The following short form 404(b)(1) evaluation follows the format designed by the Office of the Chief of Engineers, (OCE). As a measure to avoid unnecessary paperwork and to streamline regulation procedures while fulfilling the spirit and intent of environmental statutes, New Orleans District is using this format for all proposed project elements requiring 404 evaluation, but involving no significant adverse impacts.

PROJECT TITLE. IER #12, GIWW, Harvey, and Algiers Levees and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes, Louisiana

PROJECT DESCRIPTION. The U.S. Army Corps of Engineers (USACE), Mississippi Valley Division, New Orleans District (CEMVN), has prepared Individual Environmental Report # 12 (IER # 12) to evaluate the potential impacts associated with the proposed construction and upgrades of levees, floodwalls, floodgates, and pumping station(s) to achieve the authorized 100-year level of risk reduction for the this segment of the West Bank and Vicinity of the Mississippi River (WBV) Hurricane and Storm Damage Risk Reduction System (HSDRRS). The proposed action is located in Jefferson, Orleans, and Plaquemines Parishes in the state of Louisiana (figure 1).

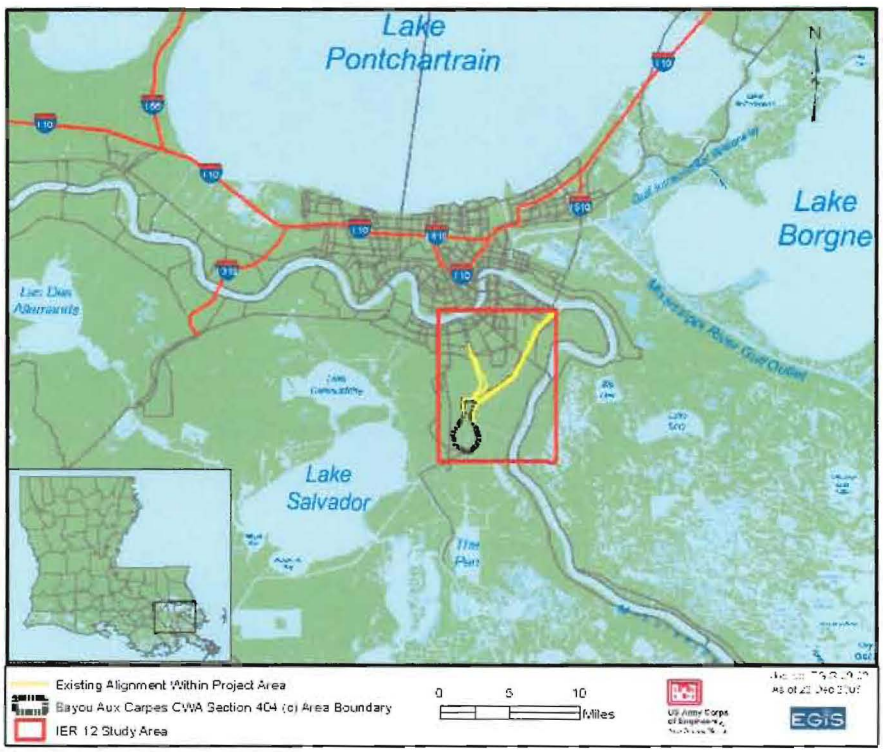

Figure 1 - IER #12 Study Area

The Proposed Action would result in the alteration of the original system alignment and the construction of a streamlined surge barrier. The alternative would consist of constructing approximately 3 miles of levee and floodwall that would reduce the primary line of defense by 38 percent. By removing 25 miles of existing parallel protection from the primary line of defense, this more streamlined surge barrier reduces the number of potential failure points in the system, increases quality control and the certainty of subsurface conditions during construction, and minimizes human impacts since the footprint of the existing levees system would not be widened to 100-year level of risk reduction.

Construction of this proposed action would not only provide the most system reliability and risk reduction for this segment of WBV, but would bring into protection those industrial areas along the Harvey Canal that are currently outside of the risk reduction system. In addition, the existing protection would become a secondary line of protection during a storm event.

The proposed action for IER # 12 would raise and/or construct levees, floodwalls, and other structures to meet the 100-year level of risk reduction for the Harvey -Westwego, Gretna – Algiers, and Belle Chasse areas (figure 2). Typical earthen materials used for levee construction consist of low organic clays, fertilizer, seed, mulch, and water, reinforced high strength geotextile fabric if required, low strength geotextile filter fabric for silt fences, plastic or steel hog wire for safety fences, steel or wood posts for silt and safety fences, crushed stone for surfacing and riprap for wave erosion prevention. The new levee and floodwall designs in IER #12 would require approximately 3,125,000 cubic yards of earthen material and 310,000 tons of stone to construct (these quantities may change based on a revised alignment and hydraulic physical modeling which may require more stone). The proposed action also includes providing a 100-year level of risk reduction fronting protection for pump stations and backflow prevention.

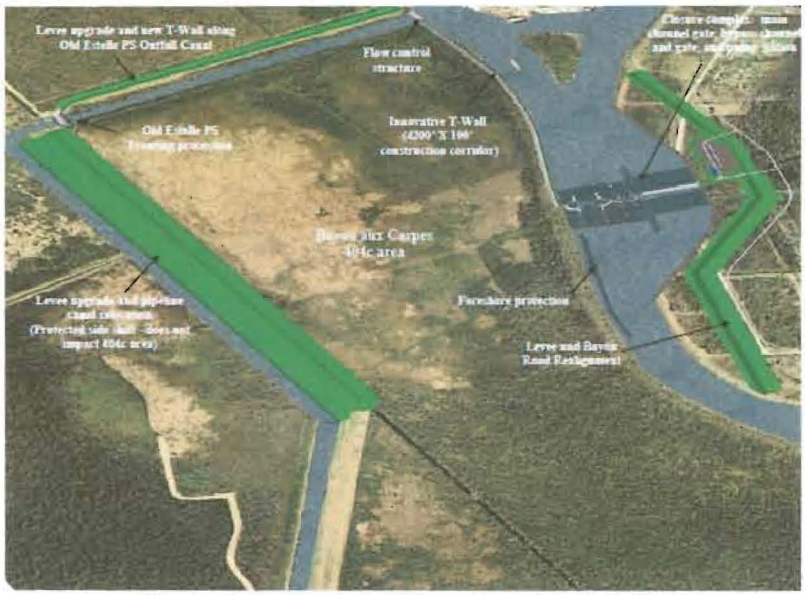

Figure 2 - Proposed Action Conceptual Model

For clarity, the proposed action is described from west to east and the entire alignment has been divided into "western", "northern", and "eastern" sections (figure 3). The western section of this alignment extends north from approximately 6,000 ft northeast of the V-line levee intersection with Highway 45 in Jefferson Parish to Old Estelle Pump Station (PS). This section includes a 200 ft wide by 15 ft deep interior drainage canal on the protected side and the Bayou aux Carpes CWA Section 404(c) area on the flood side. The proposed action for this section consists of an earthen levee enlargement with a protected side shift, partially outside of existing rights-of-way (ROW). The centerline of the new levee would be shifted 58 ft to the protected side of the centerline of the existing levee. This 5,900 ft earthen levee stretch would be raised to 100-year level of risk reduction, with a design elevation of approximately El. 14 ft. An additional 125 ft of permanent ROW into a Bottomland Hardwood (BLH) area would be required along the V-line levee to the Old Estelle PS. The proposed action would require the relocation of the existing drainage canal 200 ft to the protected side. The additional ROW required to upgrade the levee and relocate the drainage canal would be 17 acres. The levee would tie into the fronting protection at Old Estelle PS. All of the construction work would occur on the protected side of the levee and would not impact the Bayou aux Carpes CWA Section 404(c) area.

