Upland Resources -** Direct impacts to upland resources in the project area would be minor and temporary and would include soil disturbance during construction and the loss of less than 0.25 acres of marginal habitat.

- **Wildlife -** There would be minor and temporary direct impacts to small amounts of non-natural occurring wildlife habitat during construction resulting primarily from soil disturbance and noise.

- **Threatened and Endangered Species –** Only aquatic threatened and endangered species could potentially occur in the project area. Because no in-water construction work is included in the proposed action, no threatened or endangered species would be affected during construction or after the project has been completed.

- **Cultural Resources -** The proposed action would not impact any historic properties. The existing ROW and proposed staging areas have been previously impacted extensively by the construction of major navigation channels (GIWW and IHNC), port facilities, HSDRRS, railroads, vehicular bridges, and by regular maintenance dredging activities, making the likelihood for discovering intact and undisturbed archaeological deposits in the APE minimal.

- **Recreational Resources -** Indirect impacts associated with elevated noise, access difficulty and potential disturbance from night lighting, especially to recreational resources located around the northern IHNC would be possible. As most of the recreational resources in this area are currently either closed or under renovation, indirect impacts would be anticipated to be minor and would be temporary, occurring only during the construction period. Minor and temporary cumulative impacts to recreational resources would be possible due to the combination of the IHNC restoration/reinforcement methods and other projects in the area (particularly if construction of the Seabrook Gate structure overlaps with the proposed action).

- **Aesthetics –** Direct, temporary impacts resulting from the presence of construction equipment/vehicles and from lighting used for any nighttime construction to aesthetics in the project vicinity would be minor.

- **Noise –** Direct, minor impacts would result from the increased noise levels from construction activities (within 200 ft) and from construction vehicle traffic along minor roadways. Potential minor and temporary indirect impacts associated with elevated noise include those related to recreation, wildlife, and emotional and mental stress that could result from the noise levels in the area during construction. Cumulative noise impacts could result from multiple ongoing and planned construction projects in the area; this would be most significant along the northern reaches of the IHNC. These cumulative noise impacts would be minor and temporary.

- **Air Quality -** Temporary impacts to air quality from construction vehicle emissions and fugitive dust released by construction activities. Vehicle emissions would be minor and fugitive dust would be managed through BMPs such as sprinkler trucks. Potential minor and temporary indirect impacts to air quality could include temporary visual and health impairments created by airborne dust and equipment emissions. These impacts would also be minimized through the use of BMPs.

- **Transportation -** Direct impacts associated with a potential increase in congestion from construction traffic could occur. Minor indirect impacts to wear and tear of secondary roads could occur; however, haul routes would be maintained and project access would occur primarily through the use of roadways rated for heavy trucks.

- **Socioeconomics –** Temporary, beneficial direct impacts to socioeconomics associated with the purchase of materials, equipment, and services and a temporary increase in employment and income during project construction would occur. Beneficial indirect and cumulative impacts would include enhanced protection of socioeconomic resources as a result of enhancement of the HSDRRS and potential long-term employment opportunities and subsequent increases in income levels in Orleans and St. Bernard Parishes.

- **Environmental Justice -** All populations groups within the HSDRRS would benefit directly from completion of the proposed action and the resultant enhanced flood-protection. There would be minor and temporary indirect impacts resulting from construction activities, such as elevated noise, diminished air quality, and increased traffic congestion associated with construction activities. These impacts would equally impact non-minority and non-low-income communities as well as minority and low-income communities; therefore, disproportionately adverse effects on minority and low-income populations would not be expected to occur.

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APPENDIX A

List of Acronyms and Abbreviations

LIST OF ACRONYMS AND ABBREVIATIONS

%	percent
AAHU	average annual habitat unit
AD	Anno Domini
APE	Area of Potential Effect
ASTM	American Society for Testing and Materials
BC	Before Christ
BLH	bottomland hardwood
BMP	best management practices
CAA	Clean Air Act
CEMVN	Corps of Engineers, Mississippi Valley Division, New Orleans District
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFBM	Contractor Furnished Borrow Material
CFR	Code of Federal Regulations
CMP	Corrugated Metal Piping
CNO	City of New Orleans
CO	carbon monoxide
CPT	cone penetrometer test
CWA	Clean Water Act
cy	cubic yard
dB	Decibel
dBA	A-weighted decibel
DNL	day-night average sound level
DoD	Department of Defense
DSM	Deep Soil Mixing
EA	Environmental Assessment
EAR	Engineering Alternatives Report
EIS	Environmental Impact Statement
ER	Engineering Regulation
EJ	Environmental Justice
ESA	Environmental Site Assessment
ESRI	Environmental Systems Research Institute, Inc.
°F	degree Fahrenheit
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
ft	feet
FWCA	Fish and Wildlife Coordination Act
GFBM	Government Furnished Borrow Material
GIS	Geographic Information System
GIWW	Gulf Intracoastal Waterway
GNOCDC	Greater New Orleans Community Data Center
HSDRRS	Hurricane and Storm Damage Risk Reduction System

LIST OF ACRONYMS AND ABBREVIATIONS

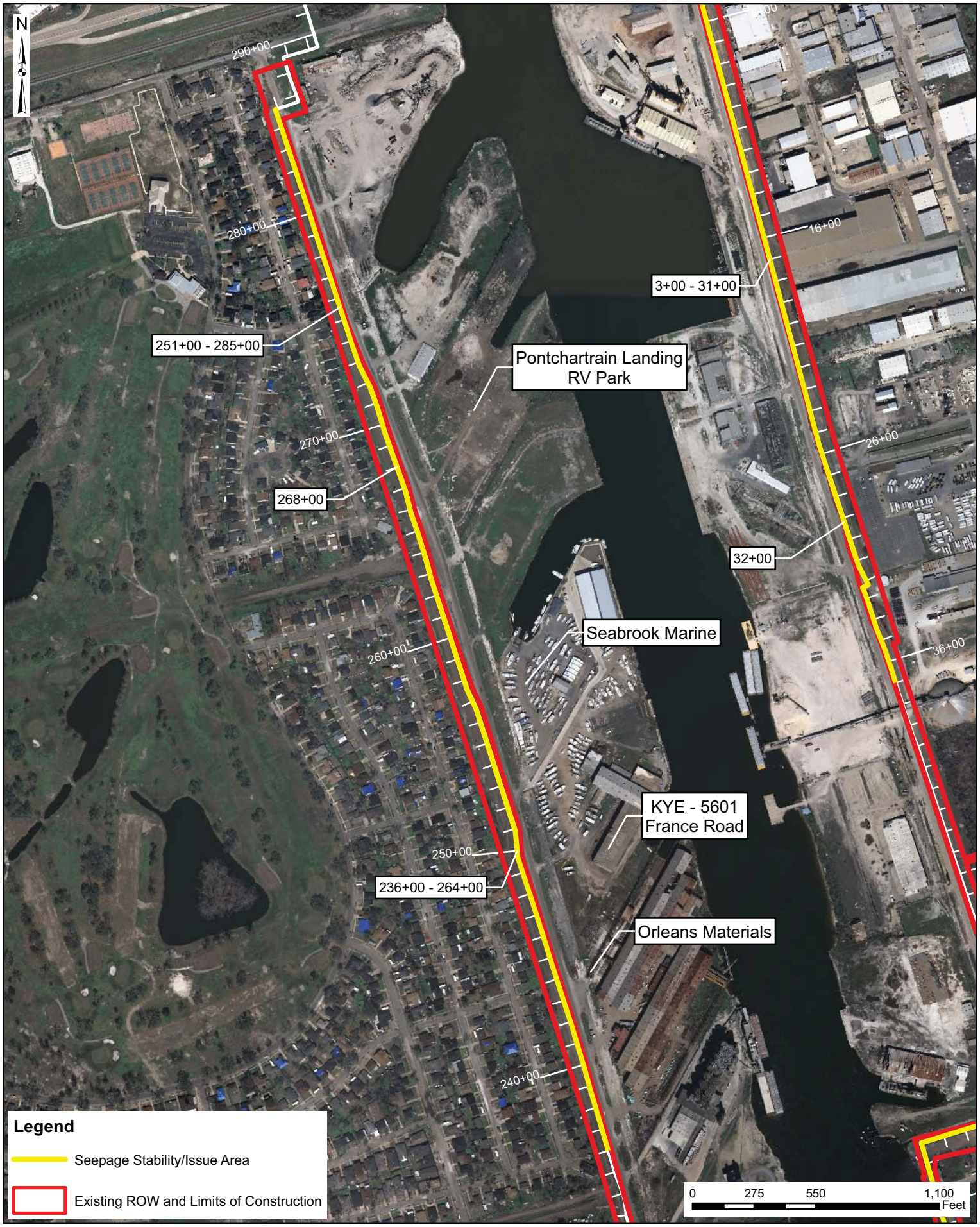
HTRW	hazardous, toxic, and radioactive waste
HUD	U.S. Department of Housing and Urban Development
I-10	Interstate 10
IBA	Important Birding Area
IHNC	Inner Harbor Navigation Canal
IER	Individual Environmental Report
IERS	Individual Environmental Report Supplemental
LaDOTD	Louisiana Department of Transportation and Development
LaCRP	Louisiana Coastal Resource Program
LaDEQ	Louisiana Department of Environmental Quality
LaDNR	Louisiana Department of Natural Resources
LaDWF	Louisiana Department of Wildlife and Fisheries
LF	linear feet
LOS	level-of-service
LPV	Lake Pontchartrain and Vicinity
mi	mile(s)
mi^2	square miles
mph	miles per hour
MRGO	Mississippi River-Gulf Outlet
MRT	Mississippi River Trail
MS	Mississippi
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NGVD29	National Geodetic Vertical Datum of 1929
NMFS	National Marine Fisheries Service
No.	number
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOLANRP	New Orleans Neighborhood Rebuilding Plan
NORA	New Orleans Redevelopment Authority
NRHD	New Orleans Register Historic District
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
NWUS	Navigable Waters of the United States
O_3	ozone
Pb	lead
PDT	Project Delivery Team
PL	Public Law
PM	particulate matter
PPL	Priority Project List
ppm	parts per million

LIST OF ACRONYMS AND ABBREVIATIONS

PPNA	Pontchartrain Park Neighborhood Association
RCGA	R. Christopher Goodwin and Associates, Inc.
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
ROD	Record of Decision
ROW	right-of-way
RV	recreational vehicle
S&WB	Sewerage and Water Board of New Orleans
SAV	submerged aquatic vegetation
SELA	Southeast Louisiana
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
sq ft	square feet
TRB	Transportation Research Board
TxDOT	Texas Department of Transportation
$\mu g/m^3$	micrograms per cubic meter
UPS	United Parcel Service
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USCB	United States Census Bureau
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	Underground storage tank
WBV	West Bank and Vicinity
WoUS	Waters of the United States
WQC	water quality certificate
WRDA	Water Resources Development Act

APPENDIX B

Detailed Figures of Subject Reach 1, 2, and 3 Segments



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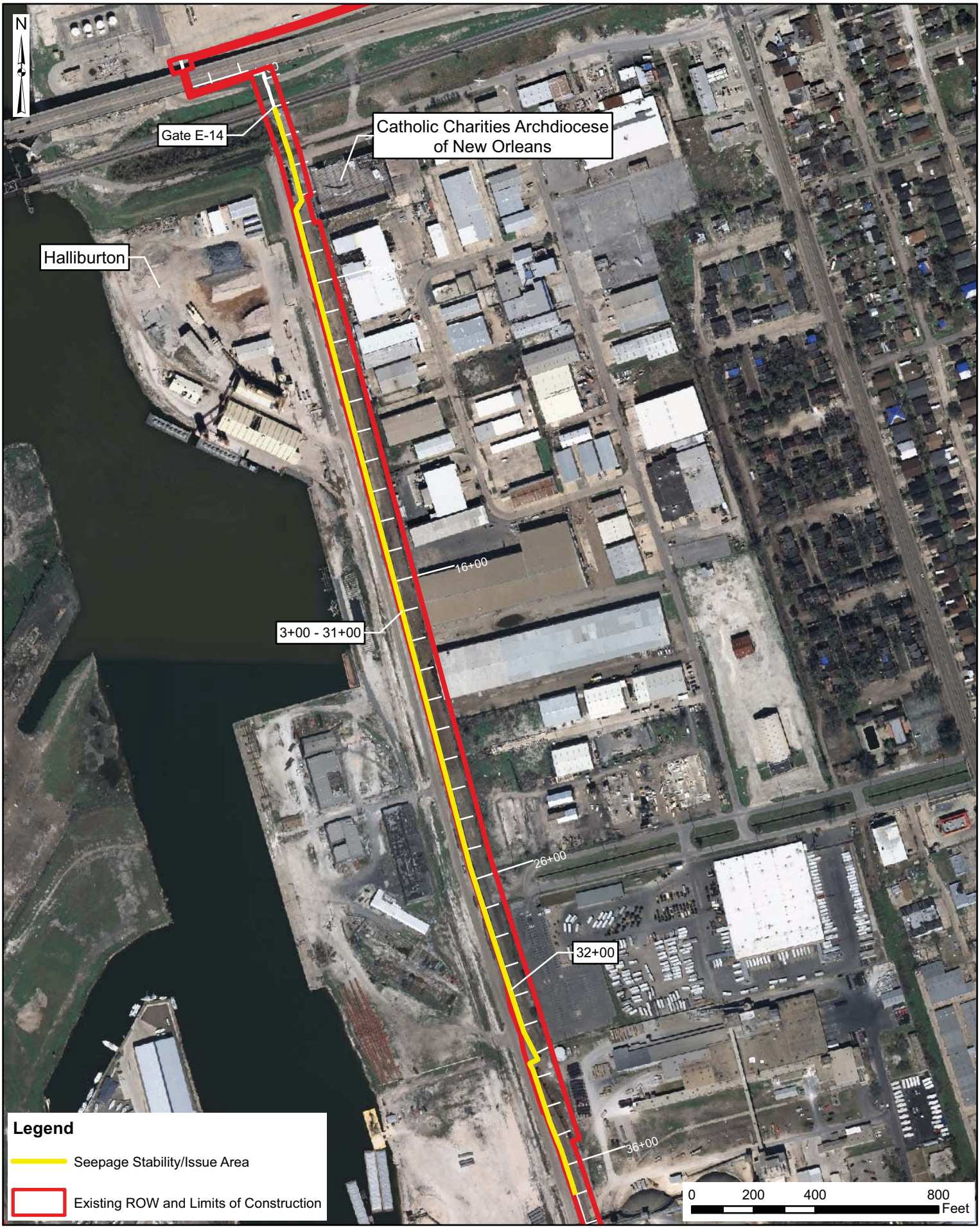

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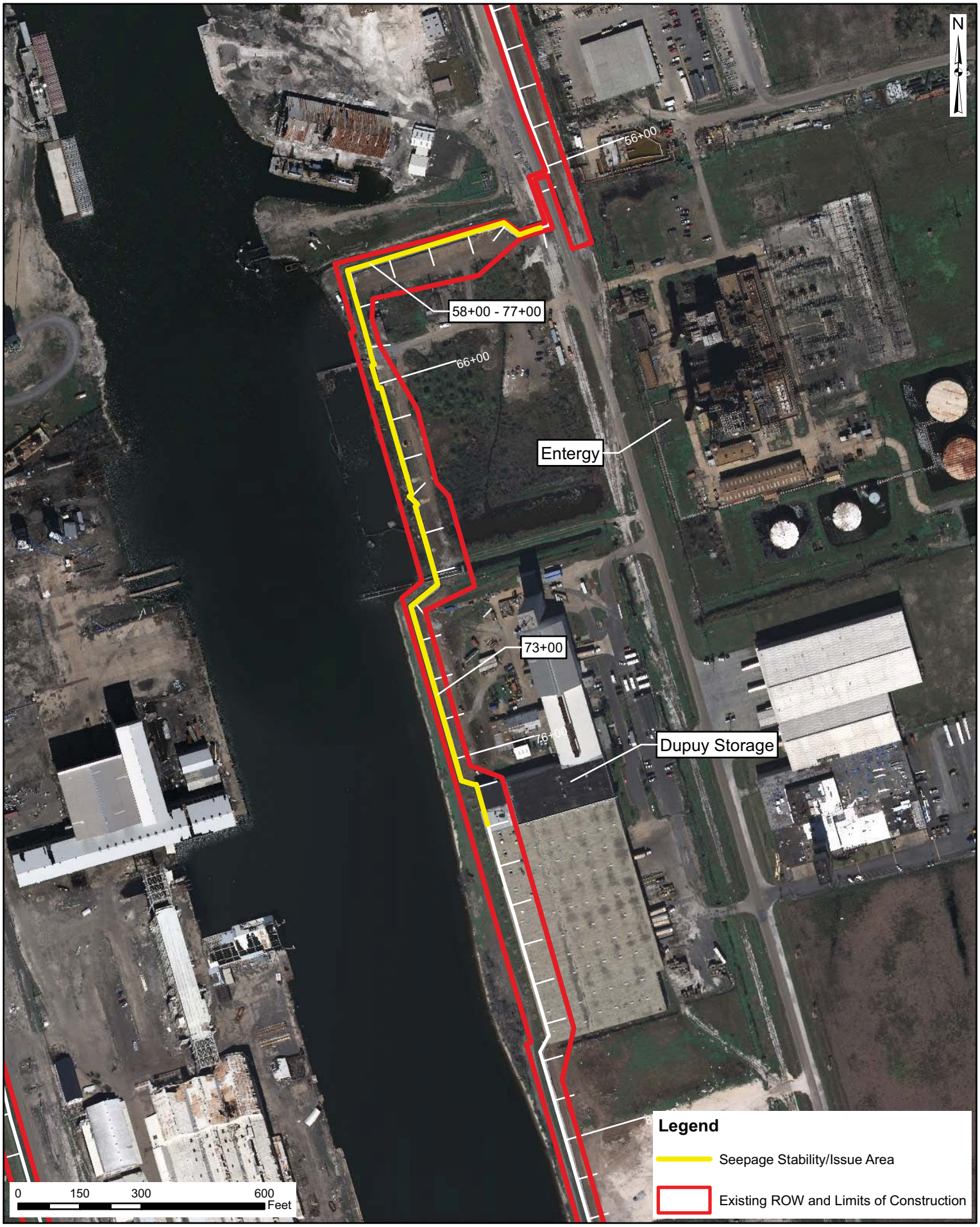

