Final Environmental Assessment

Bayou Sara Streambank Stabilization

FEMA-DR-1603- LA

West Feliciana Parish, Louisiana

Hazard Mitigation Grant Program

Project Number 1603-0436

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FEMA

U.S. Department of Homeland Security
FEMA Region VI
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ACHP	Advisory Council on Historic Preservation
ACM	Articulated Concrete Mat
AQSC	American Queen Steamboat Company
APE	Area of Potential Effects
BA	Biological Assessment
BFE	Base Flood Elevation
BG	Block Group
BGEPA	Bald and Golden Eagle Protection Act
BSBSP	Bayou Sara Bank Stabilization Project
CAA	Clean Air Act
CEA	Cumulative Effects Analysis
CEI	Coastal Environments, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	Cubic feet/second
CIP	Channel Improvement Program
CNO	Choctaw Nation of Oklahoma
CO	Carbon monoxide
CPEX	Center for Planning Excellence
CT	Census Tract
CWA	Clean Water Act
CY	Cubic Yards
dBA	Decibels measured on the A-weighted scale
DHS	Department of Homeland Security
E911	Enhanced Universal Emergency Number
EA	Environmental Assessment
EHP	Environmental and Historic Preservation
EIS	Environmental Impact Statement
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
ESO	Ecological Services Office
EO	Executive Order
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FWP	Fish and Wildlife Propagation
GEC	Gulf Engineers and Constructors
GOHSEP	Governor's Office of Homeland Security and Emergency Preparedness
Ha	Hectares
HEC-RAS	Hydraulic Engineering Center – River Analysis System
HMGP	Hazard Mitigation Grant Program

HP	Historic Preservation
ILT	Interior Least Tern
LA	Louisiana
LBB	Louisiana Black Bear
LDEQ	Louisiana Department of Environmental Quality
LDWF	Louisiana Department of Wildlife and Fisheries
LESO	Louisiana Ecological Services Office
LF	Linear Feet
LMR	Lower Mississippi River
LNHP	Louisiana Natural Heritage Program
LPDES	Louisiana Pollutant Discharge Elimination System
LRO	Louisiana Recovery Office
MBTA	Migratory Bird Treaty Act
MMT	Million Metric Tons
MS	Mississippi
NAAQS	National Ambient Air Quality Standards
NBEM	National Bald Eagle Management
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOD	New Orleans District
NPS	National Park Service
NRC	National Response Center
NRHP	National Register of Historic Places
NWP	Nationwide Permit
NWR	National Wildlife Refuge
OHWM	Ordinary High Water Mark
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PCR	Primary Contact Recreation
PEM	Palustrine Emergent
PFO	Palustrine Forested
PM	Particulate Matter
PMT	Pole Mounted Transformer
PS	Pallid Sturgeon
RBS	River Bend Station
RCP	Riverfront Concept Plan
RCRA	Resource Conservation and Recovery Act
RM	River Mile
ROI	Regional of Influence
RRP	Riverfront Redevelopment Plan
SCR	Secondary Contact Recreation
SDWA	Safe Drinking and Water Act
SFHA	Special Flood Hazard Area
SFPD	St. Francisville Police Department

SHPO	State Historic Preservation Office/Officer
SIP	State Implementation Plan
SNO	Seminole Nation of Oklahoma
SOV	Solicitation of Views
SOW	Scope of Work
SPOC	Single Point of Contact
SSA	Sole Source Aquifer
STP	Sewage Treatment Plant
TM	Treatment Measure
T & E	Threatened and Endangered
TSCA	Toxic Substances Control Act
UDA	Urban Design Associates
UMR	Upper Mississippi River
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USHR	United States House of Representatives
WFPSB	West Feliciana Parish School Board
WQC	Water Quality Certification
WSE	Water Surface Elevation

1.0 INTRODUCTION

1.1 Project Authority

On August 29, 2005 Hurricane Katrina, a category 3 hurricane with a storm surge well above normal high tide levels, moved across the Louisiana (LA), Mississippi (MS), and Alabama Gulf Coasts. Maximum sustained winds at landfall were estimated at 140 miles per hour. President George W. Bush declared a major disaster for the state of Louisiana due to damages from Hurricane Katrina and signed a disaster declaration (FEMA-1603-DR-LA) authorizing the Department of Homeland Security's (DHS) Federal Emergency Management Agency (FEMA) to provide federal assistance in designated areas of Louisiana. FEMA is administering this disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended 42 United States Code (U.S.C.) 5121, et seq. § 404 of the Stafford Act authorizes FEMA's Hazard Mitigation Grant Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration.

This Environmental Assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality (CEQ) regulations to implement NEPA (40 Code of Federal Regulations (CFR) Parts 1500-1508), and FEMA's procedures for implementing NEPA (FEMA Instruction 108-1-1).

West Feliciana Parish, through the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), applied for funding under FEMA HMGP to prevent streambank erosion from damaging utility and road infrastructure in the Parish. The purpose of this EA is to analyze potential environmental impacts of the proposed project. FEMA will use the findings in this EA to determine whether to prepare an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI).

1.2 Background

West Feliciana Parish is located in southeastern Louisiana with elevations ranging from 25 to 360 feet above mean sea level. The Parish is approximately 426 square miles in size and is bordered by the Mississippi River to the south and west, East Feliciana Parish on the east, and the State of Mississippi on the north (see Figure 1). There are two (2) major land resource areas in the Parish are the Southern Mississippi Valley Silty Uplands and the Southern Mississippi Valley Alluvium along the Mississippi River. In the vicinity of the lower end of Bayou Sara floodplains extend from Tunica Street in St. Francisville southward to the Mississippi River. Major roads in the Parish include U.S. Highway 61, and Louisiana Highways 10 and 66.