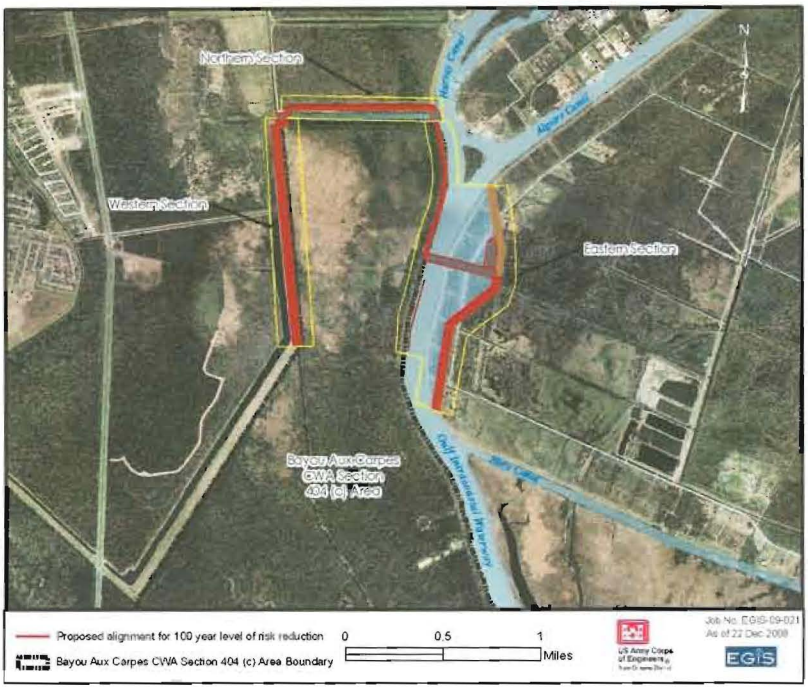

Figure 3 - Proposed Action Alignment Divided into Sections

The levee work may require geotextile fabric and/or deep soil mixing to strengthen the levee foundation. The deep soil mixing method involves the blending of a binder such as lime, cement, and slag into the soil through a hollow stem auger and mixing tool arrangement to produce round "columns" of treated soil. Applications for this method include stability and support, seepage cutoff, and seismic retrofit. This method has proven to be a viable method to effectively improve the competency of soils in Southeast Louisiana. Strengthening of the foundation can also be achieved by installing geotextile fabric in the foundation of the levee.

The northern section of this alignment extends east from Old Estelle PS to the Harvey Canal. This section includes BLH habitat on the protected side and the Old Estelle Pump Station Outfall Canal on the flood side. Fronting protection would be built to the 100-year level of risk reduction at the Old Estelle PS and would tie into the levee on each side of the pump station. A T-wall would be constructed within existing ROW on the protected side of the existing earthen levee that runs along the northern bank of Old Estelle Outfall Canal. The T-wall would have a design elevation of El. 14 to El.16 ft and would be 3,700 ft in length. This T-wall would tie into a new flow control structure at the intersection of the Old Estelle Outfall Canal and the Harvey Canal. The flow control structure would be constructed at El. 16ft, and would cross the Old Estelle Outfall Canal and tie into the eastern section of this alignment (the Bayou aux Carpes CWA Section 404(c) T-wall). This flow control structure would be required to control the discharge from the Old Estelle pumping station into the GIWW. A benefit of this flow control structure would be the potential to augment the Bayou aux Carpes CWA Section 404(c) wetland area by actively managing the freshwater discharge from the Old Estelle PS. The USACE in cooperation with the EPA, the National Park Service (NPS), the U.S. Fish and Wildlife Service (USFWS), and other Federal and state resource agencies is conducting studies that are investigating the engineered gapping of the south bank of the Old Estelle Outfall Canal. These gaps in the outfall canal would allow freshwater from the pumping station to be directed into the Bayou aux Carpes CWA Section 404(c) area if determined to be beneficial to the wetland. The freshwater would be directed to the GIWW if it was determined not to be beneficial. Studies are ongoing to optimize the use of this feature to provide maximum benefit to the Bayou aux Carpes CWA Section 404(c) wetlands. All of the construction work would occur on the protected side of the levee and would not impact the Bayou aux Carpes CWA Section 404(c) area. Construction of the northern section would be expected to take 2 years.

The eastern section of this alignment extends south from the flow control structure within the Old Estelle Outfall Canal, along the western bank of the GIWW within the Bayou aux Carpes CWA Section 404(c) area, crosses the GIWW and ends just north of Hero Canal. This section includes the GIWW channel and a BLH habitat on the

GIWW east bank on the protected side of the existing HSDRRS, and a portion of the Bayou aux Carpes CWA Section 404(c) area on the flood side. A T-wall constructed north to south along the western bank of the GIWW within the Bayou aux Carpes CWA Section 404(c) area would tie into the flow control structure at the end of the Old Estelle Outfall Canal and at the southern end of the wall would tie into the closure complex and pump station complex that crosses the GIWW. This T-wall would be constructed so that an approximately 100 ft by 4,200 ft, 9.6 acre, corridor of the Bayou aux Carpes CWA Section 404(c) area would be impacted by the construction of the floodwall. Upon the granting of a modification to the final Bayou aux Carpes determination by the EPA, the USACE would obtain the new ROW (up to 9.6 acres) required to construct the innovative T-wall within the Bayou aux Carpes CWA Section 404(c) area.