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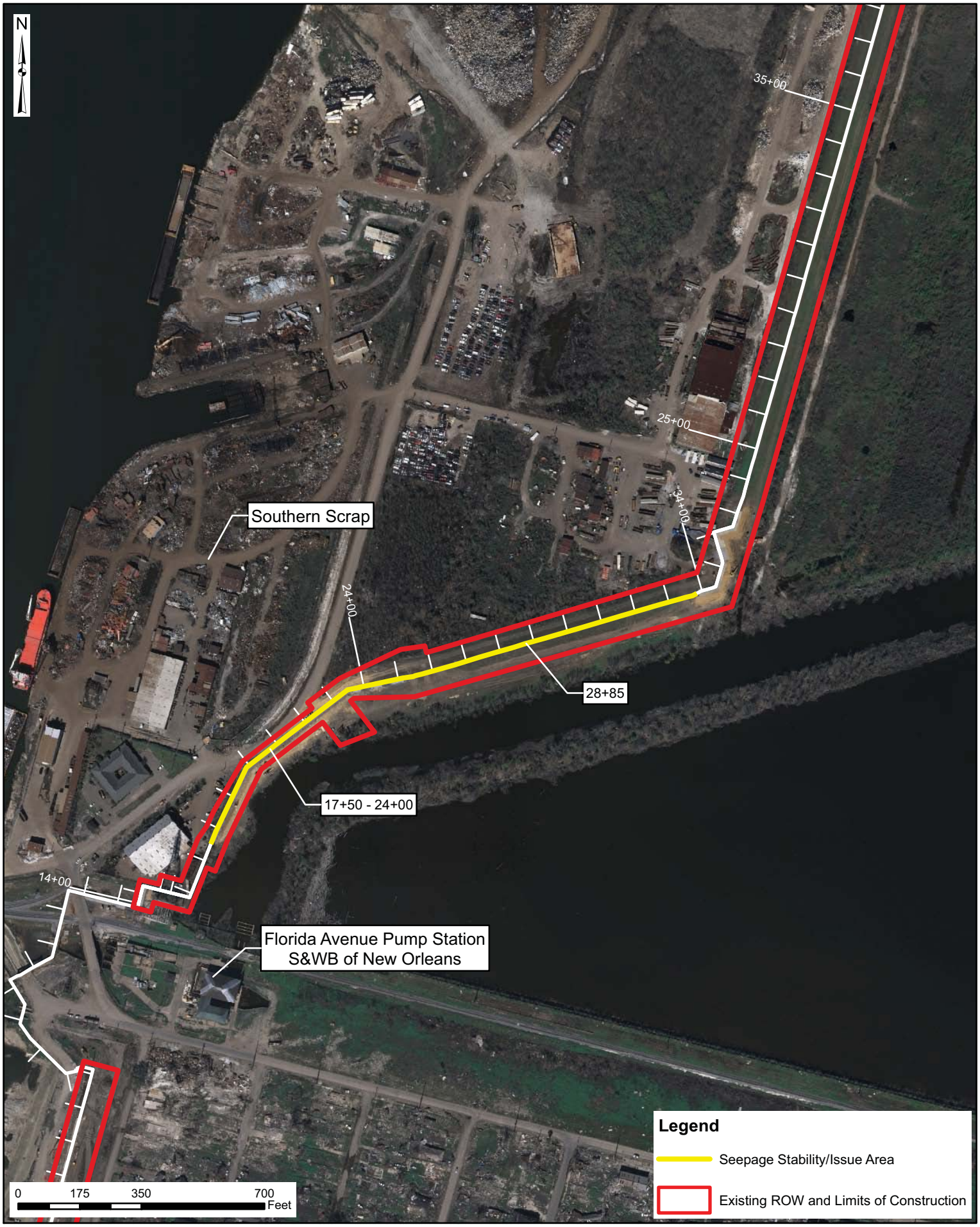

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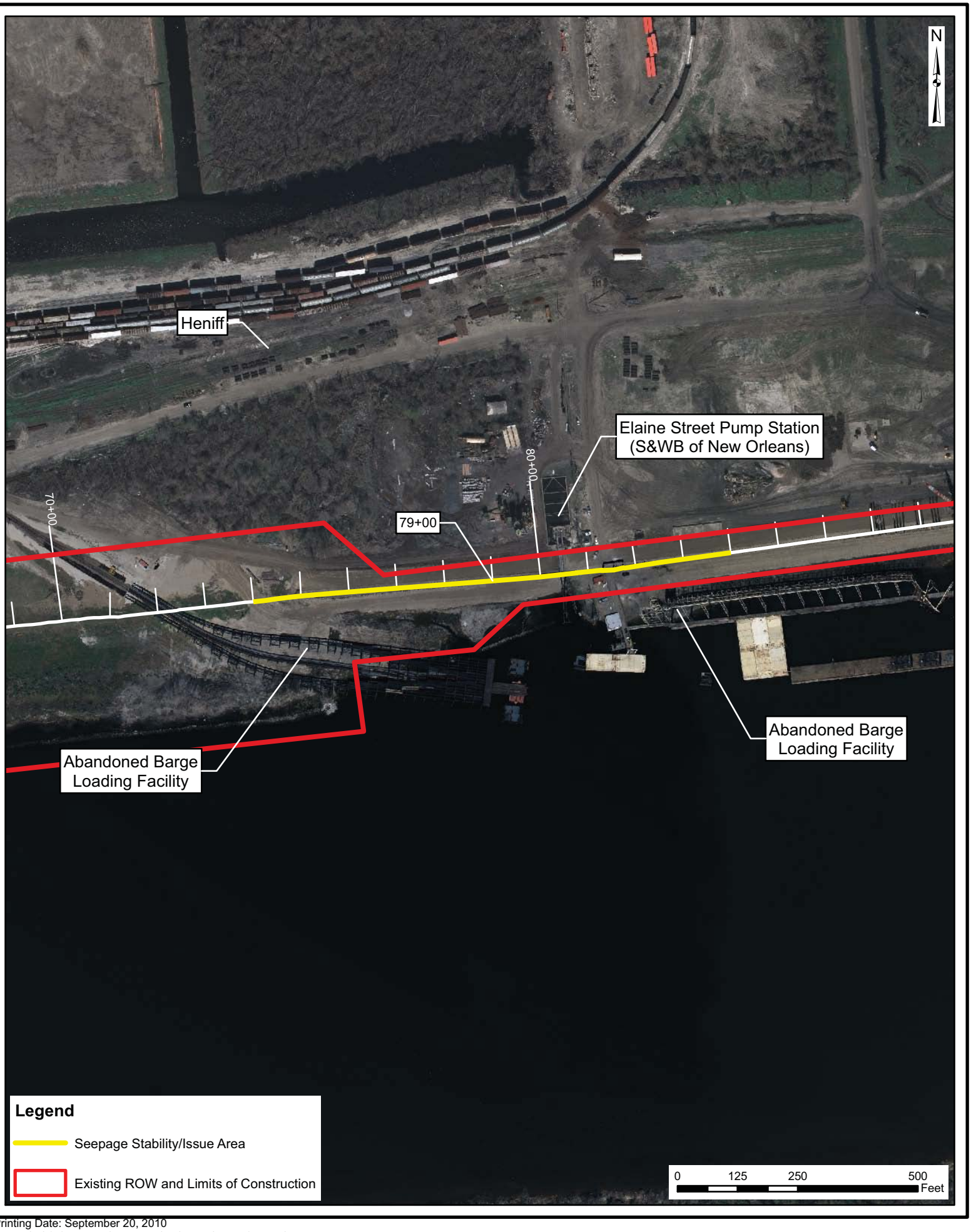

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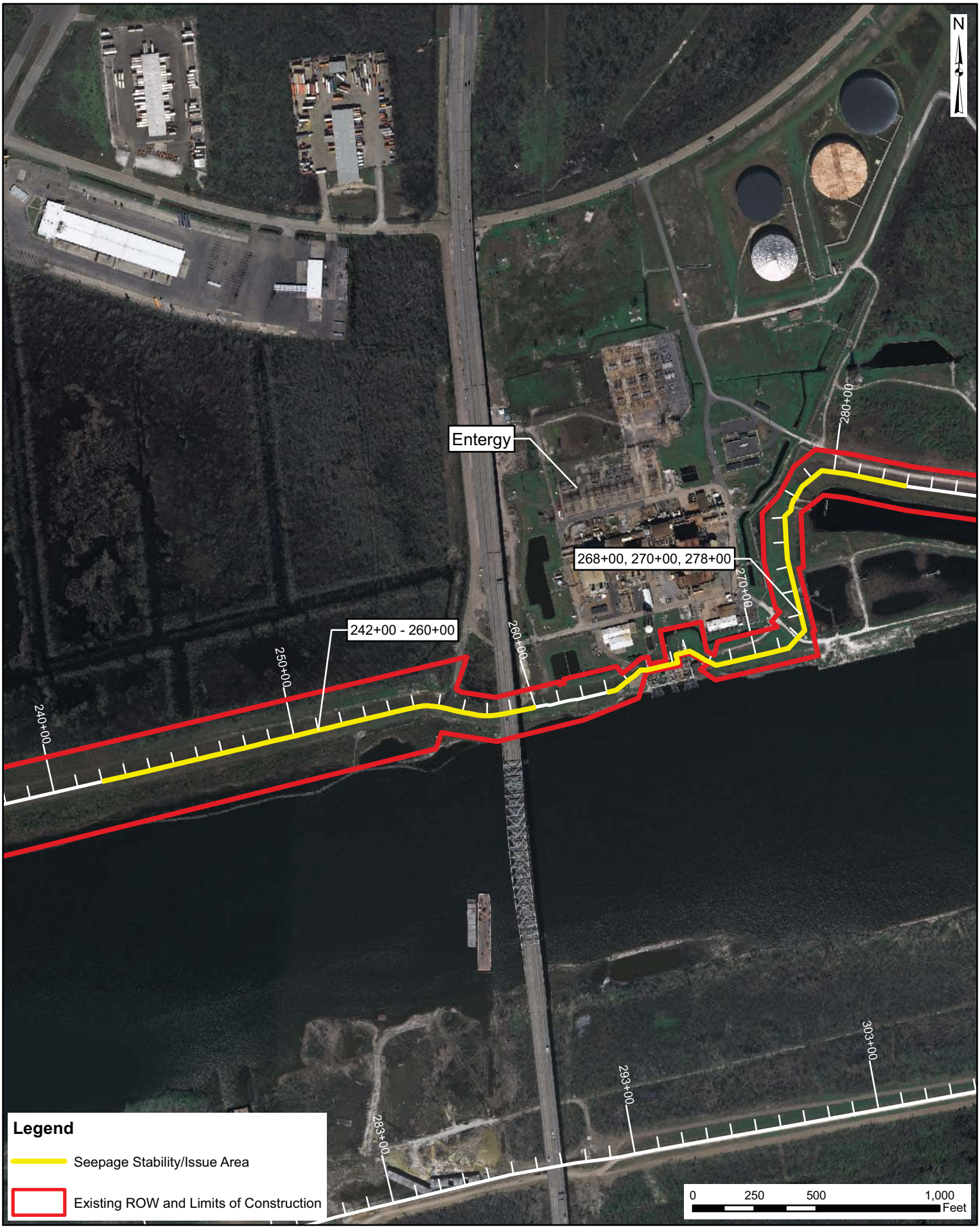

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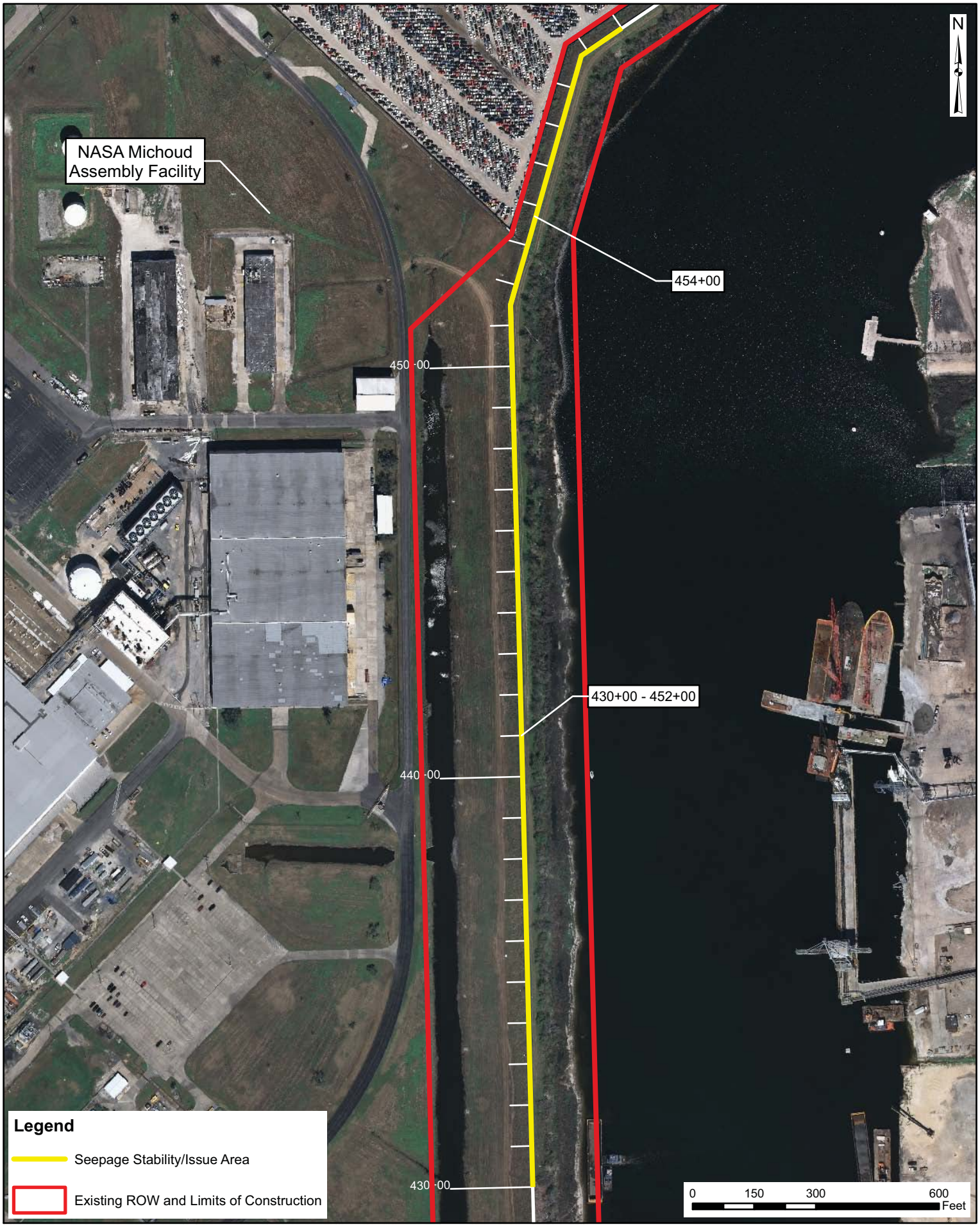

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APPENDIX C

Detailed Figures of Temporary Staging Areas

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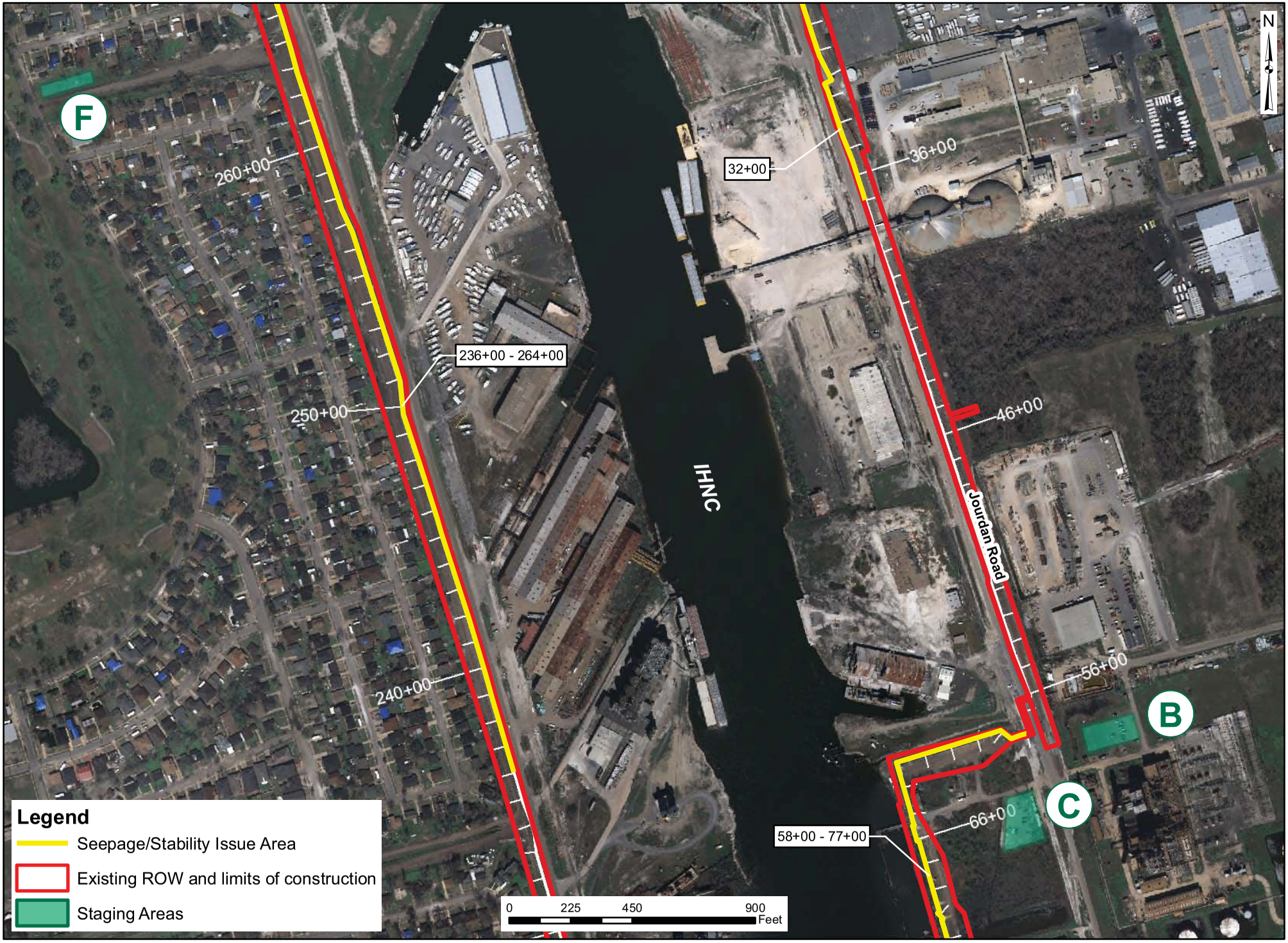