Primary watersheds in the Parish include Bayou Sara, Thompson Creek, and the Lower Mississippi. Riverine flooding from the Mississippi River poses the largest flood hazard. Most flood events in the parish have resulted from high water levels in the river causing elevation of water levels in Bayou Sara. Other streams in West Feliciana Parish include Alligator Bayou (upstream portions are known as Alexander Creek), Barrow Fork Creek, and Wickliffe Creek.

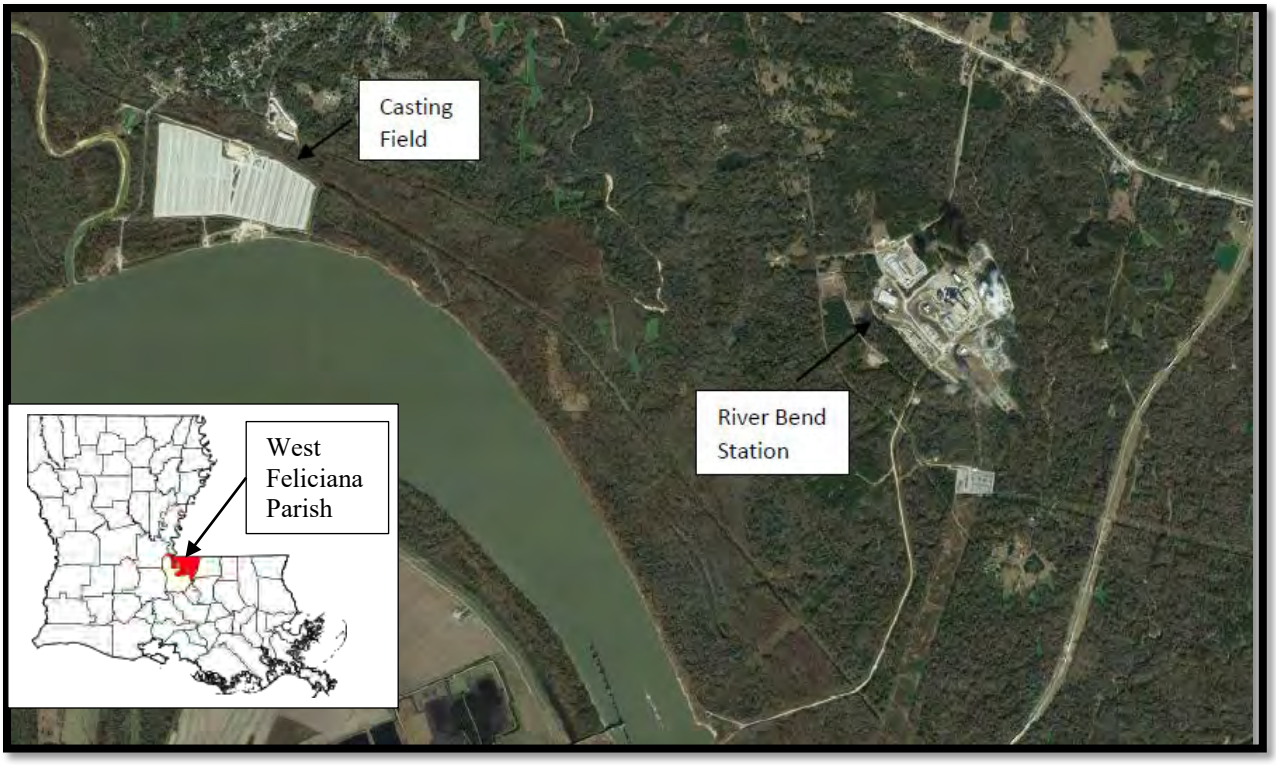

Figure 1: Bayou Sara Vicinity Map

2.0 PURPOSE AND NEED

The HMGP provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster.

The purpose of this project is to mitigate future erosion from Bayou Sara and protect the St. Francisville Sewage Treatment Plant (STP) and road (Arcadis 5/31/16 and 9/30/16; West Feliciana Parish, 2015). The east bank of Bayou Sara has experienced significant erosion on the reach between St. Francisville and the confluence with the Mississippi River. The bench area adjacent to a large bend on the east bank of the Bayou and an access road west of the St. Francisville STP sewage treatment lagoon has experienced significant erosion since at least 1998. Streambank erosion at this location was estimated to average over five (5) feet per year from 1998 to 2005, over eight (8) feet per year in 2006 and 2007, over 14 feet per year from 2008 to 2010, and approximately four (4) feet per year from 2012 to 2014. An estimated 3.4 acres of land at this bench area has been lost to streambank erosion during this period. The cumulative loss of streambank at this location during this period is shown in the aerial image on Figure 2. At this rate of streambank loss, the STP is in danger of losing the treatment lagoons in 15 to 20 years. If the streambank erosion was left unabated, Ferdinand Street, located as close as 130 feet to the east of the STP, would be undercut by the Bayou in 10-13 years. The loss of the STP lagoons would result in the discharge of raw, untreated sewage from the St. Francisville sanitary sewer system.

Currently, the applicant needs to protect the sewage treatment lagoon, which serves more than 700 customers, and also provide erosion protection for Ferdinand Street, which provides access to a U. S. Army Corps of Engineers (USACE) storage facility to the east of the street and a local boat launch. Ferdinand Street serves as St. Francisville's sole road access to the Mississippi River, which is important for local tourism derived from riverboat visits.