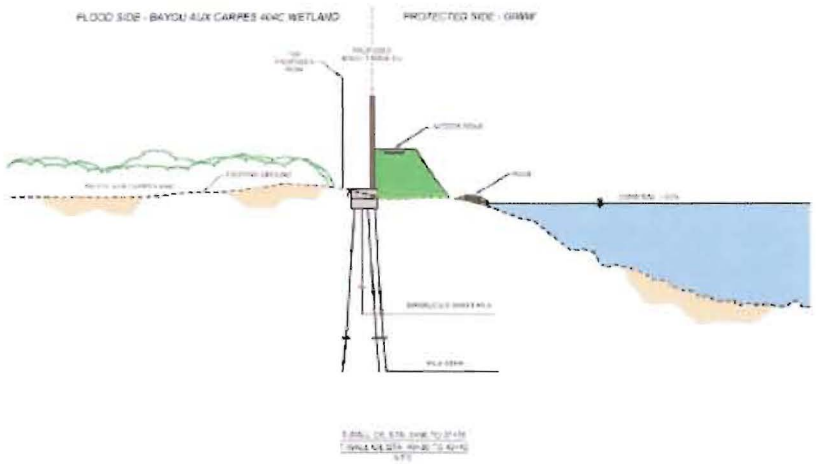

Figure 4 - Innovative T-Wall

In order to minimize impacts to these unique wetlands and confine construction impacts within that corridor, an innovative T-wall design would be used (figure 4). This innovative T-wall design was needed to minimize the footprint of the structure in the Bayou aux Carpes CWA Section 404(c) area. In addition, because the GIWW is a Federally maintained navigation channel, a protective berm would be constructed on the protected side of the floodwall, the GIWW channel side. This berm would protect the wall from barge impacts, provide concrete scour protection, and serve as a maintenance access road. Because of necessary channel dredging and pile driving activities, the Enterprise Pipeline would be relocated. In order to avoid impacts to the Bayou aux Carpes CWA Section 404(c) area the existing pipeline would be relocated utilizing modern directional drilling technologies that would pass under the 404c area. The pipeline relocation would not only avoid direct impacts to the 404c area (1 acre of wetlands), but would also minimize future impacts since the new, more modern design would require less intrusive operations and maintenance than the existing pipeline.

In the GIWW adjacent to the Bayou aux Carpes CWA Section 404(c) area, 2,000 linear feet (LF) of foreshore dike protection using 650 lb stone would be constructed to prevent impacts (i.e., scouring, bank erosion, etc.) from occurring within the 404c area due to the discharge from the 20,000 cfs pump station. This foreshore dike protection would be constructed within the GIWW adjacent to but not within the Bayou aux Carpes CWA Section 404(c) area. Foreshore protection would not alter existing hydrologic conditions within the Bayou aux Carpes CWA Section 404(c) area.

The gate(s) and pump station described in the eastern section are referred to throughout this report as the "closure complex", which is a component of the proposed action referred to as the "GIWW West Closure Complex" or WCC. Features of the closure complex that would cross the GIWW would include a primary 150-ft to 300-ft navigation gate and a secondary 75-ft to 150-ft gate built to a design elevation of 16 ft. The closure complex would tie into a

floodwall to the west and flood protection levee to the east. The design of the closure complex is being done in collaboration with representatives from the navigation industry and the US Coast Guard to ensure that the safest and most reliable system would be constructed. One of the primary design criteria of these gates is that the structure is large enough to meet the current flow rates in the channel. It would also be necessary to construct a permanent bypass channel. A 20,000 cfs pump station would be constructed, and would provide positive backflow prevention. A new levee would be constructed further eastward on what is currently the protected side. The levee work may require geotextile fabric and/or deep soil mixing to strengthen the levee foundation. Bayou Road would be realigned to provide access around the new levee on the protected side. Four million cubic yards of material would be removed during construction of the eastern floodwall, closure complex, levee, and road realignment. After being evaluated for suitability this material would be used as borrow for the HSDRRS project. The material not used for borrow would be disposed of in the Walker Road borrow sites. The overburden material (i.e. roots, stumps, tress, etc.) would be mulched and used on site or hauled away to a landfill. Any road material (i.e. rock and earthen material) would be used to construct the new road. The construction of this closure complex, levee, and road realignment would require a total of 240 acres of additional ROW to implement the construction work.

Detention Basin Improvements

The WCC would cause water to be impounded in the Harvey and Algiers Canals, when closed during a storm event, creating a detention basin. The proposed action would provide 100-year level of risk reduction south of the confluence of the Algiers and Harvey Canals in lieu of parallel protection along the Harvey and Algiers Canals. Currently, there are over 25 miles of levees, floodwalls, gate structures, and 9 pump stations along the Harvey and Algiers Canals. The proposed action includes the use of Harvey and Algiers Canal as a detention basin. This would involve a combination of improvements and dredging activities along the Harvey Canal and Algiers Canal. Improvements would consist of building fronting protection and providing positive backflow prevention at pump stations, capping or replacing floodwalls, and upgrading levees along the detention basin.

Based on the results of hydraulic models for the GIWW WCC, a detention basin still water level of maximum elevation of 4 ft in Harvey Canal and 5.8 ft in Algiers Canal would provide protection along these canals. Dredging of the Algiers Canal would be required from the Belle Chasse Tunnel South to the Hero Cutoff to facilitate efficient drainage flows in the canal. A top of protection design elevation of 8.5 ft in compliance with HSDDRS standards in the retention basin would still require work along the Harvey and Algiers Canals. However, the work would be considerably less than what would be required if the retention basin stage were increased to the 100-year level of risk reduction. All work would be performed within existing ROW unless otherwise noted.

Approximately 700,000 cubic yards would be excavated from the Algiers Canal. The frequency of maintenance dredging would exceed 25 years. Two disposal alternatives have been discussed with the Interagency Team (figure 5). The preferred alternative is the disposal of the material into the Jean Lafitte National Historic Park and Preserve (JLNHPP) Lake Salvador "Geocrib," and the alternative use of the material is placement of the material in the Walker Road borrow sites. The alternative of placement of dredged material in the Walker Road borrow sites would be done only as a convenience to the government if the preferred option is not practicable. The placement of dredged material in the Walker Road borrow sites would not be considered backfilling of those sites. If dredged material is placed in the Walker Road borrow sites, the quantity of the material would be insufficient to refill those sites. Disposal of the material in either location would be considered a project feature. The first option of placing the dredged material into the JLNHPP Lake Salvador Geocrib is preferred because it is a beneficial use site and any wetlands created with this material could be counted as mitigation for the HSDRRS projects.

Provided the material is determined to not be contaminated, the material could be excavated via either:
a) hydraulic cutter head dredge and transported as a slurry to a disposal site(s) via pipeline, or
b) via mechanical dredge (i.e. barge mounted dragline or backhoe) and placed in barges and transported to site, and either removed from the barges via a hydraulic pump and transported to the site via pipeline, or offloaded from barges, placed within trucks, and hauled to disposal site where it would then be mechanically offloaded into the disposal site.