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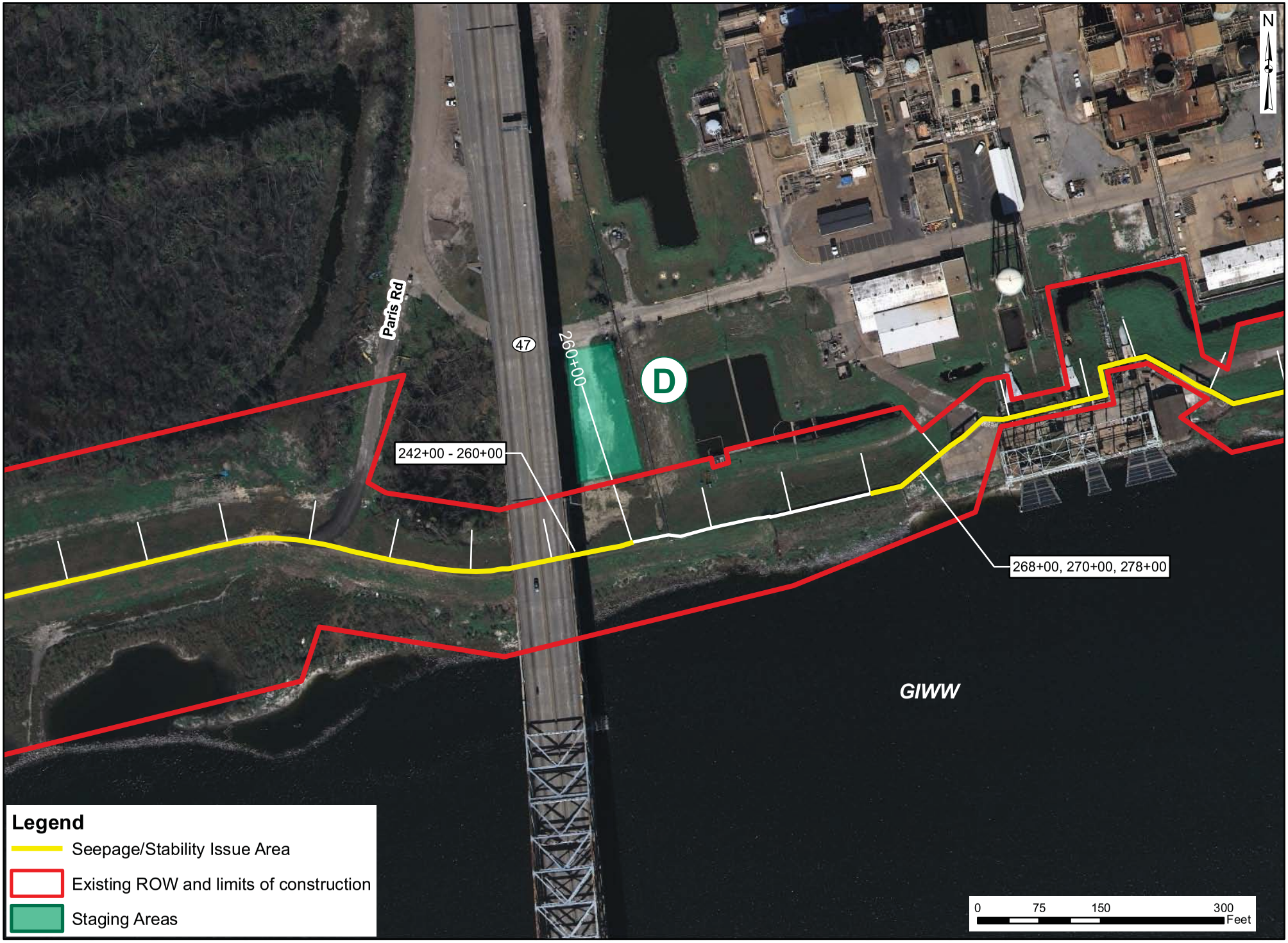

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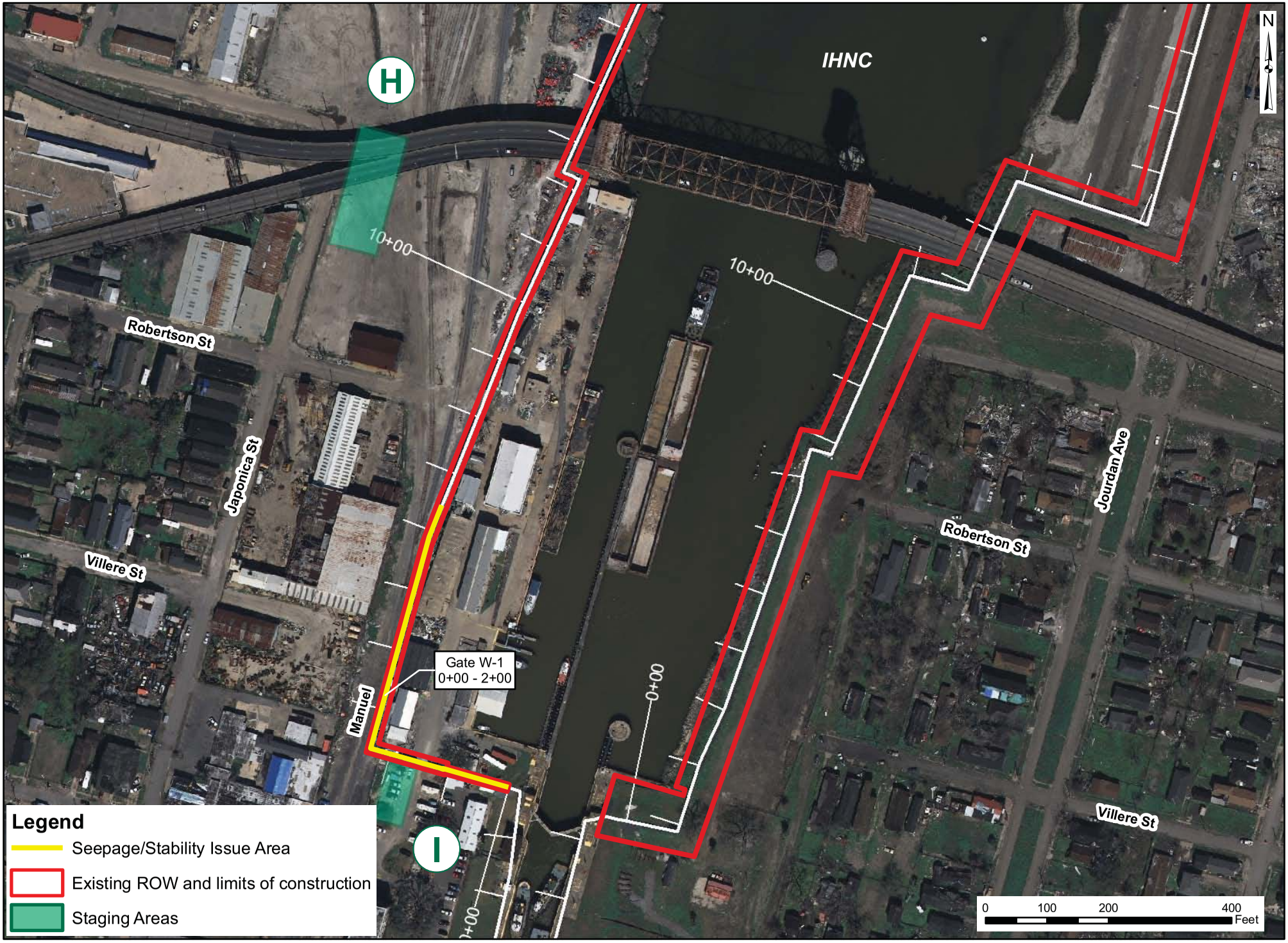

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APPENDIX D

Public Comments

(To be included after 30-day public comment period)

APPENDIX E

Interagency Correspondence

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF

MAY 03 2010

Regional Planning and
Environmental Division, South
New Orleans Environmental Branch

Mr. Gregory Ducote
Interagency Affairs - LADNR
CMD
P.O. Box 44487, Capital Station
Baton Rouge, LA 70804-4487

Dear Mr. Ducote:
Attn: Brian Marcks

Enclosed is the U.S. Army Corps of Engineers, New Orleans District's Consistency Determination for the proposed project to restore and remediate levees and floodwalls along the Inner Harbor Navigation Canal and Gulf Intracoastal Waterway.

The New Orleans District has determined that the proposed project is consistent, to the maximum extent practicable, with the guidelines of the State of Louisiana's approved Coastal Resources Program.

If you have any questions, please contact Lee Walker, Environmental Management Contractor, at 504-862-1444.

Sincerely,

Joan M Exnicios

Joan Exnicios
Chief, New Orleans
Environmental Branch

Enclosure

LOUISIANA COASTAL USE GUIDELINES
CONSISTENCY DETERMINATION

REPAIR AND RESTORATION OF LEVEES AND FLOODWALLS IN INNER HARVOR NAVIGATION CANAL/ GULF INTRACOASTAL WATERWAY CORRIDOR
ORLEANS PARISH, LOUISIANA

INTRODUCTION

Section 307 of the Coastal Zone Management Act of 1972, 16 U.S.C. 1451 et. seq. requires that "each federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities in a manner which is, to the maximum extent practicable, consistent with approved state management programs." In accordance with Section 307, a Consistency Determination has been prepared for the proposed action covered under a forthcoming NEPA document. Coastal Use Guidelines were written in order to implement the policies and goals of the Louisiana Coastal Resources Program, and serve as a set of performance standards for evaluating projects. Compliance with the Louisiana Coastal Resources Program, and therefore, Section 307, requires compliance, to the maximum extent practicable, with applicable Coastal Use Guidelines.

PURPOSE AND NEED FOR THE PROPOSED ACTION

This project includes repair and restoration of the levees and floodwalls along the Inner Harbor Navigation Canal and Gulf-Intracoastal Waterway (GIWW). Portions of the existing levees/floodwalls within this corridor have been identified as not meeting the Hurricane and Storm Damage Risk Reduction System (HSDRRS) seepage and stability criteria. Approximately 33 miles of levees and floodwalls have been examined for stability, seepage, and non-residual problematic areas. Of the 33 miles, approximately 5 miles have been recommended for repair to enhance flood protection. Because these reaches will no longer be the primarily line of defense given the construction of the Borgne Barrier and Seabrook Gate, these reaches are not being raised to the 100-year level of risk reduction.

DESCRIPTION OF THE PROPOSED ACTION

This project includes restoration and remediation of portions of levees and floodwalls that do not meet the necessary factors of safety for stability, as dictated by current design guidelines. These design guidelines for these factors of safety assume conditions are such that the water levels within the Inner Harbor Navigation Canal is at least 12 feet [NAVD88 (2004.65)] or water levels are at the top of the levee or floodwall. The HSDRRS within this corridor is composed of various features, including earthen levees, I-Walls, L-Walls, T-Walls and closure gate structures, which all provide protection to the three sub-basins from the IHNC Lock to the Seabrook Bridge at Lake Pontchartrain and along the Gulf-Intracoastal Waterway (GIWW) from the IHNC to the IHNC Barrier which is near the Michoud Canal in eastern New Orleans. The project area is divided into three primary reaches, described below and shown in figure 1.

Reach I extends from Stations 0+00 to 380+00 and extends along the east side of the IHNC from the IHNC Lock to the GIWW and also includes the south side of the GIWW from the IHNC to Bayou Bienvenue. Reach 1 has approximately 1600 feet of deficient areas.

Reach II comprises the east side of the IHNC from Lake Pontchartrain to the GIWW and extends along the north side of the GIWW from the IHNC to the Borgne Barrier. Reach 2 has approximately 1.5 miles of deficient areas.

Reach III lies along the west side of the IHNC and extends from the IHNC Lock at the Mississippi River to the Seabrook Bridge at Lake Pontchartrain. Reach 3 has approximately 3600 feet of deficient areas.

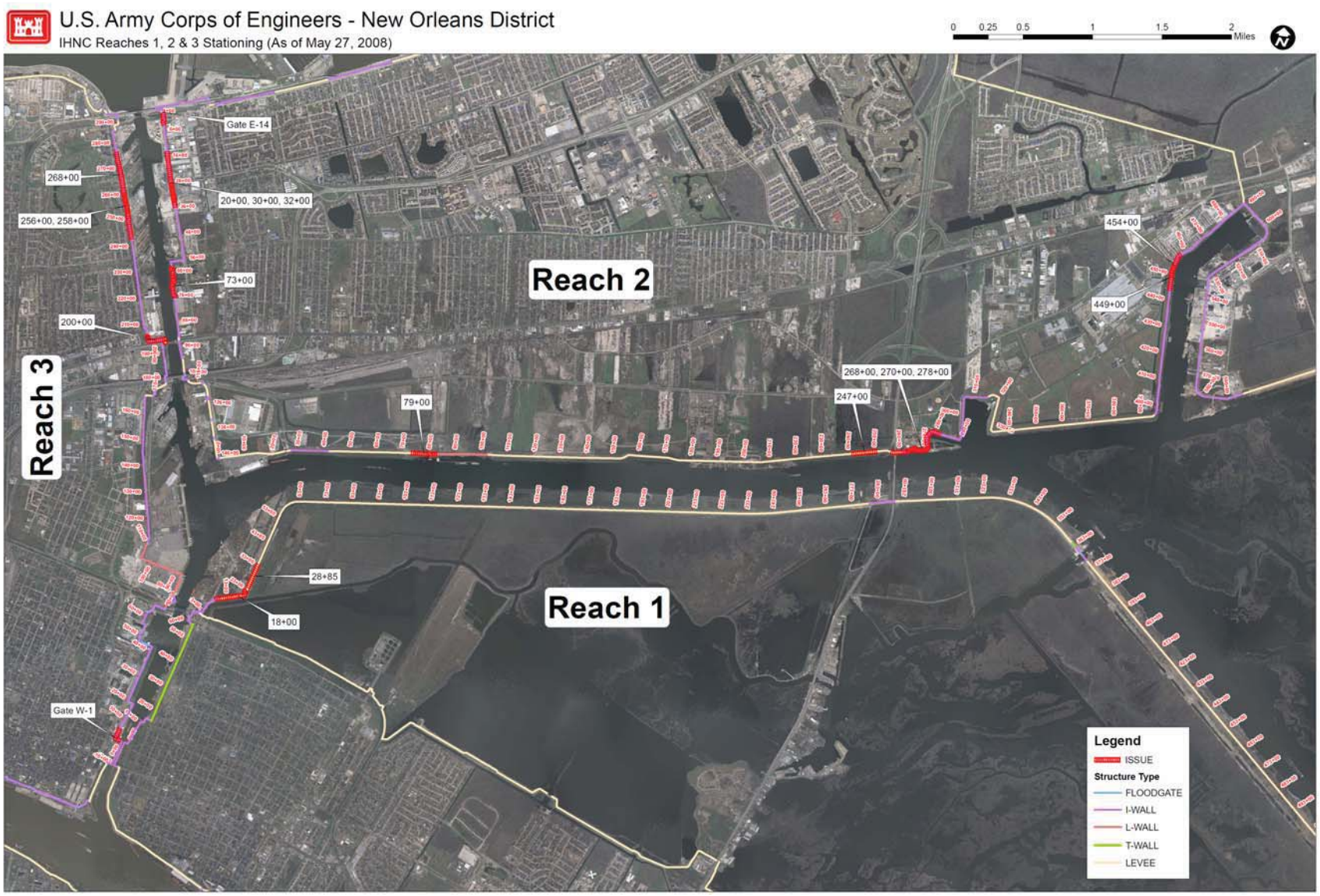

Figure 1: Approximately 5 miles of levee and floodwall in need of restoration and repair. Approximate work areas are highlighted in red.

Several alternative methods, all of which would be built within existing rights-of-way, could be used to address deficiencies within the subject reaches. These methods include the following:

Deep Soil Mixing (DSM): The deep mixing method is a stabilization method that uses cement, lime, slag, other pozzolonic materials, and combinations of these stabilizers to increase the strength and stiffness of soft or loose ground. DSM introduces panels of engineered grout or reagent into the underlying soils to modify their physical and chemical characteristics without excavation (see figure 2).

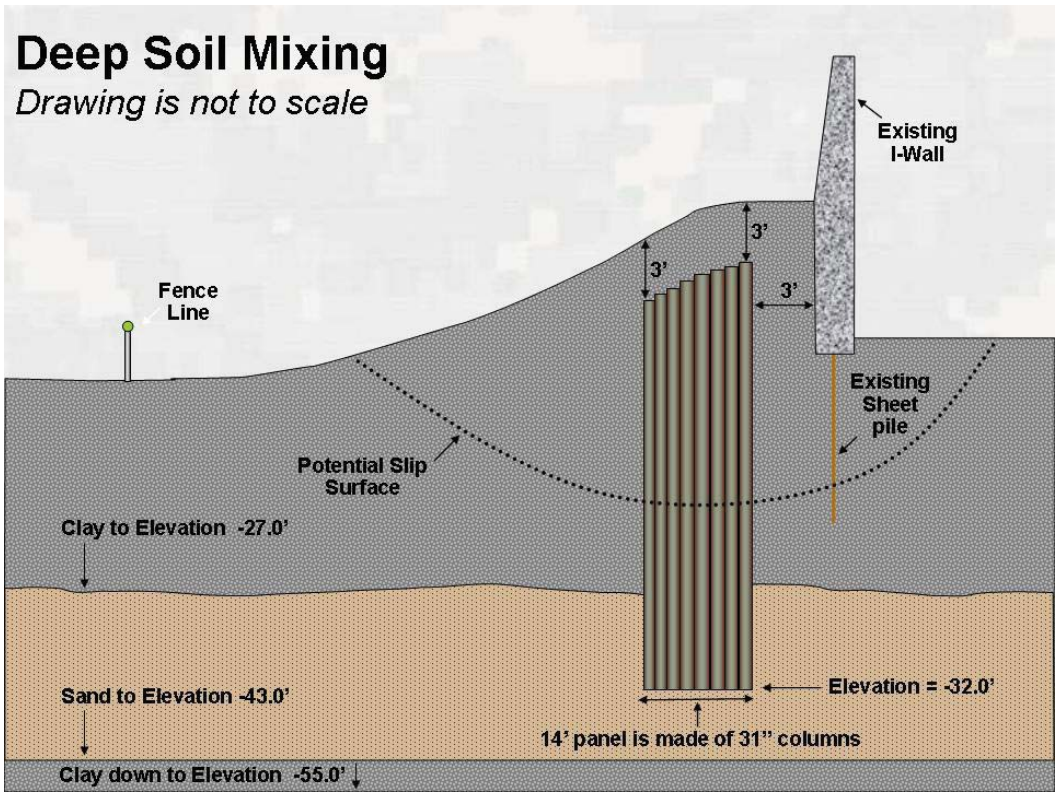

Figure 2: Conceptual figure of deep soil mixing

Berm: Approximately 16,000 cubic yards of government approved borrow would be placed on the protected side of the existing protection system to increase stability.