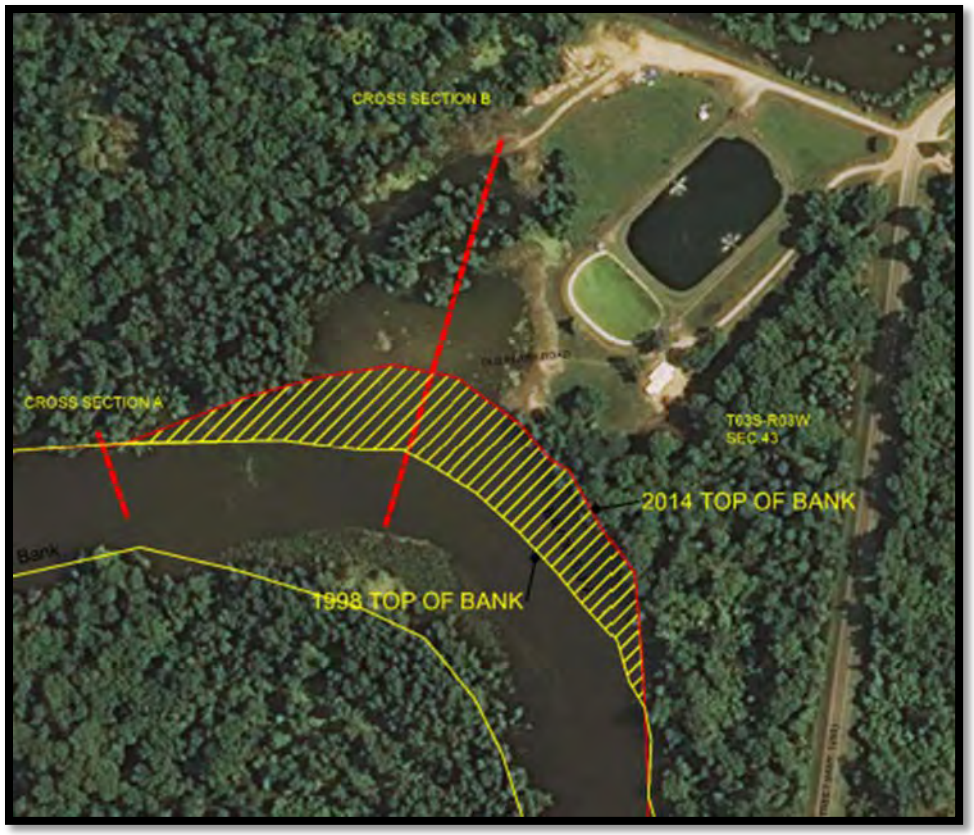

Figure 2: Bayou Sara Cumulative Streambank Losses 1998 – 2014
(Arcadis Design & Consultancy and Manchac Consulting Group, Inc., May 2016)

3.0 ALTERNATIVES

3.1 No Action Alternative

Under the No Action Alternative, Bayou Sara would continue to erode the streambank on the large bend adjacent to the STP lagoon and eventually threaten the containment of the STP lagoon; risking a major sewage release into Bayou Sara and the Mississippi River. Another large bend in Bayou Sara to the south of the STP lagoon would also continue to erode and eventually threaten the portion of Ferdinand Street between St. Francisville and the Mississippi River. This alternative does not meet the purpose and need, but will continue to be evaluated throughout this EA and serve as a baseline comparison.

3.2 Proposed Action: Construct Two (2) Revetments Adjacent to the St. Francisville STP and the Oyster Bar

The proposed action is to construct two (2) revetments along the large bends on the east bank of Bayou Sara adjacent to the STP (Reach 1) and downstream near the Oyster Bar (Reach 2). Latitude and longitude coordinates for the upstream edges and downstream ends of each revetment are summarized in Table 1 (Arcadis, January 2017) (see Figure 3).

Table 1. Bayou Sara Revetment and Access Road Coordinates

Project Feature	Latitude/Longitude Coordinates
Existing Access Roads at STP:	--
North Access Road at STP Gate	30.772804°/-91.39275°
South Access Road at STP Gate	30.772658°/-91.392805°
Upstream Revetment 1	--
Upstream Edge	30.771449°/-91.396681°
Downstream End	30.770269°/-91,394525°
Access Roads for South Revetment:	--
Access Road North of Oyster Bar at Ferdinand St.	30.766832°/-91.393742°
Access Road To the Oyster Bar off Ferdinand St.	30.76585°/-91.395035°
Downstream Revetment	--
Upstream Edge	30.767477°/-91.394645°
Downstream End	30.765819°/-91.396711°

Each revetment would include a base of riprap fill extending from a revetment toe at a 2:1 slope up to or above the Ordinary High Water Mark (OHWM). The upper portion of the streambank would consist of concrete block mats with a 3:1 slope (see Figure 4). Prior to placement of the revetment materials, the existing streambank slopes would be cut, filled with compacted fill to achieve the desired slopes, and then covered with a geotextile filter fabric. The excavated streambank materials would be deposited within the 0.87 acre Excess Cut Placement Area located between the STP lagoons and the loop access road around the STP (see Figure 5). Key trenches would be installed at the upstream and downstream edges of each of the two (2) revetments to anchor the structures. Pole gauges would be installed at the top edge of streambanks upstream and downstream from each of the two (2) revetments to provide a visual indication of erosion. A riprap pole gauge would also be installed in the south revetment to provide data on any changes in riprap thickness (Arcadis, January 2017).