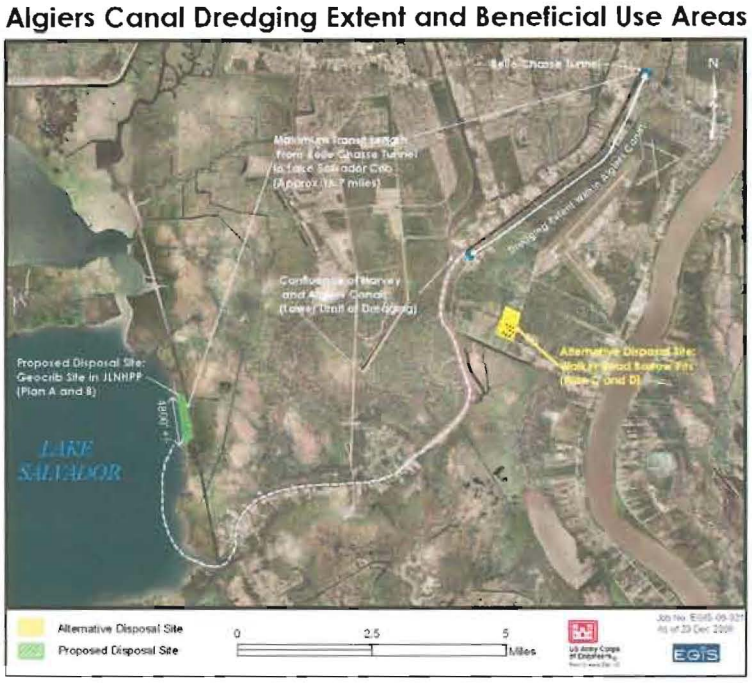

Figure 5 - Algiers Canal Dredging Extent and Beneficial Use Areas

Other Actions

Armoring

Armoring may be required at a number of locations throughout the HSDRRS. These locations may include: transition points (where levees transition into any hardened features such as other levees, floodwalls, and pump stations), floodwall protected side slopes, pipeline crossings, and earthen levees that are exposed to excessive wave overtopping during a 500-year hurricane event. For the proposed action, nearly all of these armoring areas would occur along the GIWW. However, the specific locations have not yet been determined. Armoring types vary, but the following are the most common, from the most resistant, downward:

- ACB – Articulated concrete blocks.
- ACB/TRM – Articulated concrete blocks/Turf reinforced mattress: the hydraulic parameters and physical conditions are such that small modifications could allow a reduction to TRM.
- TRM – Turf reinforced mattress.
- TRM/Grass - The hydraulic parameters and physical conditions are such that small modifications could allow a reduction to grass.
- Well maintained grass cover.

Utility Relocations

As needed, utilities would be relocated to cross the project arca in accordance with existing standards. Disruptions of service would be kept to a minimum. Relocations would be conducted in order to avoid impacts to the wetland areas, and the Enterprise Pipeline would be directionally drilled underneath the 404c area to avoid impacts to that significant resource. There could be minor impacts to wetlands in the areas where the directional drilling are staged from and to.

1. Review of Compliance (§230.10 (a)-(d)).

	Preliminary[1]		Final[2]	
A review of this project indicates that:				
a. The discharge represents the least environmentally damaging practicable alternative and if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose (if no, see section 2 and information gathered for environmental assessment alternative);	YES	NO*	YES	NO
b. The activity does not appear to: (1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the Clean Water Act; (2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and (3) violate requirements of any Federally designated marine sanctuary (if no, see section 2b and check responses from resource and water quality certifying agencies);	FOR (1) ONLY YES	NO*	YES	NO
c. The activity will not cause or contribute to significant degradation of waters of the United States including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, esthetic, and economic values (if no, see section 2);	YES	NO*	YES	NO
d. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem (if no, see section 5).	YES	NO*	YES	NO

2. Technical Evaluation Factors (Subparts C-F).	N/A	Not Significant	Significant*
a. Physical and Chemical Characteristics of the Aquatic Ecosystem (Subpart C).			
(1) Substrate impacts.			X
(2) Suspended particulates/turbidity impacts.		X	
(3) Water column impacts.		X	
(4) Alteration of current patterns and water circulation.		X	
(5) Alteration of normal water fluctuations/ hydroperiod.		X	
(6) Alteration of salinity gradients.		X	
b. Biological Characteristics of the Aquatic Ecosystem (Subpart D).			
(1) Effect on threatened/endangered species and their habitat.	X		
(2) Effect on the aquatic food web.		X	
(3) Effect on other wildlife (mammals, birds, reptiles, and amphibians).		X	
c. Special Aquatic Sites (Subpart E).			
(1) Sanctuaries and refuges.		X	
(2) Wetlands.			X
(3) Mud flats.	X		
(4) Vegetated shallows.	X		
(5) Coral reefs.	X		
(6) Riffle and pool complexes.	X		
d. Human Use Characteristics (Subpart F).			
(1) Effects on municipal and private water supplies.	X		
(2) Recreational and commercial fisheries impacts.		X	
(3) Effects on water-related recreation.		X	
(4) Esthetic impacts.		X	
(5) Effects on parks, national and historical monuments, national seashores, wilderness areas, research sites, and similar preserves.		X	

Remarks. Where a check is placed under the significant category, the preparer has attached explanation.

For 2.a.1 Substrate Impacts, See the attached 29 January 2009 Hydrologic and Hydraulic Memo.

For 2.c.(2) Special Aquatic Sites Wetlands
A complete wetland delineation has not been conducted along the proposed route, so wetland impacts have been estimated by reviewing aerial photographs, review of photographs and notes taken during site inspections, and project area descriptions prepared for the Final Individual Environmental Report 12. The proposed action will impact approximately 329 acres of wetlands, including swamp and bottom land hardwood habitat. Approximately 9.6 acres of these wetland impacts will occur within the Bayou aux Carpes CWA Section 404(c) area. After working closely with the EPA Region 6, National Park Service and other Federal and state resource agencies the CEMVN developed the WCC alternative, which was determined to be the best engineering solution, least environmentally damaging alternative. On May 28, 2009 the EPA issued a modification to the 1985 Bayou aux Carpes Final Determination that

provides for the use of up to 9.6 acres of the Bayou aux Carpes 404(c) area for construction of the Greater New Orleans HSDRRS.

3. Evaluation of Dredged or Fill Material (Subpart G).[3]

a. The following information has been considered in evaluating the biological availability of possible contaminants in dredged or fill material.

(1) Physical characteristics	X
(2) Hydrography in relation to known or anticipated sources of contaminants	X
(3) Results from previous testing of the material or similar material in the vicinity of the project	X
(4) Known, significant sources of persistent pesticides from land runoff or percolation	
(5) Spill records for petroleum products or designated (Section 311 of CWA) hazardous substances	X
(6) Other public records of significant introduction of contaminants from industries, municipalities, or other sources	X
(7) Known existence of substantial material deposits of substances which could be released in harmful quantities to the aquatic environment by man-induced discharge activities	X
(8) Other sources (specify)	

Appropriate references: See attached memo

b. An evaluation of the appropriate information in 3a above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or the material meets the testing exclusion criteria.