Buttress Wall: A buttress is an addition to an existing I-wall, installed in panels and connected by a concrete slab, projecting from the wall which serves to support or reinforce the wall. To reduce stresses in the stem, it contains buttresses at intervals along the wall to tie the stem and base slab together (see figure 3).

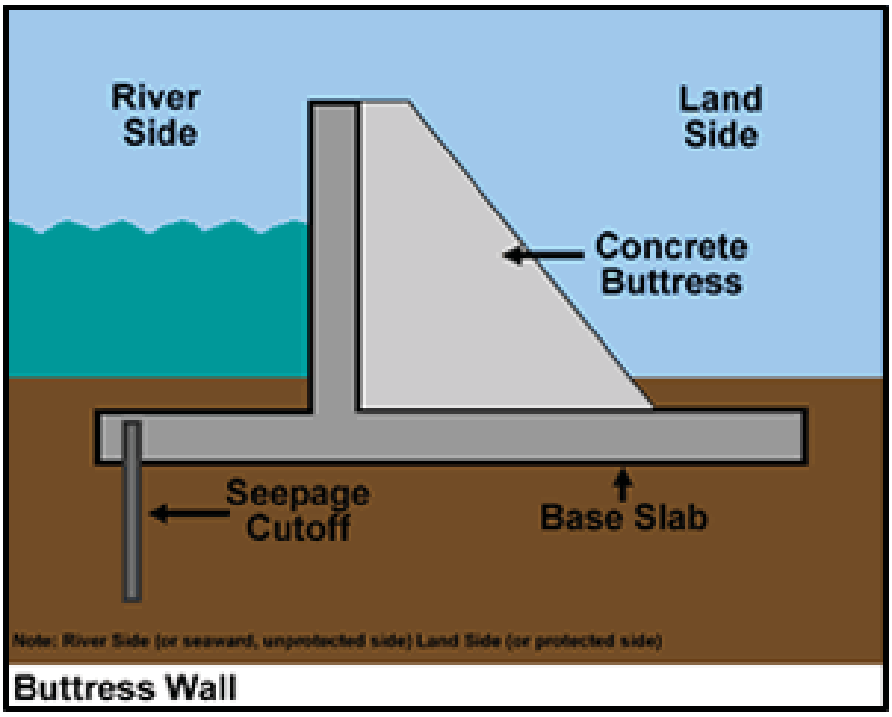

Figure 3: Conceptual figure of buttress wall

Concrete Slab: A structural concrete slab would be poured perpendicular to the adjacent floodwall on the protected side to act against lateral forces.

Relief Wells: Relief wells are vertically installed wells consisting of a well screen surrounded by a filter material designed to prevent inwash of foundation materials into the well. Relief wells intercept underseepage and provide a controlled outlet for the water, draining excess water from the subsurface sand layer (see figure 4).

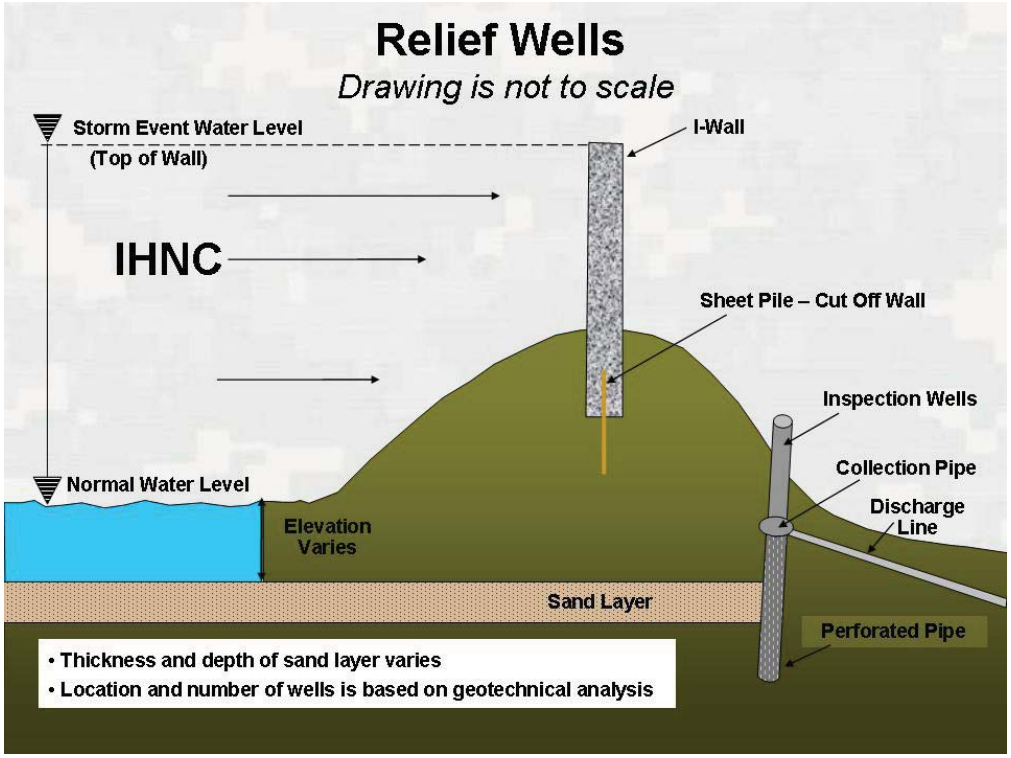

Figure 4: Conceptual figure of relief well

Preliminary analysis has developed a recommended plan for addressing deficiencies. Further analysis may indicate that a different alternative among those listed above may be more appropriate for a given reach. The following tables provide these recommendations.

Reach I Recommended Repairs

Station	*Type*	*Estimated Length(ft)*	*Recommended Repair*
28+85	Levee	500	Deep Soil Mixing
18+00	I-Wall	300	Concrete Slab

Reach II Recommended Repairs

Station	Type	Estimated Length (ft)	Recommended Repair
E-14	Gate		Concrete Slab/Berm
20+00	I-Wall		
30+00	I-Wall		
32+00	Gate	2000	Buttress Wall
73+00	I-Wall	200	Berm
79+00	L-Wall	3000	Berm
268+00	T-Wall		
270+00	I-Wall		
278+00	I-Wall	1300	Buttress Wall
449+00	I-Wall	400	Relief Wells
454+00	I-Wall	400	Concrete Slab

Reach III Recommended Repairs

Station	Type	Estimated Length(ft)	Recommended Repair
268+00	I-Wall	600	Deep Soil Mixing
258+00	I-Wall		
256+00	I-Wall	1000	Relief Wells
200+00	I-Wall	600	Concrete Slab
W-1 1+44	Gate	100	Concrete Slab

Equipment that would be required to conduct the work includes generators, cranes, dump trucks, flatbed trucks, bull dozers, excavators, rollers, graders, tractors, front end loaders, portable air compressors, welding machines, cement pumping trucks, drills, augers, portable lighting, and water trucks.

All construction that is to take place will occur within the existing levee/floodwall right of way. Construction is anticipated to begin between the months of July and October 2010, with duration of approximately 300 days. All access will be along existing roads, to include (figure 5):

Reach 1: Primary access will be from Florida Ave, St.Claude Ave, and Jordan Ave, N. Claiborne Ave, Paris Rd. and to traverse the levee as needed.

Reach 2: Primary access will be from Jordan Road, Almonaster Blvd, N. Claiborne Ave, Japonica St, Hwy 90, and Paris Rd, with secondary access through Terminal Road, Elaine St. and Boh Bros Almonaster yard, Industrial Pkwy, and to traverse the levee as needed.

Reach 3: Primary access will be from Haynes Blvd, Frances Rd, Japonica St, Hwy 90, N. Claiborne Ave., Poland Ave, and St. Claude Ave, and to traverse the levee as needed.

Figure 5: Project access would largely involve roads and properties highlighted in red

GUIDELINES APPLICABLE TO ALL USES

Response 1.1 - 1.5: These guidelines are acknowledged and have been addressed through the preparation of responses to the guidelines contained within the specific use categories.

Guideline 1.6: Information regarding the following general factors shall be utilized by the permitting authority in evaluating whether the proposed use is in compliance with the guidelines.

a) type, nature, and location of use.

Response 1.6 (a): See Project Description.

b) Elevation, soil, and water conditions and flood and storm hazard characteristics of site.

Response 1.6 (b): The project area is located within the Central Gulf Coastal Plain, or more specifically, on the eastern flank of the Mississippi River Deltaic Plain. Relief in the area is very slight with a minimum of four feet between the remnant alluvial ridge marking the location of an ancient distributary of the Mississippi River and the adjacent lowlands. Maximum elevations of 2 feet are found toward the southern end of the project area along the remnant alluvial ridge located between U.S. Highway 90 and Interstate 10. Minimum elevations of -4 feet are found in drained marsh areas near the north or Lake Pontchartrain end of the project. The foundation soils consist of artificial fill materials underlain by Halocene and Pleistocene age deposits. The material types consist predominantly of silty sands with some sands, fat and lean clays, silts and organics.

Due to its proximity to the Gulf of Mexico, the study area is susceptible to tropical waves, tropical depressions, tropical storms, and hurricanes. These weather events can produce significant amounts of precipitation over a very short period of time and are often accompanied by strong winds, tornadoes, and storm surge along the coastal areas. The levees and floodwalls within the project area provide a level of risk reduction that is currently below the 100 year level of risk reduction. Once the construction of the Borgne Barrier (as described in Individual Environmental Report #11 Tier 2 Borgne) and the Seabrook Gate (as described in Individual Environmental Report #11 Tier 2 Pontchartrain) are constructed and operational, the subject reaches will become a redundant risk reduction feature that will be required to withstand water levels caused by overtopping of the primary risk reduction system.

c) Techniques and materials used in construction, operation, and maintenance of use.

Response 1.6 (c): See Project Description.

d) Existing drainage patterns and water regimes of surrounding area including flow, circulation, quality, quantity, and salinity; and impacts on them.

Response 1.6 (d): No permanent disruption of natural hydrologic and sediment transport patterns, sheet flow, or water quality would occur from the proposed project. The IHNC is hydrologically connected to the GIWW, the MRGO, Mississippi River, and Lake Pontchartrain. The IHNC is approximately 30 ft deep, with a minimum 150 ft bottom width and 300 ft top width. The GIWW west of the Michoud Canal within the project area is authorized as 36 ft deep, 500 ft bottom width waterway. East of the Michoud Canal within the project area, the GIWW is authorized as a 150 ft width waterway. The IHNC from the GIWW/MRGO confluence to the IHNC Lock is an authorized deep draft navigation channel, 36 ft deep and 500 ft wide. The IHNC lock is located at the southern terminus of the IHNC and allows waterborne traffic to transit to and from the Mississippi River, the GIWW and Lake Pontchartrain. The MRGO was deauthorized as a Federal waterway on June 5, 2008, with a rock closure structure constructed at Bayou La Loutre.

The major influences on water levels within the basin are wind and tide with some localized effects by vessel traffic. Tidal ranges average approximately 1 ft and 2 ft at Lake Pontchartrain and Lake Borgne, respectively. Average flow velocity in the IHNC is about 0.6 feet per second (ft/s); however, surface ebb and bottom velocities may exceed 2 ft/s. More recent velocity modeling has indicated that closure of the MRGO at Bayou La Loutre may decrease existing velocities in the IHNC by half however.

The historic gage record (1923-2006) at the IHNC Lock shows that the median range of low to high water levels is -0.79 to 3.71 ft National Geodetic Vertical Datum of 1929 (NGVD29). Water level reached 10.61 ft NGVD29 during Hurricane Betsy. Although there are no water level records at the IHNC Lock for Hurricane Georges, records are available for nearby locations. During Hurricane Georges, the highest recorded water level in the IHNC at the Florida Avenue Bridge was 8.35 ft NGVD (1983 ADJ.) on 27 September 1998. The highest recorded water level (high water mark) at the IHNC Lock, due to Hurricane Katrina, was recorded at 14.3 ft NAVD88 2004.65. With completion of the HSDRRS in 2011 the risk of storm surge within the IHNC Basin is reduced.

The MRGO acts as a limited tidal conduit for the exchange of saline water from the Gulf of Mexico into the IHNC and Lake Pontchartrain. Measurements of non-storm event flows in the IHNC have demonstrated the presence of an upper layer of water flowing out from Lake Pontchartrain and a lower layer flowing toward the lake. However, the construction of the MRGO closure structure at Bayou La Loutre is expected to alter this direct saline influence, decreasing the conveyance of saline water to the IHNC and Lake Pontchartrain.

e) Availability of feasible alternative sites or methods for implementing the use.

Response 1.6 (e): The range of feasible alternatives for addressing deficiencies are provided in the project description.

f) Designation of the area for certain uses as part of a local program.

Response 1.6 (f): None identified

g) Economic need for use and extent of impacts of use on economy of locality.

Response 1.6 (g): The proposed action would enhance the HSDRRS for communities in the New Orleans Metropolitan area. Construction activities would provide a temporary direct socioeconomic benefit through local spending and employment. In the long-term, the proposed action would reduce the risk of storm-related flooding within the study area, and associated damage to buildings and infrastructure, disruption of economic activity, and displacement of residents would be more likely.

h) Extent of resulting public and private benefits.

Response 1.6 (h): The proposed action would provide an increased level of risk reduction for all communities in the project area, including Orleans and St. Bernard Parish.

i) Extent of coastal water dependency of the use.

Response 1.6 (i): The proposed construction could be considered coastal water dependent, as its purpose and need is to reduce the risk of storm-related flooding originating from coastal waters.

j) Existence of necessary infrastructure to support the use and public costs resulting from the use.

Response 1.6 (j): The existing transportation infrastructure would be utilized to construct the proposed action. Existing flood protection structures would be improved as part of the proposed action.

k) Extent of impacts on existing and traditional uses of the area and on future uses for which the area is suited.

Response 1.6 (k): Limited construction related impacts, such as increased noise and dust, could be expected to users of adjacent areas.

l) Proximity to and extent of impacts on important natural features such as beaches, barrier islands, tidal passes, wildlife and aquatic habitats, and forest lands.

Response 1.6 (l): The majority of the deficient reaches are adjacent to developed areas within New Orleans. A small portion (1300 feet) of Reach 1 is located in the vicinity of Bayou Bienvenue; however the reach is several miles from the portion of this bayou designated as a Natural and Scenic River. The proposed work would have no impact on this Scenic River.

m) The extent to which regional, state, and national interests are served including the national interest in resources and the siting of facilities in the coastal zones as identified in the coastal resources program.

Response 1.6 (m): Hurricane and storm damage risk reduction for the City of New Orleans greater metropolitan area, its residences, businesses, industrial use and infrastructure is of National, state and local interest. Because the location of the City of New Orleans is within the Louisiana Coastal Zone, the siting of these levees and floodwalls within the coastal zone is necessary.

n) Proximity to and extent of impacts on, special areas, particular areas, or other areas of particular concern of the state program or local programs.

Response 1.6 (n): None identified.

o) Likelihood of, and extent of impacts of, resulting secondary impacts and cumulative impacts.

Response 1.6 (o):: Because the proposed action would take place within existing right-of-way and within an existing HSDRRS facility, any impacts to the project area would be temporary in nature and cease at the end of construction.

p) Proximity to and extent of impacts on public lands or works, or historic, recreational or cultural resources.

Response 1.6 (p):: Any impacts such as noise, dust or limited access to recreational resources, such as bank fishing, boating or use of public parks in the project vicinity, would be temporary in nature during the construction period. No public lands would be impacted by the proposed action. No cultural or historic resources are anticipated to be impacted by the proposed action. There is one known archeological site in the vicinity of Paris Road which is within the project footprint; however, no subsurface work is proposed in the vicinity of this site. The proposed action will be coordinated with the State Historic Preservation Officer under Section 106 of the National Historic Preservation Act.

q) Extent of impacts on navigation, fishing, public access, and recreational opportunities.

Response 1.6 (q): Any impacts such as noise, dust or limited access to recreational resources, such as bank fishing, boating or use of public parks in the project vicinity, would be temporary in nature during the construction period. No impacts to navigation are anticipated.

r) Extent of compatibility with natural and cultural setting.

Response 1.6 (r): The proposed action is compatible with the natural and cultural setting that exists today, as the project features of the proposed action are of similar nature to current project features. Under the proposed action, the aesthetic value of the project corridor would be temporarily impacted by construction activities. No cultural or historic

resources are anticipated to be impacted by the proposed action. There is one known archeological site in the vicinity of Paris Road which is within the project footprint; however, no subsurface work is proposed in the vicinity of this site. The proposed action will be coordinated with the State Historic Preservation Officer under Section 106 of the National Historic Preservation Act.

s) Extent of long-term benefits or adverse impacts.

Response 1.6 (s): Long-term benefits include increase flood risk reduction for the adjacent areas. There are no long term adverse impacts anticipated.