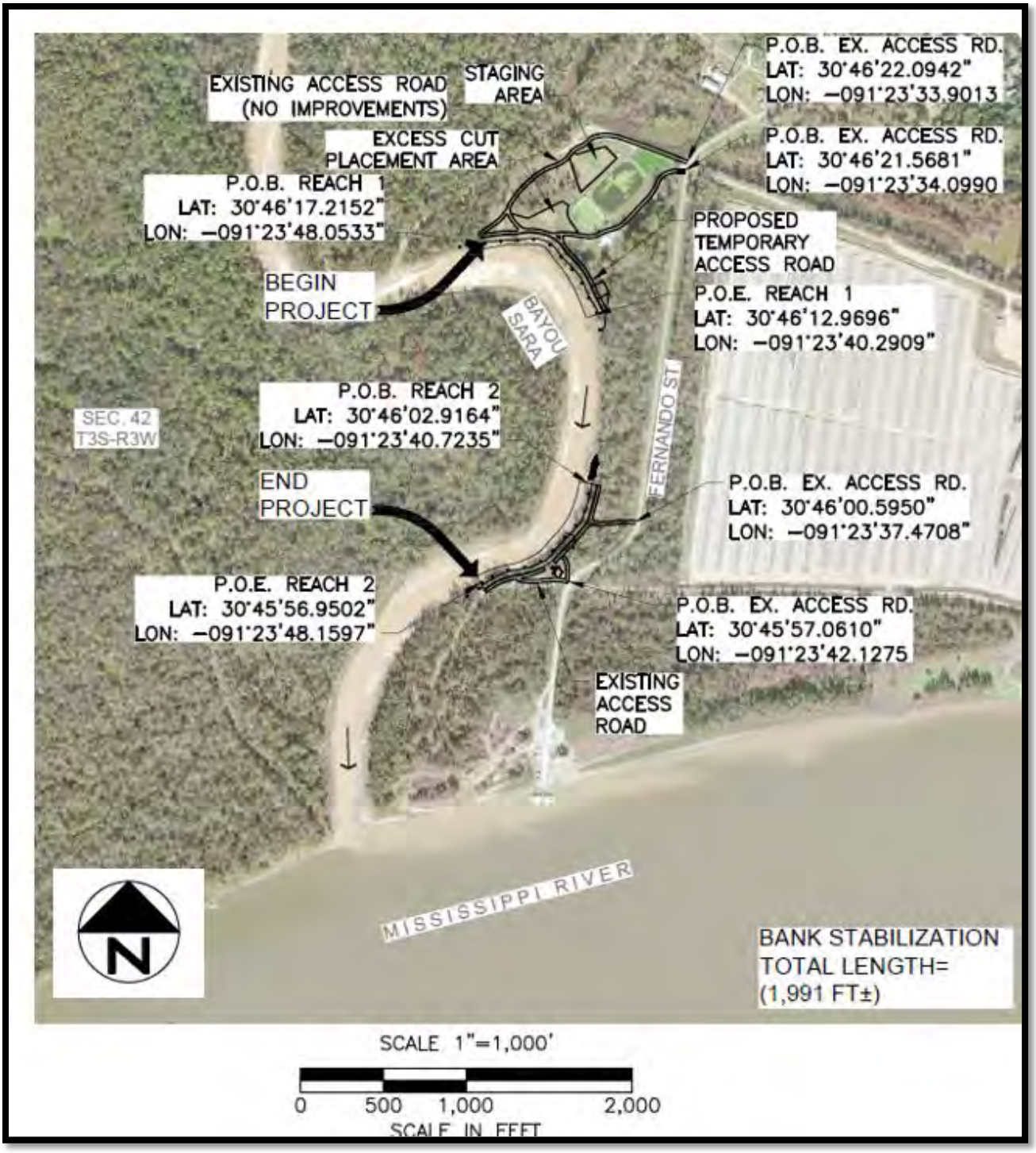

Figure 3: Map of Proposed Bayou Sara Revetments and Access Roads
(ARCADIS Design & Consultancy Biological Resources and Wetlands Finding Report, May 2017)