YES NO*

4. Disposal Site Delineation (§230.11(f)).

a. The following factors, as appropriate, have been considered in evaluating the disposal site.

(1) Depth of water at disposal site	X
(2) Current velocity, direction, and variability at disposal site	X
(3) Degree of turbulence	X
(4) Water column stratification	X
(5) Discharge vessel speed and direction	
(6) Rate of discharge	X
(7) Dredged material characteristics (constituents, amount, and type of material, settling velocities)	X
(8) Number of discharges per unit of time	
(9) Other factors affecting rates and patterns of mixing (specify)	

Appropriate references: See attached memo

b. An evaluation of the appropriate factors in 4a above indicates that the disposal site and/or size of mixing zone are acceptable.

YES	NO*

5. Actions to Minimize Adverse Effects (Subpart H).

All appropriate and practicable steps have been taken, through application of the recommendations of §230.70-230.77 to ensure minimal adverse effects of the proposed discharge.

YES	NO*

Actions taken: See attached memo

6. Factual Determination (§230.11).

A review of appropriate information as identified in items 2-5 above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge as related to:

a. Physical substrate at the disposal site (review sections 2a, 3, 4, and 5 above).	YES	NO*
b. Water circulation, fluctuation and salinity (review sections 2a, 3, 4, and 5).	YES	NO*
c. Suspended particulates/turbidity (review sections 2a, 3, 4, and 5)	YES	NO*
d. Contaminant availability (review sections 2a, 3, and 4).	YES	NO*
e. Aquatic ecosystem structure and function (review sections 2b and c, 3, and 5).	YES	NO*
f. Disposal site (review sections 2, 4, and 5).	YES	NO*
g. Cumulative impact on the aquatic ecosystem.	YES	NO*
h. Secondary impacts on the aquatic ecosystem.	YES	NO*

*A negative, significant, or unknown response indicates that the project may not be in compliance with the Section 404(b)(1) Guidelines.

[1]Negative responses to three or more of the compliance criteria at this stage indicates that the proposed projects may not be evaluated using this "short form procedure". Care should be used in assessing pertinent portions of the technical information of items 2a-d, before completing the final review of compliance.
[2]Negative responses to one of the compliance criteria at this stage indicates that the proposed project does not comply with the guidelines. If the economics of navigation and anchorage of Section 404(b)(1) are to be evaluated in the decision-making process, the "short form" evaluation process is inappropriate.
[3]If the dredged or fill material cannot be excluded from individual testing, the "short form" evaluation process is inappropriate.

7. Evaluation Responsibility.

a. This evaluation was prepared by:

Name: Eric Glisch
Position: Environmental Engineer
Organization: U.S. Army Corps of Engineers, New Orleans District

Date: 1/05/09

Name: Getrisc Coulson
Position: Environmental Resource Specialist
Organization: CEMVN PM-RS
Date: 12/28/08

b. This evaluation was reviewed by:
Name: Rodney Mach
Position: Environmental Engineer
Organization: CEMVN ED-H
Date: 1/05/09

Name: Gib Owen
Position: Chief, Ecological Planning and Restoration Section
Organization: CEMVN PM-RS
Date: 2/16/09

8. Findings.

a. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines ..... **X**___

b. The proposed disposal site for discharge of dredged or fill material complies with the Section 404(b)(1) guidelines with the inclusion of the following conditions ..... **X**___

c. The proposed disposal site for discharge of dredged or fill material does not comply with the Section 404(b)(1) guidelines for the following reason(s):

(1) There is a less damaging practicable alternative ..... ___
(2) The proposed discharge will result in significant degradation of the aquatic ecosystem ..... ___
(3) The proposed discharge does not include all practicable and appropriate measures to minimize potential harm to the aquatic ecosystem ..... ___

Final approval of this 404(b)(1) evaluation is hereby granted for all work described in this document and in the final IER 12 document as discussed in the IER 12 Decision Record approved by the New Orleans District Engineer, Colonel Alvin B. Lee on February 18, 2009. On May 28, 2009 the EPA issued a modification to the 1985 Bayou aux Carpes Final Determination that provides for the use of up to 9.6 acres of the Bayou aux Carpes 404(c) area for construction of the Greater New Orleans HSDRRS

Date: 28 May 09

Gib Owen
for Richard E. Bivc
as Actg
Chief, Environmental Planning and Compliance Branch

US Army Corps of Engineers,
New Orleans District

To: File

From: Eric Glisch, CEMVN-ED-HN

CC:

Date: 29 January 2009

Re: Individual Environmental Report #12, Gulf Intracoastal Waterway, Harvey, and Algiers Levees and Floodwalls, Jefferson, Orleans, and Plaquemines Parishes, Louisiana

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A short form 404(b)(1) evaluation of the Federal actions for Individual Environmental Report (IER) #12 was performed by ED-HN for water quality impacts. The following summarizes the review process and comments noted:

I. Subpart B – Review of Compliance

a. *230.10 (b) (1)*: After consideration of disposal site dilution and dispersion, there are no expected violations of State water quality from the proposed Federal actions.

II. Subpart C – Physical and Chemical Characteristics of the Aquatic Ecosystem

a. *230.20 - Substrate Impacts*: Placement of fill material in conjunction with the Proposed Action and alternatives would principally impact wetland areas, and in many cases would result in the conversion of wetlands to terrestrial habitat. Table 2 on the following page displays the impacts on wetlands as a result of each project feature included in the Proposed Action. Several of these project features require the placement of fill material within wetland areas.

Table 2 – Wetland Impacts Delineated by Project Feature

Project Feature	Wetland Impacts (Acres)	Habitat Type	Description
Western Levee	27.5	Altered BLH*	V-line levee upgrade and Canal Relocation
Northern Floodwall	2.7	Swamp	Old Estelle Pumping Station Improvements , Estelle Outfall Canal Floodwall and Flow Control Structure
	3.1	Alt. BLH	
Eastern Floodwall	9.6**	BLH / Swamp	Innovative T-Wall within Bayou aux Carpes CWA Section 404(c) area
	Unknown	BLH/Swamp	Project Feature Augmentations
Closure Complex and Levee and Road Realignment	134	Alt. BLH	Gates, Pump Station, and Levee and Road Realignment
	8.3	Swamp	Gates, Pump Station, and Levee and Road Realignment
	63.6	N/A	Staging Areas - Pasture
Detention Basin Improvements	34.8	Alt BLH	Harvey Canal West Bank Levees
	9.7	Swamp	Harvey Canal West Bank Levees
	20.5	Alt BLH	Algiers Canal West Bank
	3.8	Swamp	Algiers Canal West Bank
	24.9	Alt BLH	Algiers Canal East Bank
	43	Swamp	Algiers Canal East Bank
TOTALS (appx. 329 acres)	251.7	Altered BLH	177.3 AAHUs***
	2.3	BLH	1.9 AAHUs (in Bayou aux Carpes CWA Section 404(c) area)
	74.9	Swamp	38.5 AAHUs (7.3 acres/4.2 AAHUs in Bayou aux Carpes CWA Section 404(c) area)