Guideline 1.7: It is the policy of the coastal resources program to avoid the following adverse impacts. To this end, all uses and activities shall be planned, sited, designed, constructed, operated and maintained to avoid to the maximum extent practicable significant:

Guideline 1.7 (a): reductions in the natural supply of sediment and nutrients to the coastal system by alterations of freshwater flow;

Response 1.7 (a): The proposed action would not alter freshwater flows.

Guideline 1.7 (b): adverse economic impacts on the locality of the use and affected governmental bodies;

Response 1.7 (b): All work would take place within existing right-of -way.

Guideline 1.7 (c): detrimental discharges of inorganic nutrient compounds into coastal waters;

Response 1.7 (c): No detrimental discharges of such compounds are expected.

Guideline 1.7 (d): alterations in the natural concentration of oxygen in coastal waters;

Response 1.7 (d): No alteration of oxygen concentration will result from the proposed actions. Best Management Practices and a Stormwater Pollution Prevention Plan will be implemented.

Guideline 1.7 (e): destruction or adverse alterations of streams, wetland, tidal passes, inshore waters and waterbottoms, beaches, dunes, barrier islands, and other natural biologically valuable areas or protective coastal features;

Response 1.7 (e): No adverse effects to these resources are expected. Best Management Practices and a Stormwater Pollution Prevention Plan will be implemented.

Guideline 1.7 (f): adverse disruption of existing social patterns;

Response 1.7 (f): Adverse social impacts would occur primarily from the rerouting or addition of vehicular traffic, increased noise levels, and other construction-related items. These impacts would be short-term and cease upon the completion of construction.

Guideline 1.7 (g): alterations of the natural temperature regime of coastal waters;

Response 1.7 (g): Project construction and operation would not cause a change in the natural temperature regime of coastal waters.

Guideline 1.7 (h): detrimental changes in existing salinity regimes;

Response 1.7 (h): No measurable change in existing salinity regimes would occur.

Guideline 1.7 (i): detrimental changes in littoral and sediment transport processes;

Response 1.7 (i): The proposed action would not affect littoral or sediment transport processes.

Guideline 1.7 (j): adverse effects of cumulative impacts;

Response 1.7 (j): The proposed action would not result in any long term adverse effects of cumulative impacts. Temporary impacts from construction would compound impacts from other construction within the project area, but would cease upon the completion of construction.

Guideline 1.7 (k): detrimental discharges of suspended solids into coastal waters, including turbidity resulting from dredging; Best Management Practices and a Stormwater Pollution Prevention Plan will be implemented.

Response 1.7 (k): No dredging will occur. No detrimental discharges of suspended solids are expected.

Guideline 1.7 (l): reductions or blockage of water flow or natural circulation patterns within or into an estuarine system or a wetland forest;

Response 1.7 (l): No impacts to water flow or circulation patterns will result from the proposed action.

Guideline 1.7 (m): discharges of pathogens or toxic substances into coastal waters;

Response 1.7 (m): No discharges of pathogens or toxic substances into coastal waters are expected to result from the proposed action.

Guideline 1.7 (n): adverse alteration or destruction of archaeological, historical, or other cultural resources;

Response 1.7 (n): No cultural or historic resources are anticipated to be impacted by the proposed action. There is one known archeological site in the vicinity of Paris Road which is The proposed action will be coordinated with the State Historic Preservation Officer under Section 106 of the National Historic Preservation Act.

Guideline 1.7 (o): fostering of detrimental secondary impacts in undisturbed or biologically highly productive wetland areas;

Response 1.7 (o): No secondary impacts to wetlands are expected.

Guideline 1.7 (p): adverse alteration or destruction of unique or valuable habitats, critical habitat for endangered species, important wildlife or fishery breeding or nursery areas, designated wildlife management or sanctuary areas, or forestlands;

Response 1.7 (p): No adverse alteration or destruction of unique or valuable habitats is expected. CEMVN will coordinate with US Fish and Wildlife Service to confirm that this proposed action is not likely to adversely impact endangered or threatened species.

Guideline 1.7 (q): adverse alteration or destruction of public parks, shoreline access points, public works, designated recreation areas, scenic rivers, or other areas of public use and concern;

Response 1.7 (q): No adverse alteration or destruction of these resources is expected.

Guideline 1.7 (r): adverse disruptions of coastal wildlife and fishery migratory patterns;

Response 1.7 (r): No disruption to migratory patterns is expected.

Guideline 1.7 (s): land loss, erosion and subsidence;

Response 1.7 (s): No land loss, erosion or subsidence is anticipated under the proposed action.

Guideline 1.7 (t): increases in the potential for flood, hurricane or other storm damage, or increases in the likelihood that damage will occur from such hazards;

Response 1.7 (t): The proposed action would reduce the potential for damages throughout the project area.

Guideline 1.7 (u): and reductions in the long-term biological productivity of the coastal ecosystem.

Response 1.7 (u): No reduction in long-term biological productivity is expected.

Guideline 1.8: In those guidelines in which the modifier "maximum extent practicable" is used, the proposed use is in compliance with the guideline if the standard modified by the term is complied with. If the modified standard is not complied with, the use will be in compliance with

the guideline if the permitting authority finds, after a systematic consideration of all pertinent information regarding the use, the site and the impacts of the use as set forth in guideline 1.6, and a balancing of their relative significance, that the benefits resulting from the proposed use would clearly outweigh the adverse impacts resulting from non-compliance with the modified standard and there are no feasible and practical alternative locations, methods and practices for the use that are in compliance with the modified standard and:

a) significant public benefits will result from the use, or;

b) the use would serve important regional, state or national interests, including the national interest in resources and the siting of facilities in the coastal zone identified in the coastal resources program, or;

c) the use is coastal water dependent.

The systematic consideration process shall also result in a determination of those conditions necessary for the use to be in compliance with the guideline. Those conditions shall assure that the use is carried out utilizing those locations, methods and practices which maximize conformance to the modified standard; are technically, economically, environmentally, socially and legally feasible and practical and minimize or offset those adverse impacts listed in guideline 1.7 and in the guideline at issue.

Response 1.8: Acknowledged.

Guideline 1.9: Uses shall to the maximum extent practicable be designed and carried out to permit multiple concurrent uses which are appropriate for the location and to avoid unnecessary conflicts with other uses of the vicinity.

Response 1.9: The purpose and use of the proposed project would be for flood risk reduction. All work will take place within the existing right-of-way of the existing flood risk reduction system. Therefore the proposed action use is consistent with the current use.

Guideline 1.10: These guidelines are not intended to be, nor shall they be, interpreted to allow expansion of governmental authority beyond that established by La. R.S. 49:213.1 through 213.21, as amended; nor shall these guidelines be interpreted so as to require permits for specific uses legally commenced or established prior to the effective date of the coastal use permit program nor to normal maintenance or repair of such uses.

Response 1.10: Acknowledged.

GUIDELINES FOR LEVEES

Guideline 2.1: The leveeing of unmodified or biologically productive wetlands shall be avoided to the maximum extent practicable.

Response 2.1: The proposed action would modify existing levees and floodwalls within existing right-of-way and without changing the alignment.

Guideline 2.2: Levees shall be planned and sited to avoid segmentation of wetland areas and systems to the maximum extent practicable.

Response 2.2: The proposed action would modify existing levees and floodwalls within existing right-of-way and without changing the alignment.

Guideline 2.3: Levees constructed for the purpose of developing or otherwise changing the use of a wetland area shall be avoided to the maximum extent practicable.

Response 2.3: The proposed action would modify existing levees and floodwalls within existing right-of-way and without changing the alignment. The area behind the existing levees and floodwalls is already developed.

Guidelines 2.4: Hurricane and flood protection levees shall be located at the wetland/non-wetland interface or landward to the maximum extent practicable.

Response 2.4: The proposed action would modify existing levees and floodwalls within existing right-of-way and without changing the alignment.

Guideline 2.5: Impoundment levees shall only be constructed in wetland areas as part of approved water or marsh management projects or to prevent release of pollutants.

Response 2.5: No impoundment levees would be constructed as part of the proposed project.

Guideline 2.6: Hurricane or flood protection levee systems shall be designed, built, and thereafter operated and maintained utilizing best practical techniques to minimize disruptions of existing hydrologic patterns, and the interchange of water, beneficial nutrients and aquatic organisms between enclosed wetlands and those outside the levee system.

Response 2.6: Existing hydrologic patterns would not be altered. The proposed action would modify existing levees and floodwalls within existing right-of-way and without changing the alignment.

GUIDELINES FOR LINEAR FACILITIES

Guideline 3.1: Linear use alignments shall be planned to avoid adverse impacts on areas of high biological productivity or irreplaceable resource areas.

Response 3.1: Existing hydrologic patterns would not be altered. The proposed action would modify existing levees and floodwalls within existing right-of-way and without changing the alignment.

Guideline 3.2: Linear facilities involving the use of dredging or filling shall be avoided in wetland and estuarine areas to the maximum extent practicable.

Response 3.2: No dredging or filling of wetlands would occur under the proposed action.

Guideline 3.3: Linear facilities involving dredging shall be of the minimum size and length.

Response 3.3: No dredging would occur under the proposed action.

Guideline 3.4: To the maximum extent practicable, pipelines shall be installed through the "push ditch" method and the ditch backfilled.

Response 3.4: Any pipelines or utility crossings that are not in accordance with current design criteria shall be relocated, removed, modified, or abandoned in place as part of this project.

Guideline 3.5: Existing corridors, right-of-way, canals, and streams shall be utilized to the maximum extent practicable for linear facilities.

Response 3.5: The proposed action would modify existing levees and floodwalls within existing right-of-way and without changing the alignment.

Guideline 3.6: Linear facilities and alignments shall be, to the maximum extent practicable, designed and constructed to permit multiple uses consistent with the nature of the facility.

Response 3.6: Multiple uses (such as recreation and open space) of the levees and floodwalls would be permitted.

Guideline 3.7: Linear facilities involving dredging shall not traverse or adversely affect any barrier island.

Response 3.7: No barrier islands would be affected.

Guideline 3.8: Linear facilities involving dredging shall not traverse beaches, tidal passes, protective reefs or other natural gulf shoreline unless no other alternative exists. If a beach, tidal pass, reef or other natural gulf shoreline must be traversed for a non-navigation canal, they shall be restored at least to their natural condition immediately upon completion of construction. Tidal passes shall not be permanently widened or deepened except when necessary to conduct the use. The best available restoration techniques which improve the traversed area's ability to serve as a shoreline shall be used.

Response 3.8: No dredging would occur under the proposed action.

Guideline 3.9: Linear facilities shall be planned, designed, located, and built using the best practical techniques to minimize disruption of natural hydrologic and sediment transport patterns, sheet flow, and water quality, and to minimize adverse impacts on wetlands.

Response 3.9: No disruption of natural hydrologic and sediment transport patterns, sheet flow, or water quality would occur from the proposed project.

Guideline 3.10: Linear facilities shall be planned, designed, and built using the best practical techniques to prevent bank slumping and erosion, saltwater intrusion, and to minimize the potential for inland movement of storm-generated surges. Consideration shall be given to the use of locks in navigation canals and channels which connect more saline areas with fresher areas.

Response 3.10: Acknowledged.

GUIDELINES FOR DREDGED MATERIAL DEPOSITION

Not applicable

GUIDELINES FOR SHORELINE MODIFICATION

Not applicable

GUIDELINES FOR SURFACE ALTERATIONS

Guideline 6.1: Industrial, commercial, urban, residential, and recreational uses are necessary to provide adequate economic growth and development. To this end, such uses will be encouraged in those areas of the coastal zone that are suitable for development. Those uses shall be consistent with the other guidelines and shall, to the maximum extent practicable, take place only:

a) on lands five feet or more above sea level or within fast lands; or

b) on lands which have foundation conditions sufficiently stable to support the use, and where flood and storm hazards are minimal or where protection from these hazards can be reasonably well achieved, and where the public safety would not be unreasonably endangered; and

1) the land is already in high intensity of development use, or

2) there is adequate supporting infrastructure, or

3) the vicinity has a tradition of use for similar habitation or development

Response 6.1: The proposed project has the potential to reduce damages to Orleans and St. Bernard Parish. This would benefit all uses within the Parish.

Guideline 6.2: Public and private works projects such as levees, drainage improvements, roads, airports, ports, and public utilities are necessary to protect and support needed development and shall be encouraged. Such projects shall, to the maximum extent practicable, take place only when:

a) they protect or serve those areas suitable for development pursuant to Guideline 6.1; and

b) they are consistent with the other guidelines; and

c) they are consistent with all relevant adopted state, local and regional plans.

Response 6.2: The proposed project will comply with all guidelines, laws, and plans and has the potential to reduce flood risk to Orleans and St. Bernard Parish.

Guideline 6.3: BLANK (Deleted)

Guideline 6.4: To the maximum extent practicable wetland areas shall not be drained -or filled. Any approved drain or fill project shall be designed and constructed using best practical techniques to minimize present and future property damage and adverse environmental impacts.

Response 6.4: No wetlands would be impacted by the proposed action.

Guideline 6.5: Coastal water dependent uses shall be given special consideration in permitting because of their reduced choice of alternatives.

Response 6.5: The proposed project is coastal water dependent.

Guideline 6.6: Areas modified by surface alteration activities shall, to the maximum extent practicable, be re-vegetated, refilled, cleaned and restored to their predevelopment condition upon termination of the use

Response 6.6: Following construction completion, temporarily disturbed areas will be returned to pre-construction conditions.

Guideline 6.7: Site clearing shall to the maximum extent practicable be limited to those areas immediately required for physical development.

Response 6.7: Acknowledged.

Guideline 6.8: Surface alterations shall, to the maximum extent practicable, be located away from critical wildlife areas and vegetation areas. Alterations in wildlife preserves and management areas shall be conducted in strict accord with the requirements of the wildlife management body.

Response 6.8: The proposed action would modify existing levees and floodwalls within existing

right-of-way and without changing the alignment.

Guideline 6.9: Surface alterations which have high adverse impacts on natural functions shall not occur, to the maximum extent practicable, on barrier islands and beaches, isolated cheniers, isolated natural ridges or levees,' or in wildlife and aquatic species breeding or spawning areas, or in important migratory routes.

Response 6.9: The proposed project does not involve any surface alterations which have adverse impacts to these resources.

Guideline 6.10: The creation of low dissolved oxygen conditions in the water or traps for heavy metals shall be avoided to the maximum extent practicable.

Response 6.10: No low dissolved oxygen conditions or traps for heavy metals will result from the proposed action.

Guideline 6.11: Surface mining and shell dredging shall be carried out utilizing the best practical techniques to minimize adverse environmental impacts.

Response 6.11: Not applicable.

Guideline 6.12: The creation of underwater obstructions which adversely affect fishing or navigation shall be avoided to the maximum extent practicable.

Response 6.12: Not applicable.

Guideline 6.13: Surface alteration sites and facilities shall be designed, constructed, and operated using the best practical techniques to prevent the release of pollutants or toxic substances into the environment and minimize other adverse impacts.

Response 6.13: All practical techniques will be used to prevent the release of pollutants or toxic substances. A Phase I Hazardous, Toxic, Radioactive Waste (HTRW) Environmental Site Assessment (ESA) will be completed for the project area.

Guideline 6.14: To the maximum extent practicable only material that is free of contaminants and compatible with the environmental setting shall be used as fill.

Response 6.14: Acknowledged.

GUIDELINES FOR HYDROLOGIC AND SEDIMENT TRANSPORT MODIFICATIONS

Not applicable

GUIDELINES FOR DISPOSAL OF WASTES

Guideline 8.1: The location and operation of waste storage, treatment, and disposal facilities shall be avoided in wetlands to the maximum extent practicable, and best practical techniques shall be used to minimize adverse impacts which may result from such use.

Response 8.1: The proposed project does not involve any such facilities.

Guideline 8.2: The generation, transportation, treatment, storage and disposal of hazardous wastes shall be pursuant to the substantive requirements of the Department of Natural Resources adopted pursuant to Act 334 of 1978 and approved pursuant to the Resource Conservation and Recovery Act of 1976 P.0. 94-580, and of the Office of Conservation for injection below surface.

Response 8.2: Acknowledged.

Guideline 8.3: Waste facilities located in wetlands shall be designed and built to withstand all expectable adverse conditions without releasing pollutants.

Response 8.3: The proposed project does not involve any such facilities.

Guideline 8.4: Waste facilities shall be designed and constructed using best practical techniques to prevent leaching, control leachate production, and prevent the movement of leachate away from the facility.

Response 8.4: The proposed project does not involve any such facilities.

Guideline 8.5: The use of overland flow systems for non-toxic, biodegradable wastes, and the use of sump lagoons and reservoirs utilizing aquatic vegetation to remove pollutants and nutrients shall be encouraged.

Response 8.5: The proposed project does not involve any such activities.

Guideline 8.6: All waste disposal sites shall be marked and, to the maximum extent practicable, all components of waste shall be identified.

Response 8.6: The proposed project does not involve any such sites.

Guideline 8.7: Waste facilities in wetlands with identifiable pollution problems that are not feasible and practical to correct shall be closed and either removed or sealed, and shall be properly re-vegetated using the best practical techniques.

Response 8.7: The proposed project does not involve any such facilities.

Guideline 8.8: Waste shall be disposed of only at approved disposal sites.

Response 8.8: Acknowledged.

Guideline 8.9: Radioactive wastes shall not be temporarily or permanently disposed of in the coastal zone.

Response 8.9: The proposed project does not involve any such wastes.

GUIDELINES FOR USES THAT RESULT IN THE ALTERATION OF WATERS DRAINING INTO COASTAL WATERS

Not applicable

GUIDELINES FOR OIL, GAS, AND OTHER MINERAL ACTIVITIES

Not applicable

CONSISTENCY DETERMINATION

Based on this evaluation, the New Orleans District, U.S. Army Corps of Engineers, has determined that the proposed action would be consistent, to the maximum extent practicable, with the State of Louisiana's approved Coastal Resources Program.