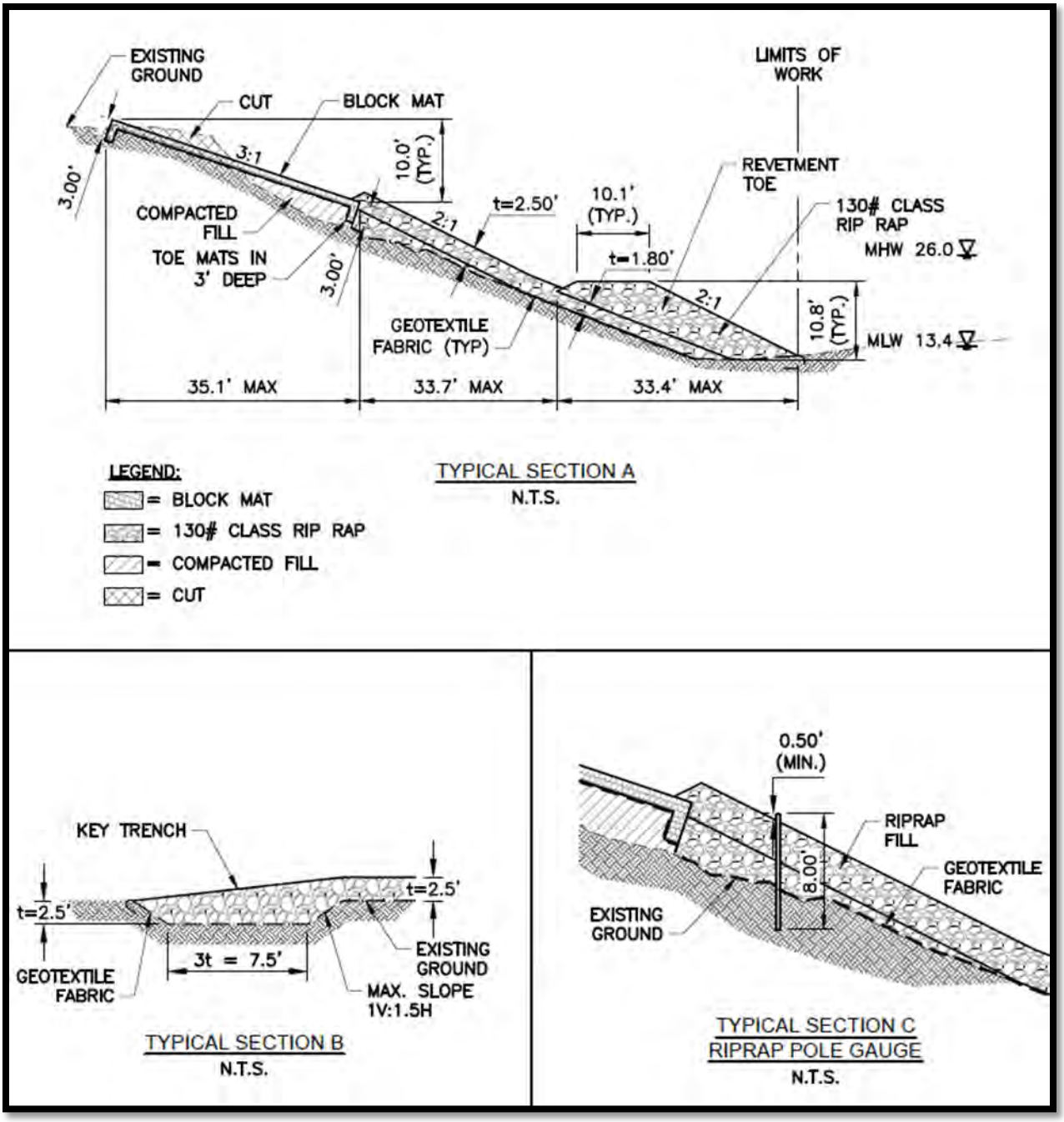

Figure 4: Revetment Design Details for Bayou Sara Streambank Stabilization
(ARCADIS Design & Consultancy Biological Resources and Wetlands Finding Report, May 2017)

To facilitate the revetment installation, existing access roads between Ferdinand Street and the planned revetments at the following locations would be utilized:

- On both sides of the sewage treatment plant lagoons, which are accessed through a gate on Ferdinand Street (each is roughly 1,500 linear feet (LF)(see Figures 3 and 5)(loop length approximately 2,700 LF)

- Off of Ferdinand Street north of the Oyster Bar (approximately ~250 LF)(see Figure 6)(approximate length 250 LF)
- On both sides of the Oyster Bar, which are accessed off of Ferdinand Street (approximate combined length of 400 LF)(Arcadis January 2017)

Latitude and longitude coordinates for each of these access roads are summarized in Table 1.

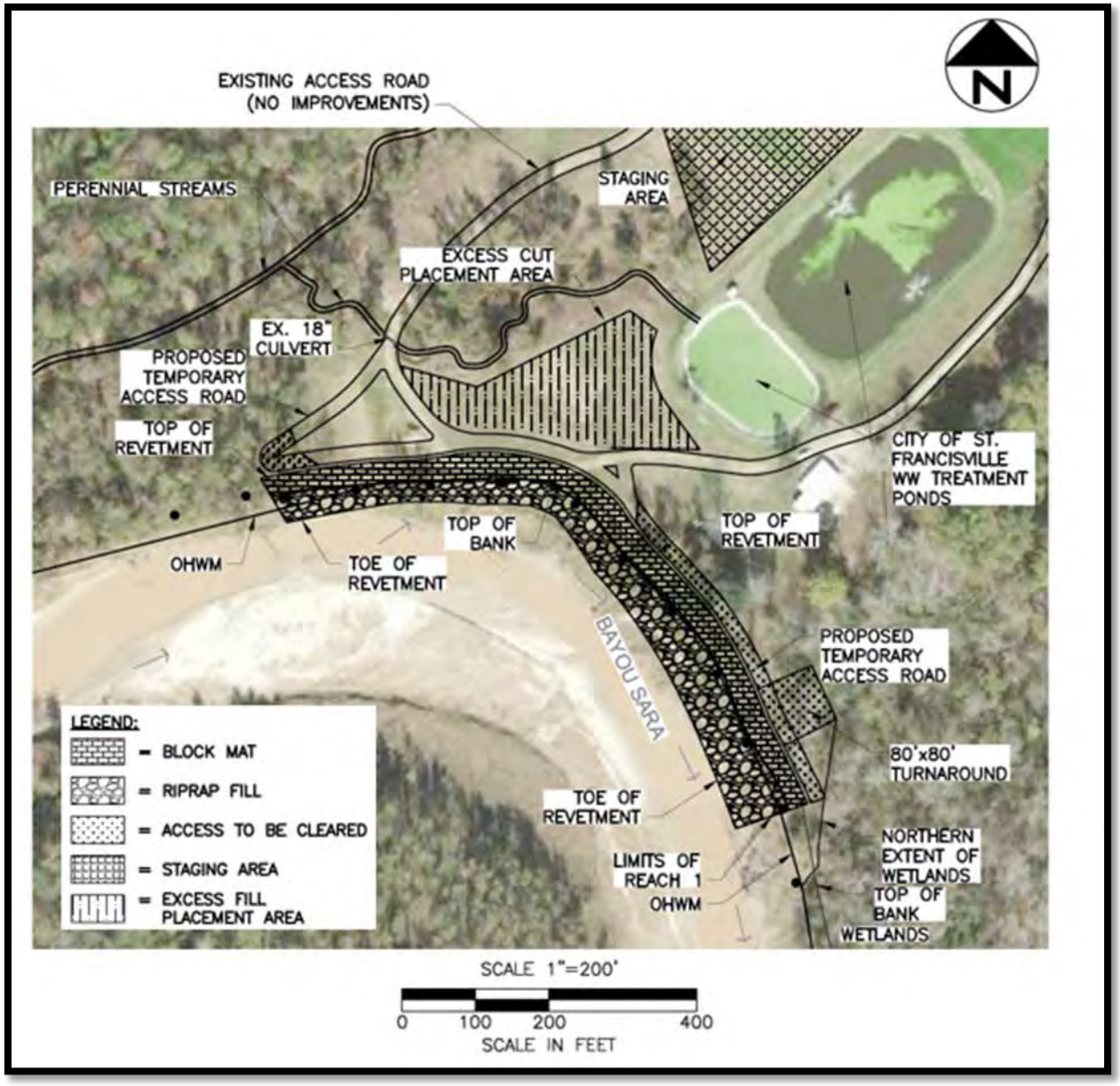

Figure 5: Map of Project Details for the Reach 1 Revetment
(ARCADIS Design & Consultancy Biological Resources and Wetlands Finding Report, May 2017)