**Hydrologically Altered bottomland hardwood forest (BLH)*

*** The U.S. Army Corps of Engineers has calculated that the 100 ft by 4200 ft corridor is 9.6 acres, which is different than the most recent U.S. Fish and Wildlife Services Calculation. The U.S. Army Corps of Engineers' calculation is used consistently in IER # 12 as the correct number of acres impacted in the Bayou aux Carpes CWA Section 404(c) area.*

****AAHU – average annual habitat unit. A habitat unit (HU) is a value derived from multiplying the average habitat quality score for a cover type by the size of the areas for which this score was calculated (HU = average habitat quality score x size of cover type). AAHU, therefore, refers to the total number of habitat units gained or lost as a result of a proposed action, divided by the life of the action.*

Pertinent to substrate impacts for the Proposed Action, Section 230.1(d) of the 404(b)(1) guidelines states that "*From a national perspective, the degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts covered by these guidelines. The guiding principle should be that degradation or destruction of special sites may represent an irreversible loss of valuable aquatic resources.*" (USEPA 2008) According to the 404(b)(1) guidelines, then, the construction of several of the project features included in the Proposed Action would therefore result in the most severe environmental impacts covered by these guidelines.

In the case that a proposed project will result in unavoidable impacts to waters of the U.S., the 404(b)(1) guidelines emphasize the development or employment of a practicable alternative that will minimize impacts. Sections 230.10(a)(1)-230.10(a)(2) of the guidelines state that:

(a) Except as provided under section 404(b)(2), no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse consequences.

(1) For the purpose of this requirement, practicable alternatives include, but are not limited to:

(i) Activities which do not involve a discharge of dredged or fill material into the waters of the United States of ocean waters;

(ii) Discharges of dredged or fill material at other locations in waters of the United States or ocean waters

(2) An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purposes.

Additionally, section 230.10(3) emphasizes the importance of minimizing impacts to special aquatic sites (which includes wetlands):

In addition, where a discharge is proposed for a special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge into a special aquatic site are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise.

The guidelines clearly emphasize that no discharge of dredged or fill material into the aquatic environment—and especially into a special aquatic site, such as a wetland—shall be permitted if there is a practicable alternative predicted to result in significantly less environmental impact, and that an alternative is practicable if it is still within reasonable cost, is considered to be technologically feasible, and is logistically plausible.

The Proposed Action was selected for construction because it meets these requirements. It simultaneously (1) minimizes impacts to residential, commercial, and industrial properties with no Environmental Justice issues, (2) minimizes the amount of storm frontage, decreasing risk while improving reliability, and (3) minimizes overall environmental impacts (specifically to the EPA designated Bayou aux Carpes CWA Section 404(c) area) as compared to other alternatives. Further details for the selection of the Proposed Action as the environmentally preferred alternative are included in Chapter 5 of IER #12 (USACE 2009b). Because it is the alternative that contributes the least to adverse impacts to wetlands as a result of placement of fill material, the Proposed Action is therefore also the preferred action from a 404(b)(1) regulation standpoint. Although significant impacts to wetlands due to placement of fill will occur as a result of the project, the necessity of hurricane protection for the greater New Orleans area is of primary concern for an area vulnerable to natural disaster, and the Proposed Action minimizes the impacts to wetlands while providing reliable hurricane protection to businesses and citizens of the West Bank vicinity of New Orleans.

Mitigation for wetland impacts due to the Proposed Action will be prepared separately, in mitigation IERs. Mitigation IERs will be prepared to include mitigation of impacts on a system-wide basis for all IERs in the Metropolitan New Orleans area, including IER # 12.

Approximately 700,000 cubic yards of channel sediment would be excavated from the Algiers Canal, with the frequency of maintenance dredging exceeding 25 years, for development of the

Canal, along with Harvey Canal, as a detention basin to be utilized during storm events. The Proposed Action includes the use of this sediment for a marsh restoration project in the Jean Lafitte National Historical Park, along the eastern shoreline of Lake Salvador. Use of the dredged material for marsh creation would be counted as mitigation for the Greater New Orleans Hurricane Protection Projects. All material will be excavated and transported from the channel using either:

a. Hydraulic cutterhead dredging and dredged slurry pipeline; or
b. Mechanical dredging and barge transport

Placement of dredged material for marsh creation would effectively transform an area which is presently open water to marsh platform, resulting in significant alteration of substrate elevation. This alteration would in turn affect the chemical and biological properties of the substrate. The effects of the dredged material placement activity are desired, and are essential components of a successful marsh creation project.

Dredged and fill material placement activities may adversely affect bottom-dwelling organisms at the site by smothering immobile forms and forcing mobile forms to migrate. No recolonization of benthic organisms is expected for the wetland areas that will be converted to terrestrial habitat during construction activities. Recolonization of the placement area would occur as marsh vegetation captures the site, and species that utilize the marsh habitat adjacent to the placement area would be expected to migrate into the newly created marsh.

As a requirement, only uncontaminated fill material will be used in conjunction with the proposed project. Fill material will be certified by physical testing, chemical analysis, and/or manufacturer's certification. Potential fill material sources are being evaluated in separate IERs. It is not expected that the placement of fill material into wetlands or open water will result in adverse impacts to the adjacent aquatic ecosystem.

Analysis results for eleven (11) sediment samples extracted from within the proposed Algiers Canal dredging reach are available in the IER #12 Phase II Environmental Site Assessment (USACE 2009a). Samples were analyzed for 140 contaminants, including eight (8) metals, fifty-eight (58) semi-volatile organic compounds, forty (40) volatile organic compounds, seven (7) polychlorinated biphenyls, sixteen (16) pesticides, eight (8) herbicides, and three (3) total petroleum hydrocarbons. A majority of the contaminant levels measured were below the detection limit; in other words, due to the relatively minute levels of these contaminants, the laboratory equipment responsible for their measurement was unable to positively quantify a concentration. Overall, only eleven contaminants were detectable, including six (6) metals (arsenic, barium, cadmium, chromium, lead, and mercury), one (1) semi-volatile organic compound (benzo(b)fluoranthene), two (2) volatile organic compounds (acetone and carbon disulfide), and two (2) total petroleum hydrocarbons (diesel and oil range organics).