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

REPLY TO
ATTENTION OF

15 July 2010

Hurricane Protection Office
P.O. Box 60267
New Orleans, Louisiana 70160-0267
FAX: 504-862-2897

James Boggs
Field Supervisor
U.S. Fish and Wildlife Service
646 Cajundome Blvd - Suite 400
Lafayette, LA 70506

Dear Mr. Boggs:
Attn: David Walther

Provided for your review are the project description, project location map, and determination by the U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN) of the effect that the proposed action would have on threatened and endangered (T&E) species under USFWS jurisdiction. An Environmental Assessment #498 (EA #498) is currently being conducted to evaluate potential impacts from the proposed action, referred to as Inner Harbor Navigation Canal (IHNC) Levees and Floodwalls Restoration and Repair Project. The levees, floodwalls, and closure gate structures that were identified as needing repair are part of the Hurricane and Storm Damage Risk Reduction System (HSDRRS) for Orleans Parish, Louisiana. This draft EA #498 will be completed in the next few months and will be forwarded to you upon completion.

PROJECT DESCRIPTION

The proposed project consists of repairing and restoring portions of levees and floodwalls that did not meet the necessary factors of safety for stability, as dictated by current HSDRRS design guidelines (USACE 2008a). The levees and floodwalls within the project area provide a level of risk reduction that is currently below the 100-year level of risk reduction. Once construction of the Borgne Barrier (as described in IER #11 Tier 2 Borgne) and the Seabrook Gate (as described in IER #11 Tier 2 Pontchartrain) has been completed and these structures are operational, the subject reaches would become a redundant risk reduction feature that would be required to withstand water levels caused by overtopping of the primary risk reduction system. The design guidelines for the safety factors assume conditions are such that water levels within the IHNC are at least 12 feet (ft; North American Vertical Datum of 1988 [NAVD88]) or water levels are at the top of the levee or floodwall.

The HSDRRS within this corridor is composed of various features, including earthen levees, I-Walls, L-Walls, T-Walls, and closure gate structures, which all provide risk reduction to the three sub-basins (figure 1) from the IHNC Lock to the Seabrook Bridge at Lake Pontchartrain and along the GIWW from the IHNC to the IHNC Barrier, which is near the Michoud Canal in New Orleans East. The project area is divided into three primary reaches and each reach is comprised of numerous deficient segments of levees/floodwalls (figure 2).

Several methods of repair/restoration are proposed; all of which would be built entirely within existing right of way (ROW), and could be used to address deficiencies within the subject reaches. These construction methods include the following:

Deep Soil Mixing

The deep soil mixing (DSM) method is a stabilization method that uses cement, lime, slag, other pozzolonic materials, and combinations of these stabilizers to increase the strength and stiffness of soft or loose ground. DSM introduces panels of engineered grout or reagent into the underlying soils to modify their physical and chemical characteristics without excavation (see figure 3).

DSM consists of improving the existing earthen embankment on the protected side of the levee or I-wall by installing soilcrete columns. Geotechnical analyses indicate that adding columns with an average unconfined compressive strength provides sufficient strength to the overall soil mass and increases the global stability of the section to acceptable levels. Although, the exact dimensions of repair methods cannot be determined until the final design is complete, DSM typically consists of soil mix columns arranged in rows or panels oriented perpendicular to the levee or I-wall. There are typically eight 32-ft long soil-mixing columns in a row, which overlap each other by approximately 6 inches, giving the panels a width of 15 ft. Each set of panels (columns) typically have 8 ft of space between them.

Berm

Approximately 16,000 cubic yards (CY) of government-approved borrow would be placed on the protected side of the existing risk reduction system to increase stability and control seepage. Seepage berms are infrequently used in conjunction with floodwalls since floodwalls are often constructed in areas where ROW availability or cost is insufficient for levee construction (USACE 1989); however, the existing ROW for the floodwalls and levees at stations 73+00, 79+00, 247+00, and 525-535+00 in Reach 2 offers enough space for stability berms to be built without requiring additional area. All proposed berms would have an approximate width of 25 ft, a height of 3 ft, and would be placed at the toe on the protected side of the levee or floodwall. Berms would be constructed to the estimated lengths provided for each station in tables 1 through 3. The embankment would be reseeded upon completion.

Buttress Wall

A concrete buttress wall is an addition to an existing I-wall which is constructed by driving piles,

setting forms against (behind) the existing flood protection structure, and pouring concrete inside the forms such that the completed addition meets the design engineer's specifications. These buttress pilings are installed at intervals along the wall to tie the stem and base slab together and to assist in resisting the floodwall or levee load (see figure 4).

Concrete Slab

A structural concrete base slab would be poured perpendicular to the adjacent floodwall on the protected side to act against lateral forces. The thickness of the concrete slabs would vary between 12 inches and 24 inches and extend out approximately 8 ft from the existing I-walls or gates.

Relief Wells

Relief wells are vertically installed wells consisting of a well screen surrounded by a filter material designed to prevent the inwash or migration of foundation materials into the well. Relief wells intercept underseepage and provide a controlled outlet for the water, draining excess water from the subsurface sand layer (see figure 2-5).

Five segments within Reaches 2 and 3, totaling approximately 3,800 ft in length, are proposed to be repaired by relief wells. Preliminary designs indicate that the relief wells would be placed approximately 30 ft to 45 ft from the floodwalls, installing approximately 60 wells total. Each relief well would be 8 inches in diameter and installed to a depth of approximately 30 ft to 35 ft. In addition, a collector pipe and discharge line would also be constructed along each segment where relief wells are installed. The collector pipe collects the excess seepage from each well and a discharge line for each I-wall segment discharges it to the nearest canal.

Preliminary analysis has developed a recommended plan for addressing deficiencies and the recommended construction techniques for the proposed action of repairing and restoring levees and floodwalls to meet HSDRRS safety factors along the IHNC. Corresponding stations are listed in tables 1 through 3. The proposed action is based on these recommended repair methods; however, any alternative repair methods that could potentially be employed at each of the subject stations are also provided in tables 1 through 3. Future detailed analysis could indicate that an alternative method among those listed in the tables may be more appropriate for a given station once designs are finalized, however because all repair methods are approximately within the same footprint (existing ROW) and would provide the same level of risk reduction, they are not considered separate alternatives and are evaluated as part of the proposed action. For several deficient segments of HSDRRS, no alternate repair method was available; therefore, at these stations, only the no action alternative and the proposed action were evaluated.

Reach 1

Reach 1 extends from Stations 0+00 to 380+00 and extends along the east side of the IHNC from the IHNC Lock to the GIWW and also includes the south side of the GIWW from the IHNC to Bayou Bienvenue. Reach 1 has approximately 800 ft of deficient areas which correspond with two stations, 28+85 and 18+00. Station IDs, type of flood risk reduction structure, length, and recommended repairs for Reach 1 are presented in Table 1.

Table 1.
Reach 1 Proposed Action

Station	Type	Estimated Length (ft)	Recommended Repair Method	Alternate Repair Method
28+85	Earthen Levee	500	Deep Soil Mixing	Berm
18+00	I-wall	300	Concrete Slab	Buttress Wall

Reach 2

Reach 2 comprises the east side of the IHNC from Lake Pontchartrain to the GIWW and extends along the north side of the GIWW from the IHNC to the Borgne Barrier. Reach 2 has approximately 2.4 miles (mi) of deficient areas which are presented in Table 2.

Table 2.
Reach 2 Proposed Action

Station	Type	Estimated Length (ft)	Recommended Repair Method	Alternate Repair Method
E-14	Gate	1,000	Concrete Slab/Berm	Buttress Wall
20+00	I-Wall	1,000	Buttress Wall	NA
30+00	I-Wall	1,000	Buttress Wall	NA
32+00	Gate	500	Buttress Wall	NA
65+00 to 70+00	I-Wall	500	Concrete Slab	Buttress Wall
73+00	I-Wall	200	Berm	Deep Soil Mixing
79+00	L-Wall	3,000	Berm	Deep Soil Mixing
247+00	Earthen Levee	1,600	Berm	Deep Soil Mixing
268+00	T-Wall	500	Buttress Wall	NA
270+00	I-Wall	400	Buttress Wall	NA
278+00	I-Wall	400	Buttress Wall	NA
406+00	I-Wall	600	Relief Wells	NA
449+00	I-Wall	400	Relief Wells	NA
454+00	I-Wall	400	Concrete Slab	Buttress Wall
525+00 to 535+00	I-Wall	1,000	Berm	Deep Soil Mixing

NA = no alternate repair method available

Reach 3

Reach 3 lies along the west side of the IHNC and extends from the IHNC Lock at the Mississippi River to the Seabrook Bridge at Lake Pontchartrain. As shown in Table 2-3, Reach 3 has approximately 4,100 ft of deficient areas.

Table 3.
Reach 3 Proposed Action

Station	Type	Estimated Length (ft)	Recommended Repair Method	Alternate Repair Method
268+00	I-Wall	600	Deep Soil Mixing	Buttress Wall
258+00	I-Wall	1,000	Relief Wells	NA
256+00	I-Wall	1,000	Relief Wells	NA
248+00	I-Wall	800	Relief Wells	NA
200+00	I-Wall	600	Concrete Slab	Buttress Wall
W-1 1+44	Gate	100	Concrete Slab	Buttress Wall

NA = no alternate repair method available

Construction Related Information for Proposed Action

The permanent ROW that could potentially be impacted by construction of the proposed action would be approximately 62.5 acres, all within existing ROW. Staging areas, primarily located in upland areas not within existing ROW, would be required for the proposed action and would temporarily impact approximately 5.4 acres (figure 2, detailed views shown on figures 6 and 7). Fourteen staging areas, each 0.5-acre in size or smaller, would be necessary to repair/restore deficiencies in Reaches 1, 2, and 3 (figures 6 and 7). Two staging areas would be located along the east bank of the IHNC, south of its convergence with the GIWW; seven staging areas would be required for Reach 2 repair work along the east bank of the IHNC and north bank of the GIWW; and five staging areas would be established along the west bank of the IHNC within Reach 3.

Repair and restorative construction would occur entirely within the existing levee/floodwall ROW. The construction duration would be approximately 300 days (10 months) and would likely begin between August and October 2010. The construction schedule may include work up to 24 hours per day and 7 days per week.

Project access would occur along existing roads and properties, to include those illustrated in figure 2-8. Small, ancillary streets are not highlighted on figure 2-8 but would still be used to access existing HSDRRS. Reach 1 primary access would be from Florida Avenue, St. Claude Avenue, Jourdan Avenue, N. Claiborne Avenue, Paris Road, and to traverse the levee as needed. Primary access to Reach 2 would require use of the following roadways: Jourdan Road, Almonaster Boulevard, N. Claiborne Avenue, Japonica Street, Highway 90, and Paris Road, with secondary access through Terminal Road, Elaine Street and Boh Bros. Almonaster Yard, Industrial Parkway, and to traverse the levee as needed. Reach 3 primary access would

occur from Hayne Boulevard, France Road, Japonica Street, Highway 90, N. Claiborne Avenue, Poland Avenue, and St. Claude Avenue, and to traverse the levee as needed. Construction of the proposed action would not be expected to result in any temporary road closures.

A significant amount of construction equipment would be required to conduct the work, including generators, cranes, dump trucks, flatbed trucks, bulldozers, excavators, rollers, graders, tractors, front end loaders, portable air compressors, welding machines, cement pumping trucks, drills, augers, portable lighting, and water trucks. Table 4 provides information on the approximate volumes of materials that would be required for construction of the proposed action.

Table 4.
Estimated Construction Material Quantities Required to Complete the Proposed Action

Material	Total Length of Material Placement (ft)	Units of Measure	Quantity
Reach 1			
Structural Concrete	300	CY	1,200
Silt Fencing	800	linear feet (LFT)	960
Concrete for DSM	500	CY	2,000
Rebar	300	LFT	1,800
Reach 2			
Embankment Fill	4,800	CY	24,000
Top Soil	4,800	CY	24,000
Concrete Form	5,700	square feet (sq ft)	22,800
Structural Concrete	1,900	CY	7,600
Silt Fencing	12,500	LFT	15,000
Corrugated Metal Piping (CMP)	1000	LFT	2,500
Rebar	5700	LFT	34,200
Reach 3			
Concrete for DSM	600	CY	2,400
Concrete Form	700	sq ft	2,800
Structural Concrete	700	CY	2,800
Rebar	700	LFT	4,200
Silt Fencing	4100	LFT	4,920
CMP	2800	LFT	7,000

CEMVN DETERMINATION OF IMPACTS TO T&E SPECIES

CEMVN has assessed the environmental impacts of the proposed action on T&E species in the project vicinity. In a previous consultation letter to CEMVN dated February 2, 2009 related to IER #11 Tier 2 Pontchartrain, USFWS discussed two Federally listed species under its

jurisdiction that potentially could occur in the northern IHNC- Lake Pontchartrain area: the endangered West Indian manatee (*Trichechus manatus*) and the endangered brown pelican (*Pelecanus occidentalis*). The brown pelican subsequently was delisted in November 2009 due to its recovery, so it is not included in this determination.

Manatees potentially can occur in Lake Pontchartrain at the mouth of the IHNC and, although it is unlikely, they could enter the canal. The proposed action would involve construction and operation of new levee protection measures along the canal. No in-water construction would occur. Given the total absence of in-water work associated with the proposed action, this project would have no direct effects on this species. The potential for indirect effects on manatees due to adverse effects on the water quality of inshore areas of Lake Pontchartrain or the IHNC during the construction period would be prevented through the use of best management practices and adherence to regulations governing stormwater runoff at construction sites. Thus, the proposed action would have no direct or indirect effect on the manatee.

CONTACT INFORMATION

Please review the enclosed information and provide comments within 30 days of the date of this letter. This EA will not be finalized until all environmental review and compliance requirements have been completed. A copy of the final EA will be provided upon request.

Comments should be mailed to the attention of Ms. Laura Lee Wilkinson; U.S. Army Corps of Engineers; CEMVN-HPO; P.O. Box 60267; New Orleans, Louisiana 70160-0267. Comments may also be provided by E-Mail to Laura.L.Wilkinson@usace.army.mil. Ms. Wilkinson may be contacted at (504) 862-1212, if questions arise.

Sincerely,

Laura Lee Wilkinson

Laura Lee Wilkinson
Environmental Coordinator
Hurricane Protection Office

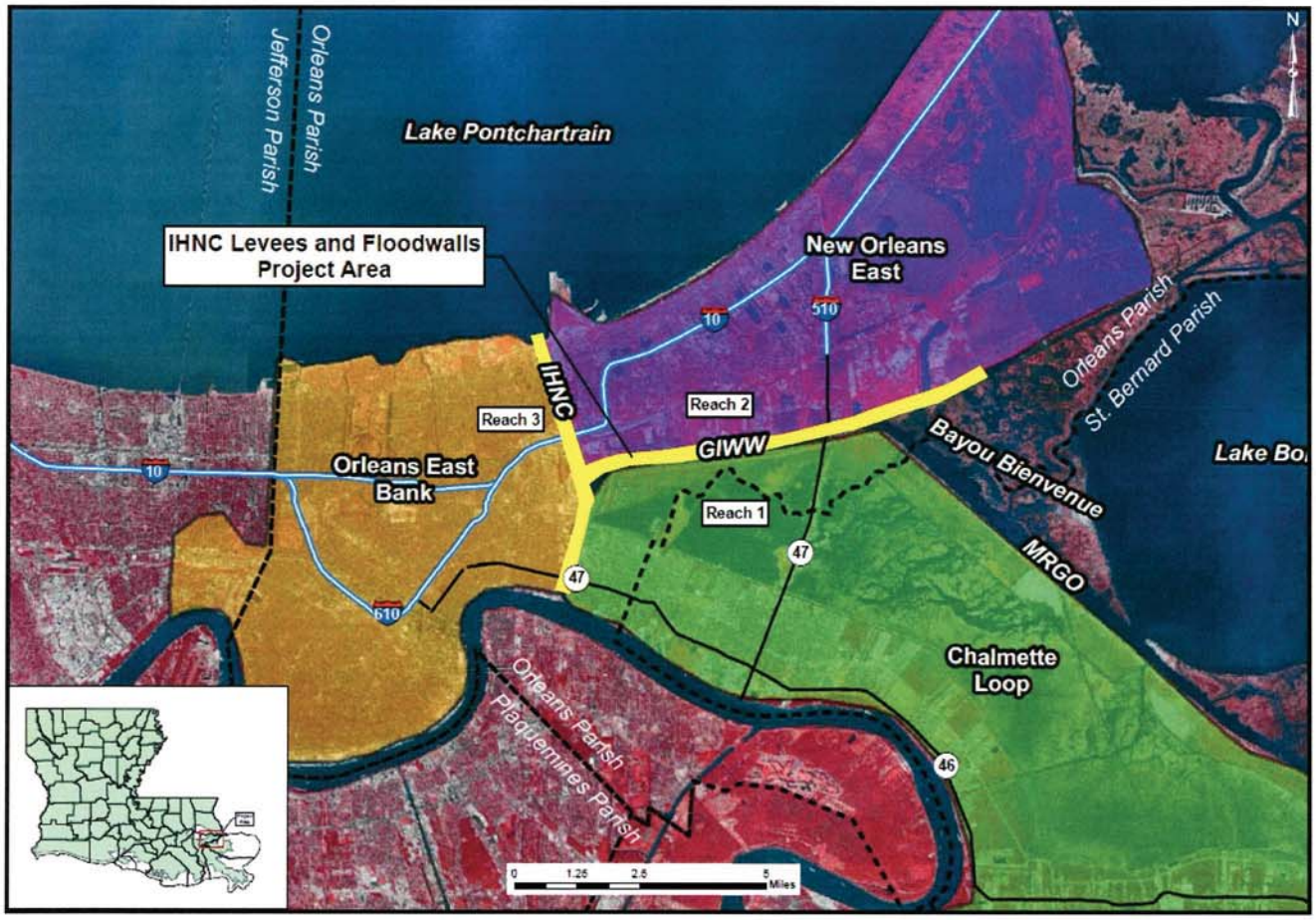

Figure 1. Project Area Map Showing the Location of Sub-basins and Reaches 1, 2, and 3