Additional temporary access roads would also be constructed at the following locations:

- Adjacent to the upstream end of Reach 1 extending from the southwest portion of the existing access road that loops around the STP lagoons (length of approximately 125 LF)(see Figure 5)
- Adjacent to the downstream ½ of Reach 1 (length of approximately 475 LF)
- Adjacent to the entire length of Reach 2, except for a small gap directly behind the Oyster Bar (approximate length of 1,050 LF)(see Figure 6)
- From the end of the existing access road on the east side of Oyster Bar to Reach 2 (approximate length of 100 LF)(Arcadis, January 2017)

An 80-foot by 80-foot turnaround area would also be cleared adjacent to the access road constructed along the downstream half of Reach 1 (see Figure 4). A 0.95 acre staging area would be located between the northern portion of the loop access road and the STP lagoons to provide space for parking and materials storage (Arcadis, January 2017). Additional project design data are located in Appendices B and C.

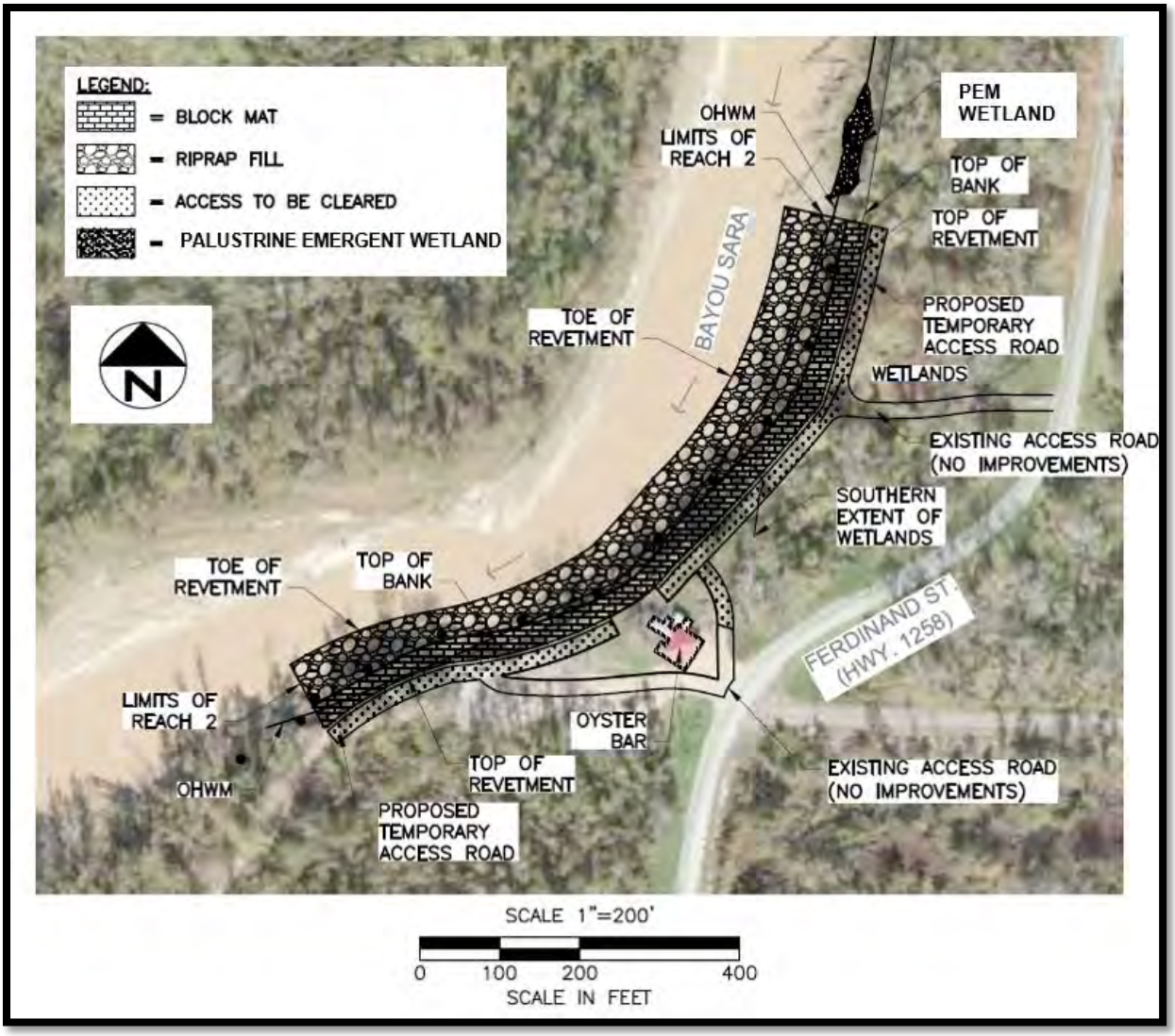

Figure 6: Map of Project Details for the Reach 2 Revetment
(ARCADIS Design & Consultancy Biological Resources and Wetlands Finding Report, May 2017)

3.3 Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Under this alternative, the straight section of the east bank of Bayou Sara between the two (2) large bends (Reach 3) that would be armored under the proposed action (Reaches 1 and 2) would also be armored with a revetment (see Figure 7)(West Feliciana Parish, 4/5/17). The straight section revetment would generally be identical in design to the proposed action revetment design with a base of riprap fill extending from a revetment toe at a 2:1 slope up to or above the OHWM with the upper portion of the streambank consisting of concrete block mats with a 3:1 slope. Prior to placement of the revetment materials, the existing streambank slopes would also be cut, filled with compacted fill to achieve the desired slopes, and then covered with a geotextile filter fabric. The excavated streambank materials would be deposited within 0.87 acre excess cut area located

adjacent to the STP lagoons. The most upstream and downstream key trench locations to anchor the structures under the proposed action alternative would also remain the same, but the key trenches at the downstream edge of the north revetment and the upstream edge of the south revetment under the proposed action alternative would not be installed as the revetment would be one (1) continuous segment.