For detected compounds, concentrations were compared to available sediment quality screening values to determine whether the contaminant levels correlate to levels associated with toxic effects in benthic organisms. Values were compared to freshwater screening values only (NOAA 2008), as Louisiana Department of Environmental Quality (LDEQ) surface water quality data for the nearest representative location (Harvey Canal at Lapalco Boulevard [LDEQ 2008a]) indicate that the Canal is most likely exclusively a freshwater water body (see Appendix A, Table A.2).

Comparison of the detected contaminant concentrations to available freshwater sediment quality screening values indicated that the contaminant levels in the sediment do not correlate to levels associated with toxic effects in benthic organisms (see Appendix A, Table A.1 for a

detailed table of comparison). Results of the comparison have led to a screening-level analysis conclusion that no long-term contaminant-related impacts would be expected due to the placement of dredged material for marsh creation.

It is recommended, in accordance with the Inland Testing Manual (USEPA 1998), that channel material be re-evaluated prior to any future maintenance dredging. A separate 404(b)(1) permit evaluation will be required for maintenance dredging, and thus channel material will need to again be characterized to accurately determine acceptable disposal alternatives.

230.21 – Suspended Particulates/Turbidity Impacts: Release of dredged and fill material into the water column as part of these activities could temporarily decrease oxygen levels in the waters immediately surrounding the construction site by inhibiting photosynthesis or promoting solar heating. Also, some particles could contain chemically reduced substances (e.g., sulfides), which have a high chemical oxygen demand (COD), while other particles may have microorganisms attached, which could decompose organic matter and create a biological oxygen demand (BOD). Thus, a localized and temporary reduction in dissolved oxygen could occur in the immediate area of discharge. Oxygen levels would be expected to return to normal soon after construction. Excessive turbidity can also lead to water body temperature increases. Increased suspended solids produced during construction could absorb incident solar radiation and slightly increase the temperatures of water bodies, especially near the surface. However, these effects would be temporary and would occur only during construction.

c. *230.22 – Water Column Impacts*: Because only uncontaminated fill material will be used in conjunction with the proposed project, it is not expected that the placement of fill material into wetlands or open water will result in adverse water column impacts.

Impacts to the water column during placement of dredged material for marsh creation include the introduction of contaminants carried by effluent exiting the confined marsh creation area and entering the adjacent, or "receiving", waters. Effluent consists of "a release of water and solids discharged directly to receiving waters during a CDF (confined marsh creation area) filling operation and would include water discharged directly over weir structures or through filter cells of retaining dikes" (USEPA 1998). Effluent generated from the marsh creation area during placement of dredged material will vary in quality and quantity, depending on the final method of placement selected. For hydraulically placed dredged material, the sediments will settle within the confined site, resulting in a thickened layer of sediments underlying clarified supernatant which exits the site through an outlet structure. A mechanically placed dredged material operation will result in effluent in the form of displaced site water, as well as free water released with the sediment during placement. Little or no effluent production will result for mechanically placed sediment, and effluent quality would be expected to characterize runoff from a confined placement area in the beginning drying stages (Schroeder et al (2006 and 2008).

In order to be in compliance with State water quality regulations, the discharge of effluent into the receiving waters must not exceed water quality criteria outside the State regulated mixing zone, which is defined by the State of Louisiana as "those portions of water bodies where effluent waters are dispersed into receiving waters" (LDEQ 2008b). The mixing zone for Lake Salvador, classified as a coastal lake under State regulations, is a radial distance of 200 feet from the point of discharge from the marsh creation area.

Because the Proposed Action provides the possibility of either hydraulic or mechanical placement, estimation of effluent contaminant concentrations was performed for both methods of placement. Procedures for estimation of effluent concentrations for hydraulic placement are

included in Schroeder et al (2006). Procedures for the estimation of effluent concentrations for mechanically placed material, which is likened to that of runoff from a confined placement area in the beginning drying stages (unoxidized runoff), is available by determining unoxidized confined placement area runoff concentrations, as described in Schroeder et al (2008).

Use of screening evaluation spreadsheet (ERDC; in preparation), which utilizes the procedures described in Schroedero et al (2006) to estimate effluent concentrations for hydraulically placed material, as well as the procedures described in Schroeder et al (2008) to estimate concentrations for unoxidized runoff (and, for the purpose of this project, mechanically placed material), provides a comprehensive yet user-friendly approach for utilizing the referenced procedures in determining whether effluent concentrations are in compliance with State and Federal water quality criteria at the point of discharge. A determination of compliance at the point of discharge would indicate that no mixing within the receiving water body is necessary for the discharge to meet State water quality criteria, and would eliminate the need to determine the dilution available at the edge of the LDEQ mixing zone located a radial distance of 200 feet from the discharge point.

Spreadsheet input and results are available in Appendix B. For input parameters, a majority of the values used were recommended default values. Grain-size distribution and water content were the only in-situ sediment properties for which a default value was not used, and were derived from ERDC and USACE personnel having experience with use of the spreadsheet and familiarity with general properties of the channel sediments within the vicinity of the project (source: Trudy Estes, U.S. Army Engineer Research and Development Center Environmental Laboratory; Jeffery Corbino, U.S. Army Corps of Engineers, New Orleans District).

Because the evaluation requires the contaminant concentrations in the channel sediment and water (labeled as "carrier water" in the spreadsheet), as well as for the receiving water, and water quality criteria, very few contaminants could be utilized for the evaluation. The only detectable sediment contaminant concentrations for which water quality criteria were available were arsenic, cadmium, chromium (+III), lead, and mercury. Concentrations in carrier and receiving water were available for all of these contaminants, with the exception of mercury. In order to include mercury in the evaluation without available carrier and receiving water concentrations, a value less than and within approximately one percent of the water quality criteria was used as a surrogate for the missing results. The assumption behind this technique is that using concentrations close to—but not exceeding—water quality criteria for the missing values will provide an approximation of the influence thatcontaminants bound to sediments and within sediment pore water will have on exceeding water quality criteria for effluent concentrations at the point of discharge in a worst-case scenario (i.e., in a scenario where the carrier and receiving water is just below the criteria and the dissolution of contaminants bound to sediment and within sediment pore water will exclusively determine whether the effluent discharge will meet water quality criteria at the point of discharge).