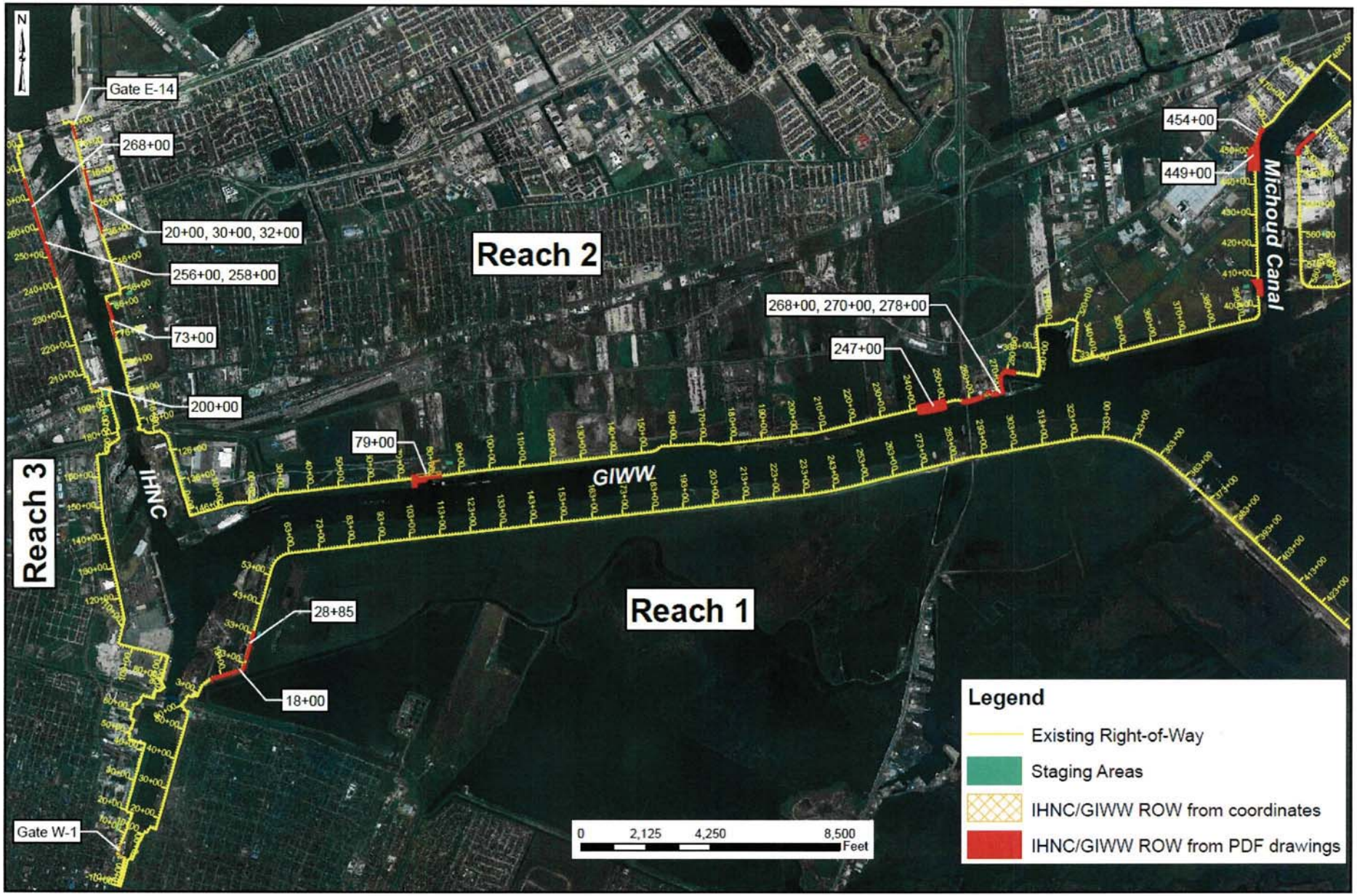

Figure 2. Map of Project Area Showing Deficient Segments of Levees and Floodwalls and Existing ROW

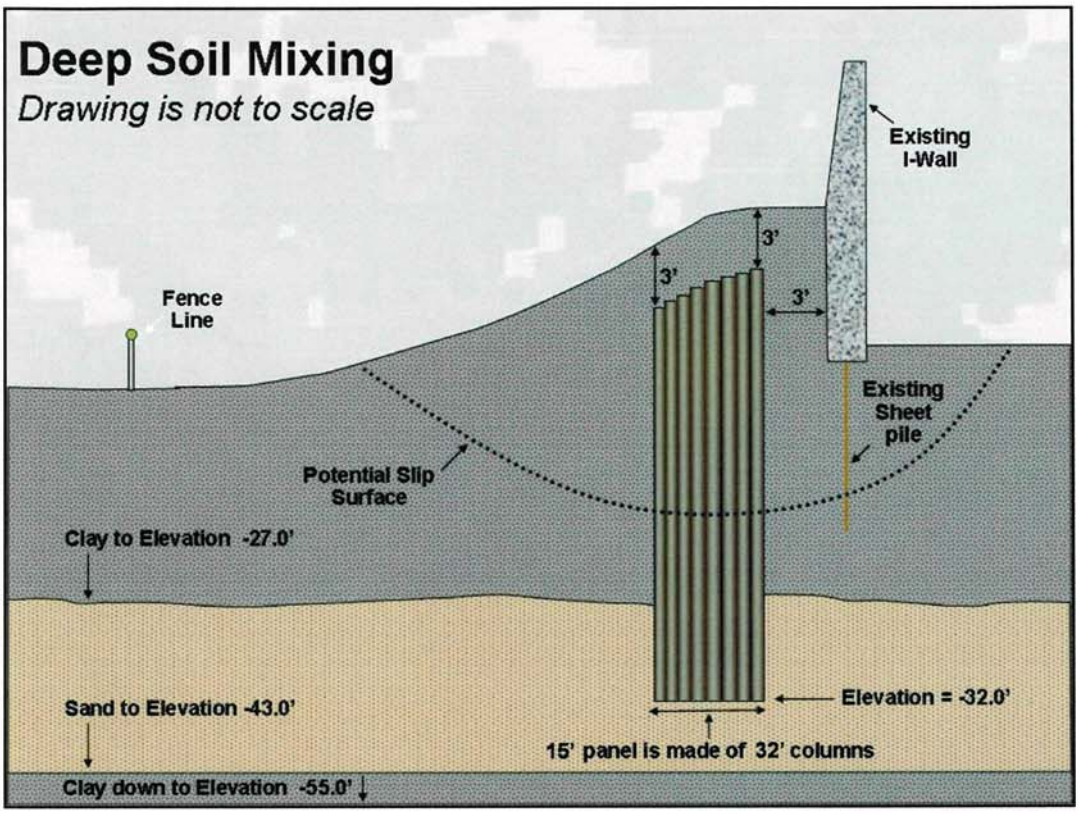

Figure 3. Conceptual Figure of Deep Soil Mixing

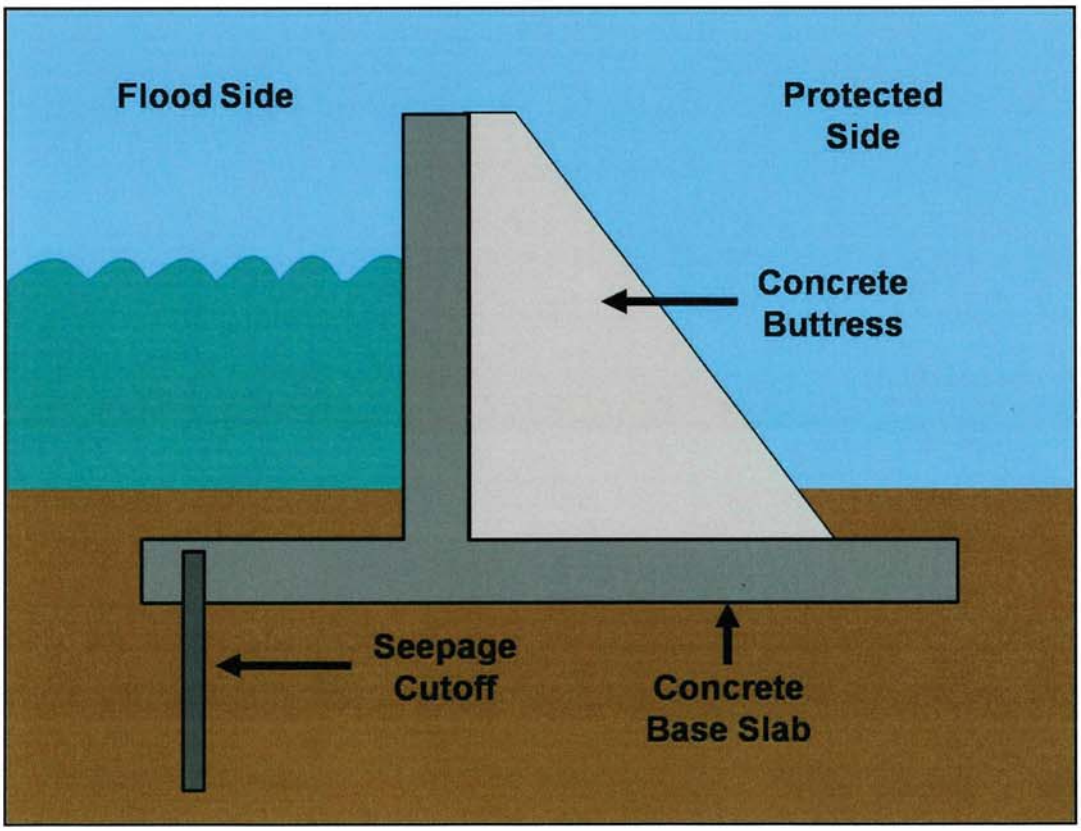

Figure 4. Conceptual Figure of a Buttress Wall

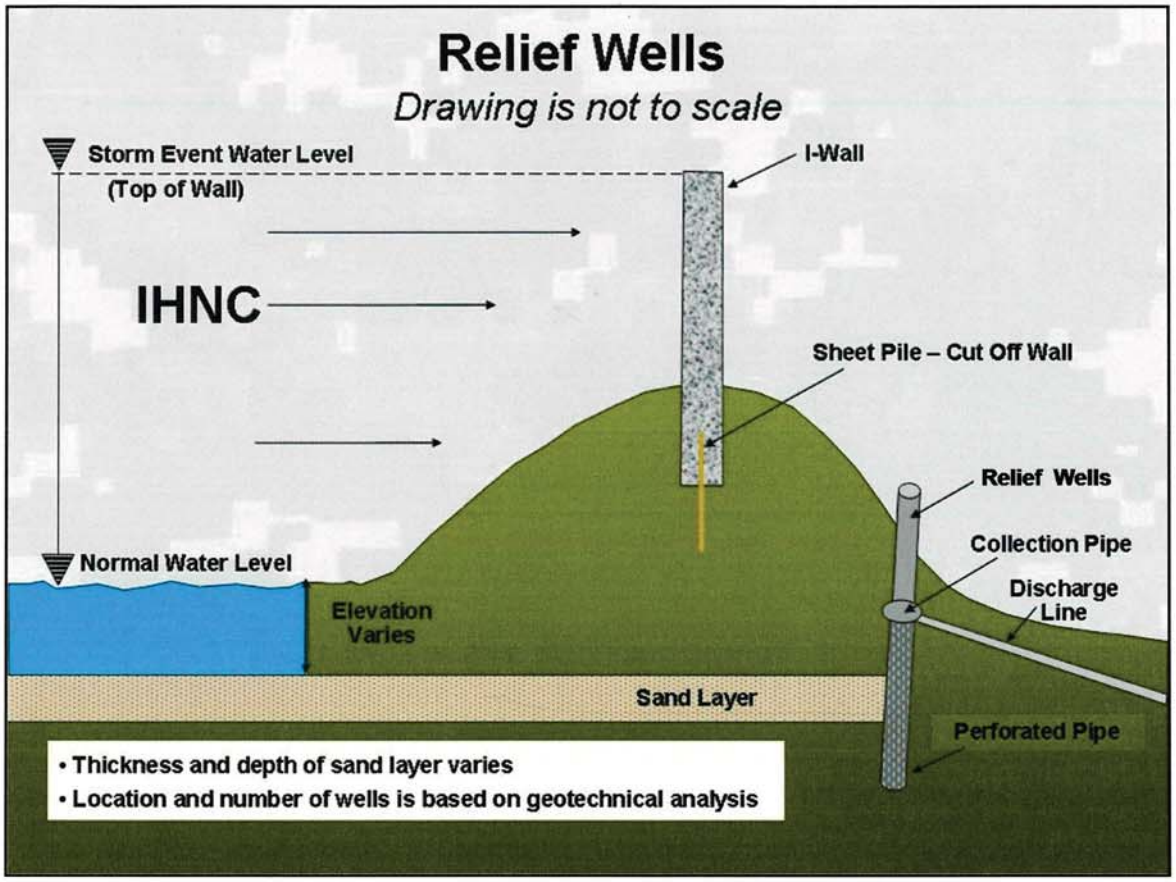

Figure 5. Conceptual Figure of Relief Wells

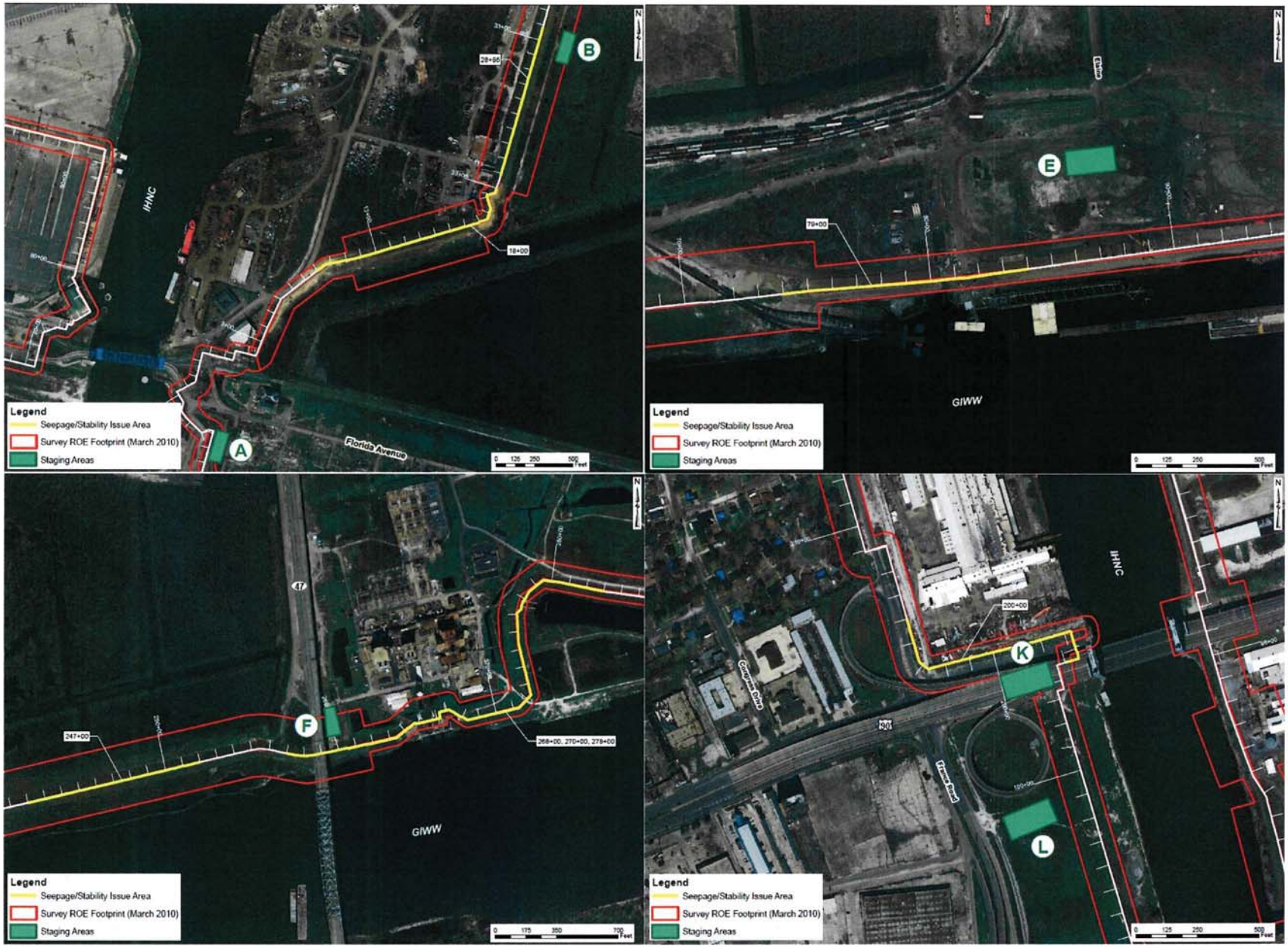

Figure 6. Temporary Staging Area Locations (1 of 2)