A design process would be utilized to determine the locations and placement of pole gauges and riprap pole gauges for the continuous revetment, and to determine the need for and location of any additional staging area. The access roads proposed for use under the proposed action would be utilized plus an additional access for a temporary road adjacent to the straight section of revetment would likely be required. Hand tools would be used to clear access along the middle section of revetment. This access road would likely consist of timber mats or other materials that would minimize damage to wetlands.

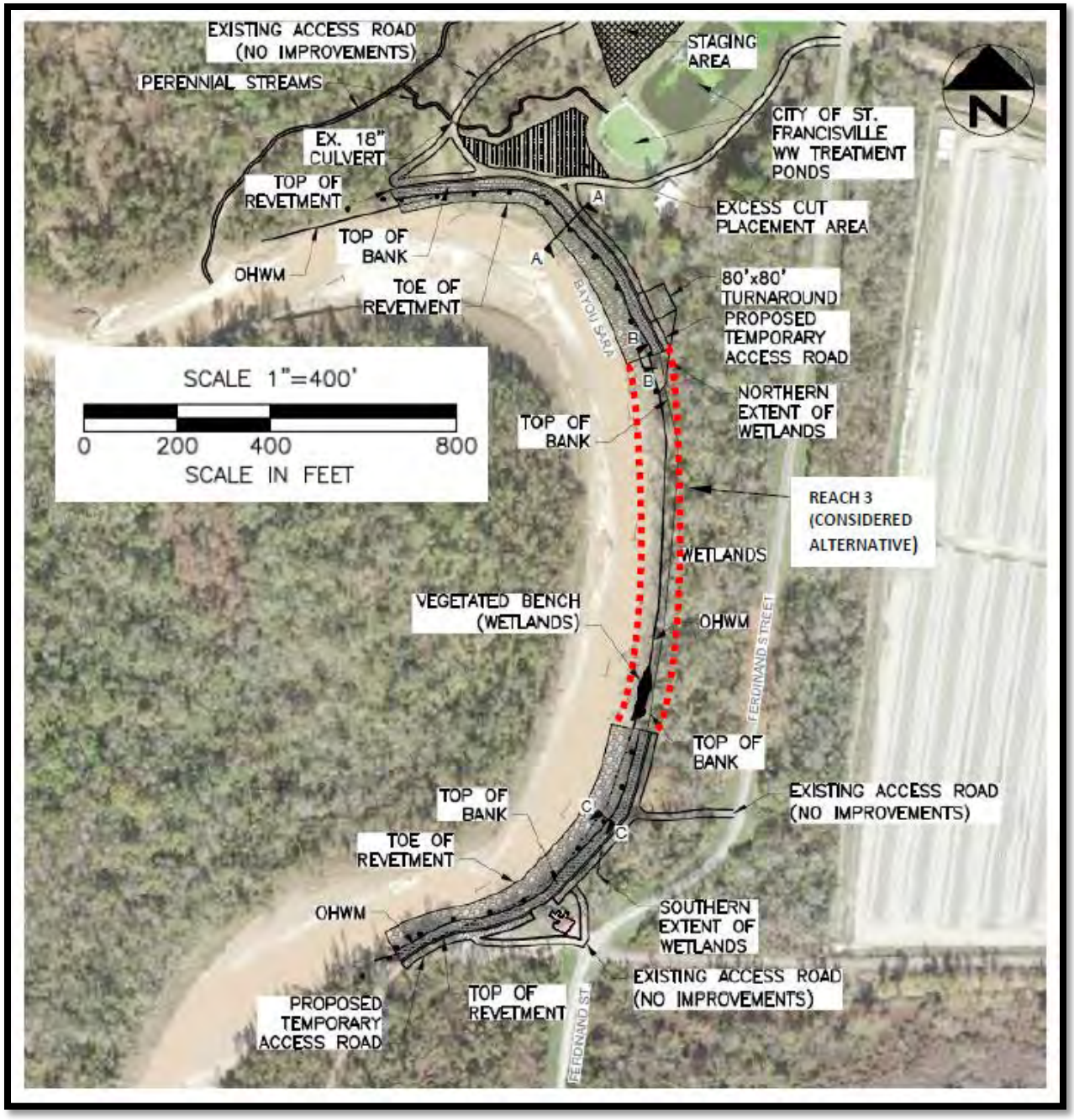

Figure 7: Map Showing Revetment Footprint Area in Reach 3 Added for Considered Alternative
(ARCADIS Design & Consultancy Biological Resources and Wetlands Finding Report, May 2017)

4.0 AFFECTED ENVIRONMENT AND ALTERNATIVES ANALYSIS

FEMA Environmental and Historic Preservation (EHP) staff has reviewed and assessed whether or not there are potential impacts to the natural and human environment by the proposed action, considered alternative and the no action alternative.

4.1 Physical Resources

4.1.1 Geology and Soils,

The Farmland Protection Policy Act (Public Law 97-98, §§ 1539-1549; 7 U.S.C. § 4201 et seq.) was enacted in 1981 and is intended to minimize the impact federal actions have on the unnecessary and irreversible conversion of farmland to non-agricultural uses. This law assures that, to the extent possible, federal programs and policies are administered in a way that is compatible with state and local farmland protection policies and programs.

Soils at the project site include Moganfield and Bigbee soils, which are frequently flooded. Morganfield soils consist of silt loam and are found on floodplains. Bigbee soils consist of excessively drained loamy sand and sand. These soils are not classified as prime farmland and are not subject to the Farmland Protection Policy Act. Areas subject to runoff and erosion within the project work limits above the OHWM include access roads, non-wetland portions of the revetment footprint, the staging area and the excess cut placement area (U.S. Department of Agriculture, 2001).