Results for effluent contaminant concentrations and dilution requirements for hydraulically and mechanically placed dredged material are available in Appendix B, on pages B-4 and B-5, respectively. Effluent dilution ratio, which is defined as the volume of receiving water required to dilute one unit volume of effluent, has been added into pages B-4 and B-5, and is determined by the equation

$D = (C_{eff} - C_{wq})/(C_{wq} - C_B)$; where

C_{eff} = estimated contaminant concentration in the effluent (µg/L)
C_{wq} = applicable water quality criteria (µg/L)
C_B = contaminant concentration in the receiving water (µg/L)

For hydraulically placed material, effluent concentrations were estimated based on either equilibrium boundary condition or the mixing boundary condition as described in Schroeder et

al (2006), or based on pore water concentration. For the sake of providing a conservative estimate of effluent concentration, the estimated concentration used for the calculation of a dilution ratio was the maximum value obtained using these three techniques, which most often happened to be the pore water concentration. Calculation of dilution ratio using the maximum estimated effluent concentration resulted in negative dilution ratios for all of the contaminants utilized in the evaluation. Therefore, the screening evaluation indicates that no dilution would be required for effluent to meet water quality criteria for hydraulically placed material.

For mechanically placed material, no further alterations to the procedures described in Schroeder et al (2008) were implemented in order to determine dilution ratios, and negative dilution ratios were achieved for all of the contaminants utilized in the evaluation. Therefore, the screening evaluation indicates that no dilution would be required for effluent to meet water quality criteria for mechanically placed material.

d. *230.23 – Alteration of Current Patterns and Water Circulation*: For the Proposed Action and alternatives, current patterns and water circulation would not be significantly impacted. Wetland and open water areas that are converted to upland due to the placement of fill material would eliminate current pattern and water circulation for those regions. However, this would not significantly affect the overall waterbody within the project area due to the scale and location of the impacts.

   Placement of dredged material along the eastern shoreline of Lake Salvador for marsh creation would not result in significant alteration of current patterns and water circulation of the waterbody. Any alteration of current pattern and water circulation observed due to placement of the dredged material would be localized, where elevated substrate and marsh vegetation would effectively reduce the flow through the marsh creation area, subsequently reducing the effects of current patterns and water circulation.

e. *230.24 – Alteration of Normal Water Fluctuations/Hydroperiod*: The impacts would not be significant. Because the relatively small footprint of the project encroachment on the adjacent wetlands, as well as the small footprint of the marsh creation area encroachment on Lake Salvador, no significant effects to normal water fluctuations/hydroperiod are expected.

f. *230.25 – Alteration of Salinity Gradients:* The proposed project, including placement of dredged and fill material, is not expected to affect salinity gradients within the project area.

III. Subpart F – Human Use Characteristics

a. *230.50 – Effects on Municipal and Private Water Supplies*: N/A

IV. Subpart G – Evaluation of Dredged or Fill Material

a. *230.61 (a) – Considerations in Evaluating the Biological Availability of Possible Contaminants in Dredged or Fill Material:* Evaluation of biological availability of possible contaminants in fill material will be addressed in separate IERs. As a requirement, only uncontaminated fill material will be used in conjunction with the proposed project.

   Considerations in evaluating the biological availability of possible contaminants for dredged material proposed for marsh creation include review and use of several environmental resources and references. Initial investigation of biological availability includes historical evidence of contaminant migration into Algiers Canal, which can be located at the U.S. Coast Guard National Response Center (USCG 2008), the IER #12 Phase II Environmental Site Assessment (USACE 2009a), as well as the Limited Phase II Environmental Assessment of

potential sector gate locations near the confluence of Algiers and Harvey Canals (USACE 2008).

Further investigation, including comparison of Algiers Canal sediment chemistry to sediment screening levels and the evaluation of effluent discharged from the marsh creation area, requires water chemistry results for site water (Algiers Canal) and receiving water (Lake Salvador), as well as sediment chemistry of the dredged material and an estimation of physical properties of the material (Included in Appendix A). Tri-monthly water quality data for the carrier and receiving waters were available on the U.S. Environmental Protection Agency (EPA) Enviromapper for Water website (USEPA 2009) and the Louisiana Department of Environmental Quality (LDEQ) Ambient Surface Water Quality Monitoring Data website (LDEQ 2008a). Sediment chemistry results were available from the IER #12 Phase II Environmental Site Assessment (USACE 2009a).

b. An evaluation of the appropriate information in VI(a) above indicates that there is reason to believe the proposed dredge or fill material is not a carrier of contaminants, or the material meets the testing exclusion criteria: Only uncontaminated fill material will be used in conjunction with the proposed project. Evaluation of dredged material proposed for marsh creation indicates no short- or long-term impacts are expected due to the Proposed Action. See II(a) and II(c) of this memo for evaluation details.

V. Disposal Site Delineation

a. *230.11 (f) – Considerations in Evaluating the Disposal Site:* Because only uncontaminated fill material will be used in conjunction with the proposed project, the discharge of such material into the aquatic environment would be expected to meet mixing zone criteria.

The screening evaluation used to determine whether the effluent discharge from the confined marsh creation area would meet water quality criteria indicates that no dilution of effluent is required to meet the criteria. Therefore, it is implied that the proposed discharge will meet water quality criteria at the edge of the mixing zone.

b. An evaluation of the appropriate factors in V(a) above indicates that the disposal site and/or size of mixing zone are acceptable: Due to the expected uncontaminated nature of the fill material, it is expected that the disposal site will be acceptable in that the placement of fill material for improving levees will not result in any exceedences of water quality criteria.

The screening evaluation used to determine whether the effluent discharge from the confined marsh creation area would meet water quality criteria indicates that no dilution of effluent is required to meet the criteria. Therefore, it is implied that the proposed discharge will meet water quality criteria at the edge of the mixing zone.

VI. Subpart H - Actions to Minimize Adverse Effects

All appropriate and practicable steps have been taken, through application of the recommendations of *230.70 – 230.77* to ensure minimal adverse effects of the proposed discharge:

VII. Factual Determinations

A review of appropriate information as identified in items I - VI above indicates that there is minimal potential for short- or long-term environmental effects of the proposed discharge:

a. Physical substrate at the disposal site (review sections II, IV, V, and VI above): No

c. Water circulation, fluctuation and salinity (review sections II, IV, V, and VI): Yes

d. Suspended particulates (review sections II, IV, V, and VI): Yes

e. Contaminant availability (review sections II, IV, and V): Yes

VIII. References

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h. USACE 2008. *Limited Phase II Environmental Assessment (Soil Sampling), Potential Sector Gate Locations, Algiers and Hero Canals, Jefferson and Plaquemines Parishes, Louisiana.*

i. USACE 2003. *Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities—Testing Manual.* http://el.erdc.usace.army.mil/dots/guidance.html. Last accessed on January 29, 2009.

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k. Unites States Coast Guard (USCG) 2008. National Response Center. www.nrc.uscg.mil/index.htm. Last accessed on January 8, 2008

l. United Stated Environmental Protection Agency (USEPA) 2009. EnviroMapper for Water. http://map24.epa.gov/emr/. Last accessed on January 13, 2009.

m. USEPA 2008. *Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material.* http://www.access.gpo.gov/nara/cfr/waisidx_08/40cfr230_08.html. Last accessed on January 12, 2009.

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