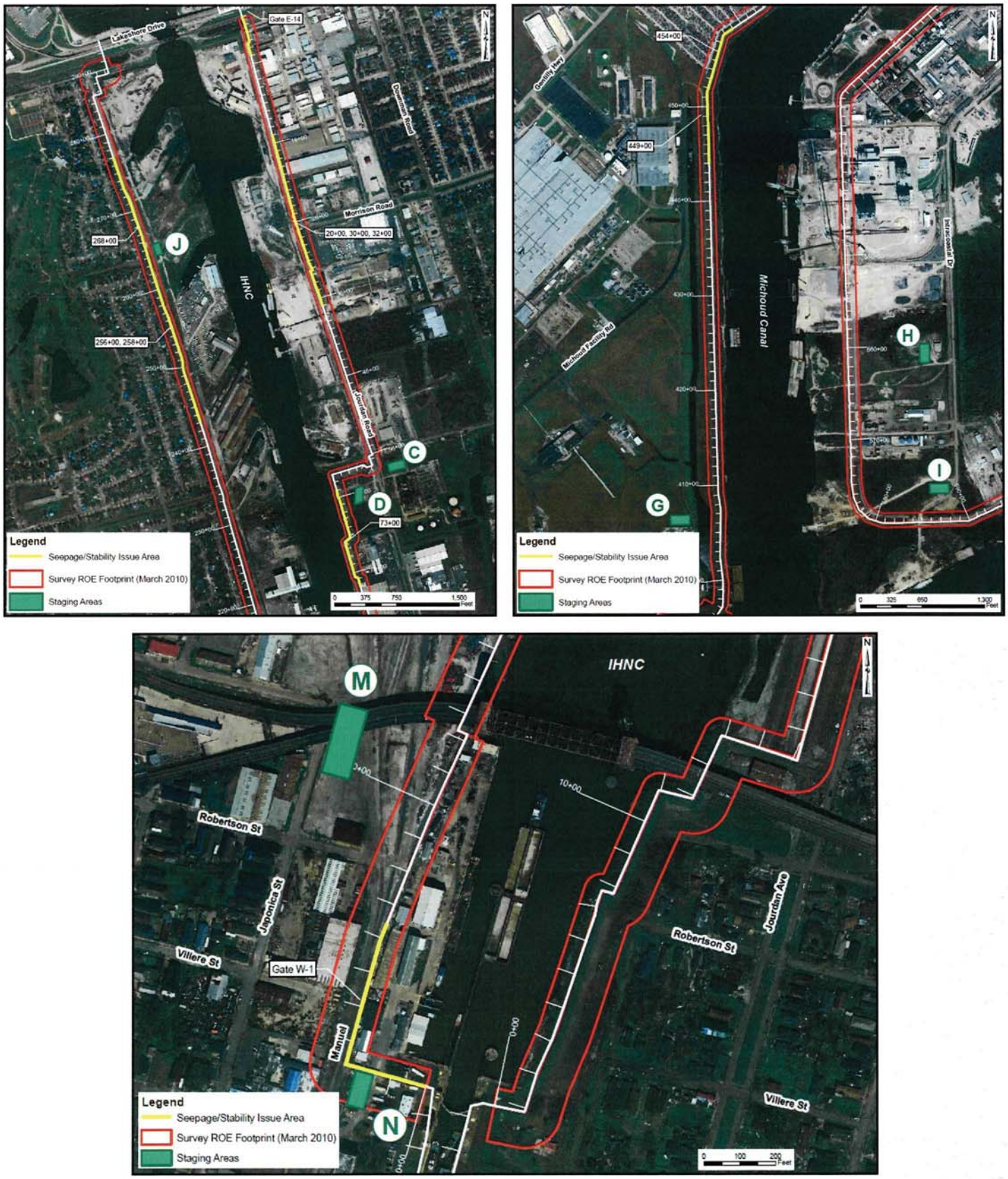

Figure 7. Temporary Staging Area Locations (2 of 2)

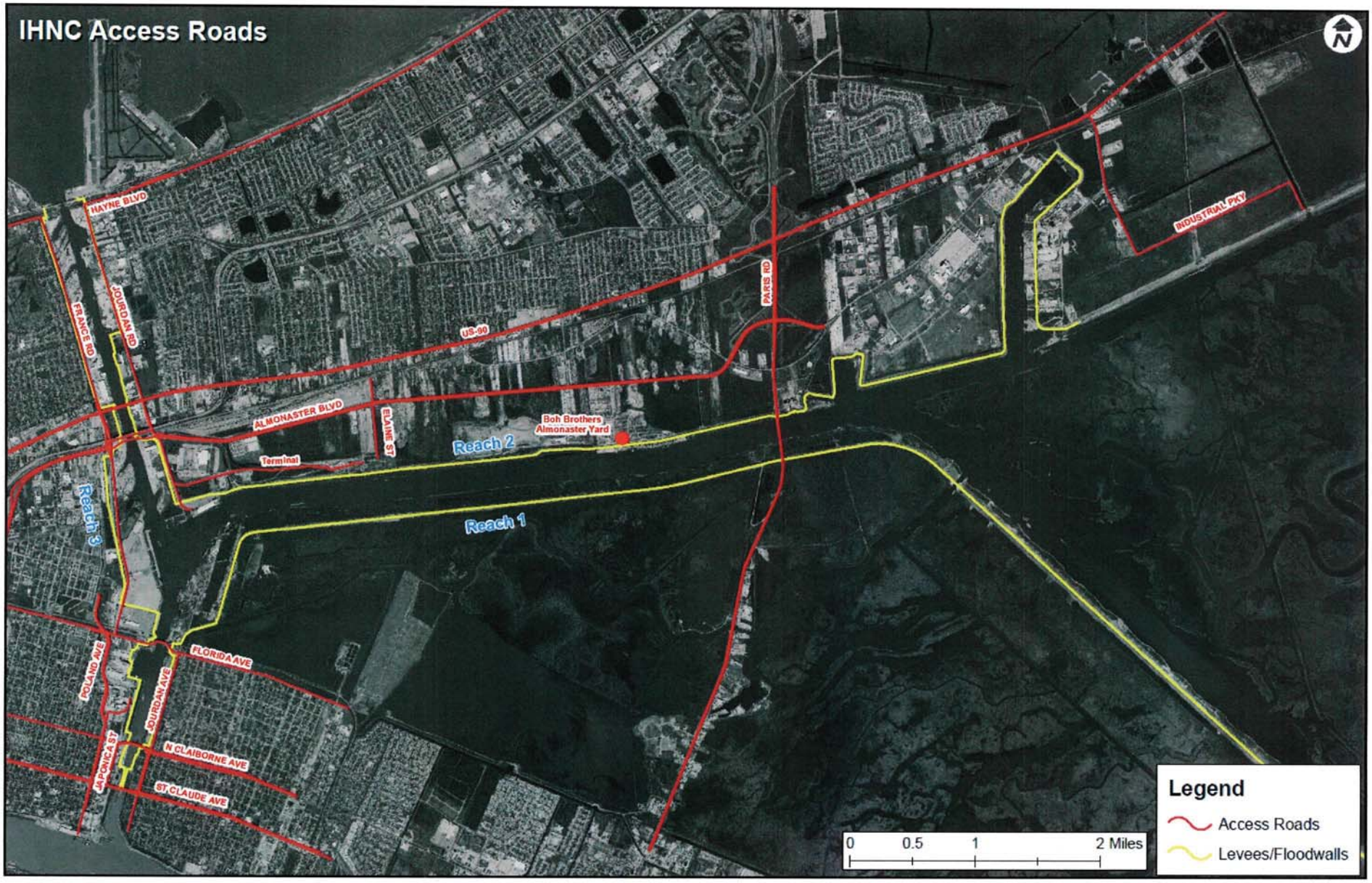

Figure 8. Map of Anticipated Project Access Roads and Properties

BOBBY JINDAL
GOVERNOR

ROBERT D. HARPER
SECRETARY

State of Louisiana

DEPARTMENT OF NATURAL RESOURCES
OFFICE OF COASTAL MANAGEMENT

July 23, 2010

Joan M. Exnicios
Chief, Environmental Planning & Compliance Branch
Dept. of the Army
New Orleans District, Corps of Engineers
P. O. Box 60267
New Orleans, LA 70160-0267

RE: **C20100126,** Coastal Zone Consistency
U. S. Army Corps of Engineers, New Orleans District
Direct Federal Action
Repair and restoration of levees and floodwalls in the INHC and GIWW corridor,
Orleans Parish, Louisiana

Dear Ms. Exnicios:

The above referenced project has been reviewed for consistency with the approved Louisiana Coastal Resource Program (LCRP) as required by Section 307 of the Coastal Zone Management Act of 1972, as amended. The project, as proposed in the application, is consistent with the LCRP. If you have any questions concerning this determination please contact Brian Marcks of the Consistency Section at (225)342-7939.

Sincerely yours,

Gregory J. DuCote
Administrator
Interagency Affairs/Field Services Division

GJD/JDH/bgm

CC: Lee Walker COE-NOD
Dave Butler, LDWF
Tim Killeen, IA/FSD
Wynecta Fisher, Orleans Parish

Post Office Box 44487 • Baton Rouge, Louisiana 70804-4487
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DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
P.O. BOX 60267
NEW ORLEANS, LOUISIANA 70160-0267

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LAFAYETTE, LA.

REPLY TO
ATTENTION OF

15 July 2010

Hurricane Protection Office
P.O. Box 60267
New Orleans, Louisiana 70160-0267
FAX: 504-862-2897

James Boggs
Field Supervisor
U.S. Fish and Wildlife Service
646 Cajundome Blvd - Suite 400
Lafayette, LA 70506

This project has been reviewed for effects to Federal trust resources under our jurisdiction and currently protected by the Endangered Species Act of 1973 (Act). The project, as proposed,
( ) Will have no effect on those resources
(✓) is not likely to adversely affect those resources.
This finding fulfills the requirements under Section 7(a)(2) of the Act.

Jul 27, 2010

Acting Supervisor **Date**
Louisiana Field Office
U.S. Fish and Wildlife Service

Dear Mr. Boggs:
Attn: David Walther

Provided for your review are the project description, project location map, and determination by the U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN) of the effect that the proposed action would have on threatened and endangered (T&E) species under USFWS jurisdiction. An Environmental Assessment #498 (EA #498) is currently being conducted to evaluate potential impacts from the proposed action, referred to as Inner Harbor Navigation Canal (IHNC) Levees and Floodwalls Restoration and Repair Project. The levees, floodwalls, and closure gate structures that were identified as needing repair are part of the Hurricane and Storm Damage Risk Reduction System (HSDRRS) for Orleans Parish, Louisiana. This draft EA #498 will be completed in the next few months and will be forwarded to you upon completion.

PROJECT DESCRIPTION

The proposed project consists of repairing and restoring portions of levees and floodwalls that did not meet the necessary factors of safety for stability, as dictated by current HSDRRS design guidelines (USACE 2008a). The levees and floodwalls within the project area provide a level of risk reduction that is currently below the 100-year level of risk reduction. Once construction of the Borgne Barrier (as described in IER #11 Tier 2 Borgne) and the Seabrook Gate (as described in IER #11 Tier 2 Pontchartrain) has been completed and these structures are operational, the subject reaches would become a redundant risk reduction feature that would be required to withstand water levels caused by overtopping of the primary risk reduction system. The design guidelines for the safety factors assume conditions are such that water levels within the IHNC are at least 12 feet (ft; North American Vertical Datum of 1988 [NAVD88]) or water levels are at the top of the levee or floodwall.

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL

To Laura Lee	From David Walther
Dept./Agency	Phone #
Fax #	Fax #

# of pages ▶ 2

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Net Embankment Increase/Concrete Slab: The net embankment increase requires adding fill on the protected side of the I-Wall so that SWE is not more than 4 feet above the protected side embankment. A concrete slab tying the cut-off wall to the I-wall may be used to increase the embankment if the 4 foot stick-up requirement cannot be met by adding fill alone. It also may require adding fill to the flood side of the wall to remediate the pile penetration concerns or both sides of the wall to remediate the D/H concerns. Construction of this alternative would require access on the protected side for equipment and material delivery. The increased embankment height is not expected to exceed 2 feet above the existing embankment.

CEMVN DETERMINATION OF IMPACTS TO T&E SPECIES

In conjunction with IER #5 (Permanent Protection System for the Outfall Canals Project on 17th Street, London Avenue and Orleans Avenue Canals) and IER #4 (Orleans East Bank, New Orleans Lakefront Levee, West of Inner Harbor Navigation Canal to Eastbank of 17th St. Canal), we believe that these projects, as planned, would not adversely affect any threatened or endangered species, and any impacts to the designated Gulf Sturgeon critical habitat would be temporary and will have been minimized to the maximum extent practicable. Please review this information and inform us whether or not you agree with our determination.

CONTACT INFORMATION

Please review the enclosed information and provide comments within 30 days of the date of this letter. The IER will not be signed until all environmental review and compliance requirements have been completed. A copy of the signed IER will be provided upon request.

Comments should be mailed to the attention of Ms. Laura Lee Wilkinson; U.S. Army Corps of Engineers; CEMVN-HPO; P.O. Box 60267; New Orleans, Louisiana 70160-0267. Comments may also be provided by E-Mail to Laura.L.Wilkinson@usace.army.mil. Ms. Wilkinson may be contacted at (504) 862-1212, if questions arise.

Sincerely,

Laura Lee Wilkinson

Laura Lee Wilkinson
Environmental Coordinator
Hurricane Protection Office
U.S. Army Corps of Engineers,
New Orleans District

This project has been reviewed for effects to Federal trust resources under our jurisdiction and currently protected by the Endangered Species Act of 1973 (Act). The project, as proposed,
( ) Will have no effect on those resources
(✓) is not likely to adversely affect these resources.
This finding fulfills the requirements under Section 7(a)(2) of the Act.

24 Jul 2010
Date

Acting Supervisor
Louisiana Field Office
U.S. Fish and Wildlife Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE
646 Cajundome Blvd.
Suite 400
Lafayette, Louisiana 70506
August 5, 2010

Colonel Edward R. Fleming
District Engineer
U.S. Army Corps of Engineers
Post Office Box 60267
New Orleans, Louisiana 70160-0267

Dear Colonel Fleming:

Please reference the U.S. Army Corps of Engineers (Corps) August 2, 2010, electronic correspondence providing supplemental information regarding the "Draft Individual Environmental Report Supplemental (IERS) Improved Protection on the Inner Harbor Navigation Canal (IHNC), Orleans and St. Bernard parishes, Louisiana, IERS # 11b Tier 2 Borgne." That IER is being prepared the under the approval of the Council on Environmental Quality (CEQ) to obtain compliance with the National Environmental Policy Act of 1969 (83 Stat. 852, as amended; 42 U.S.C. 4321- 4347) and is authorized Public Law 109-234, Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006 (Supplemental 4), and Public Law 110-28, U.S. Troop Readiness, Veterans' Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (5th Supplemental). Those laws authorized the Corps of Engineers (Corps) to upgrade two existing hurricane protection projects (i.e., Westbank and Vicinity of New Orleans and Lake Pontchartrain and Vicinity) in the Greater New Orleans area in southeast Louisiana to provide 100-year hurricane protection. This draft report provides planning objectives and recommendations to minimize project impacts to fish and wildlife resources resources.

The U.S. Fish and Wildlife Service (Service) provided a November 26, 2007, Draft Programmatic Fish and Wildlife Coordination Act (FWCA; 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) report that addresses the hurricane protection improvements authorized in Supplemental 4, an October 9, 2008, FWCA Report that provided recommendations specific to IER 11 Tier 2 Borgne, and an October 23, 2009, FWCA Report that provided recommendations specific to IER 11 Tier 2 Pontchartrain. This letter supplements our previous reports and addresses the proposed repair and restoration of portions of levees and floodwalls that do not meet the necessary factors of safety for stability as dictated by the current Corps design guidelines. This report does not constitute the report of the Secretary of the Interior as required by Section 2(b) of the FWCA. This report has been provided to the Louisiana Department of Wildlife and Fisheries and the National Marine Fisheries Service; their comments will be incorporated into our final report.

The study area is located within Orleans and St. Bernard Parishes within the Mississippi River

TAKE PRIDE IN AMERICA

Deltaic Plain of the Lower Mississippi River Ecosystem. Higher elevations occur on the natural levees of the Mississippi River and its distributaries. Developed lands are primarily associated with natural levees, but extensive wetlands have been leveed and drained to accommodate residential, commercial, and agricultural development. Federal, State, and local levees have been installed for flood protection purposes, often with negative effects on adjacent wetlands. The Mississippi River, the Gulf Intracoastal Waterway (GIWW), and Inner Harbor Navigation Canal (IHNC) are prominent landscape features, as are extensive oil and gas industry access channels and pipeline canals. Extensive wetlands and associated shallow open waters dominate the landscape outside the flood control levees, and Lakes Pontchartrain and Borgne are two major estuarine water bodies located within the study area.

Habitat types in the study area include forested wetlands (i.e., bottomland hardwoods in varying succesional stages and/or swamps), non-wet bottomland hardwoods, marsh, open water, and developed areas. Due to development and a forced-drainage system, the hydrology of most of the forested habitat within the levee system has been altered. The forced-drainage system has been in operation for many years, and subsidence is evident throughout the areas enclosed by levees.

As previously mentioned, the Service has provided FWCA Reports for the authorized hurricane protection project. Those reports contain a thorough discussion of the significant fish and wildlife resources (including habitats) that occur within the study area. For brevity, that discussion is incorporated by reference herein but the following information is provided to supplement the previously mentioned reports and provide specific recommendations regarding the proposed change in plans.

To ensure a 100-year level of protection the subject reaches of the existing levees and floodwalls along the IHNC will be repaired and restored to become a redundant risk reduction feature associated with overtopping of the primary risk reduction system (i.e., the Borgne Barrier and Seabrook Gate). Several methods of repair and restoration are proposed along the three primary reaches which include numerous deficient segments of levee and floodwalls. Construction methods include deep soil mixing, constructing berm on the protected-side of the existing system to increase stability, constructing a concrete buttress wall in addition to the existing I-wall, constructing a structural concrete base slab perpendicular to the adjacent floodwall on the protected side, and constructing relief wells. Approximately 62.5 acres of existing right-of-way (ROW) could potentially be impacted by construction of the proposed action. Fourteen staging areas, primarily located in upland areas not within the existing ROW, would be required for the proposed action and would temporarily impact approximately 5.4 acres. Existing levee ROWs currently vegetated with grass and provide minimal habitat for fish and wildlife resources.

SERVICE POSITION AND RECOMMENDATIONS

Because the proposed project do not require mitigation and will not impact high quality fish and wildlife habitat, the Service still does not object to the construction of the proposed project but believes that the recommendations provided in our previous FWCA Reports continue to remain valid and should be incorporated into future project planning and implementation.

Should you or your staff have any questions regarding this letter and our attached report, please contact Angela Trahan (337/291-3137) of this office.

Sincerely,

James F. Boggs
Supervisor
Louisiana Field Office

cc: NMFS, Baton Rouge, LA
EPA, Dallas, TX
LDWF, Baton Rouge, LA
LDNR, CMD, Baton Rouge, LA
OCPR, Baton Rouge, LA

SCOTT ANGELLE
LIEUTENANT GOVERNOR

State of Louisiana

OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT
DIVISION OF HISTORIC PRESERVATION

PAM BREAUX
SECRETARY

September 13, 2010

Ms. Joan M. Exnicios
Chief, New Orleans Environmental Branch
New Orleans District, U.S. Army Corps of Engineers
P.O. Box 6267
New Orleans, LA 70160-0267

Re: Determination of Effect
Proposed Repair and Restoration of Levees and Floodwalls in
Inner Harbor Navigation Canal\Gulf Intracoastal Waterway Corridor
New Orleans, Orleans Parish, LA

Dear Ms. Exnicios:

We have completed our review of the referenced levee-floodwall repair and restoration project and it is our opinion that it would have no adverse effect on any historic property.

If you have any questions, please contact Mike Varnado in the Division of Historic Preservation at (225) 219-4596.

Sincerely,

Phil Boggan
Deputy State Historic Preservation Officer

PB:MV:s

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