No Action Alternative

The "No Action" alternative would have no impacts to prime farmland, unique farmland, farmland of statewide or local importance, or other important geologic resources.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

Areas subject to runoff and erosion within the project work limits above the OHWM include access roads, non-wetland portions of the revetment footprint, the staging area; and the excess cut placement area. Vegetative cover would be removed from a six (6)-acre area during construction creating the potential of increased runoff during storm events. Erosion of soils from the area of vegetation removal would be reduced and minimized through the selection, installation and monitoring of appropriate erosion and sediment controls, and stabilization practices.

The applicant would be required to ensure that best management practices are implemented to prevent erosion and sedimentation to surrounding, nearby or adjacent wetlands. This includes equipment storage and staging of construction to prevent erosion and sedimentation to ensure that wetlands are not adversely impacted per the Clean Water Act (CWA) and Executive Order (EO) 11990.

A Solicitation of Views (SOV) request was sent to the Louisiana Department Environmental Quality (LDEQ) on August 9, 2016. LDEQ's response dated September 12, 2016, stated that if any hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required; and all precautions should be observed to control nonpoint source pollution from construction activities (see Appendix D). See also Section 7.0 Conditions and Mitigation Measures.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

This area of potential soil erosion would be 0.4 acre larger as compared to the same area under the proposed action due to the need to clear vegetation adjacent to the Bayou Sara streambank between Reaches 1 and 2 (total clearance of 6.4 acres). The applicant would be required to ensure that best management practices are implemented to prevent erosion and sedimentation to surrounding, nearby or adjacent wetlands. This includes equipment storage and staging of construction to prevent erosion and sedimentation to ensure that wetlands are not adversely impacted per the CWA and EO 11990. Overall impacts to soils along the project corridor would be expected to be negligible. All precautions should be observed to control nonpoint source pollution from construction activities.

4.1.2 Air Quality

The Clean Air Act (CAA) (42 U.S.C. § 7401 et seq.) is the federal law that regulates air emissions from stationary and mobile sources. This law tasks the U.S. Environmental Protection Agency (USEPA), among its other responsibilities, with establishing primary and secondary air quality standards. Primary air quality standards protect the public's health, including the health of "sensitive populations, such as people with asthma, children, and older adults." Secondary air quality standards protect the public's welfare by promoting ecosystem health, preventing decreased visibility, and reducing damage to crops and buildings. The USEPA also has set National Ambient Air Quality Standards (NAAQS) for the following six (6) criteria pollutants: carbon monoxide (CO), lead, nitrogen oxides, ozone, particulate matter (less than 10 micrometers [PM_{10}] and PM less than 2.5 micrometers [$PM_{2.5}$]), and sulfur dioxide.

Under the 1990 amendments to the CAA, the USEPA may delegate its regulatory authority to any state which has developed an approved State Implementation Plan (SIP) for carrying out the mandates of the CAA. The State of Louisiana's initial SIP was approved on July 5, 2011, and its CAA implementing regulations are codified in Title 33.III of the Louisiana Environmental Regulatory Code. The SIP has been revised several times since its original approval.

According to 40 CFR § 93.150(a), "No department, agency or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an applicable implementation plan." In addition, 40 CFR § 93.150(b) states, "A Federal agency must make a determination that a Federal action conforms to the applicable implementation plan in accordance with the requirements of this subpart before the action is taken." As a result, when FEMA provides financial assistance for a project, such as the one (1) currently under review in this drat EA, the CAA requires a General Conformity determination whenever the project site is located in a "non-attainment area" for any one (1) of the six (6) criteria pollutants (Revisions to the General Conformity Regulations 2010).

West Feliciana Parish is classified as attainment with the NAAQS and has no general conformity determination obligations.

No Action Alternative

There would be no revetment construction activities and no construction-related emissions. No impacts to air quality would occur.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

Potential short-term, localized impacts to air quality from construction equipment (compressors) and engine emissions would occur. These effects would be considered to be negligible.

Vehicle operation times should be kept to a minimum. Area soils must be covered and/or wetted, if necessary, during construction to minimize dust. LDEQ responded to the August 8, 2016 SOV requests stating West Feliciana Parish is currently in attainment with the NAAQS and has no general conformity determination requirements. See also Section 7.0 Conditions and Mitigation Measures.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Potential short-term, localized impacts to air quality from construction equipment (compressors) and engine emissions would occur. Vehicle operation times should be kept to a minimum. Area soils must be covered and/or wetted during construction to minimize dust. These effects would be considered to be negligible.

4.2 Water Resources

West Feliciana Parish is not located in the Louisiana Coastal Zone and does not have designated Coastal Barrier Resources System units. There are no designated National or state Wild and Scenic Rivers in West Feliciana Parish or surrounding Parishes. These resource categories will not be evaluated further in this EA.

4.2.1 Wetlands and Waters of the United States

The dredging and filling of wetlands and waters of the U.S. is regulated by USACE under CWA § 404. CWA § 401 requires state certification of all federal licenses and permits in which there is a "discharge of fill material into navigable waters." Waters of the U.S. are defined in 33 CFR § 328.3 and include a broad scope of surface waters. Wetlands, a subset of waters of the U.S., are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR § 328.3[b]) (Regulatory Programs of the Corps of Engineers 1986).

Section 10 of the Rivers and Harbors Act of 1899 regulates structures or work in or affecting navigable waters. Navigable waters under this statute are defined as "those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33 CFR § 329.4) (Regulatory

Programs of the Corps of Engineers 1986). The USACE implements a permit program to evaluate impacts to navigable waters and their navigable capacity under § 10 (jointly with § 404 of the CWA when a discharge of fill material is also involved). Regulated structures include such objects as buoys, piers, docks, bulkheads, and jetties, while work includes dredging or filling activities.

EO 11990, *Protection of Wetlands*, directs federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands for federally funded projects (US President 1977). FEMA regulations for complying with EO 11990 are found at 44 CFR Part 9, Floodplain Management and Protection of Wetlands.

No Action Alternative

If no mitigation action is taken, the natural erosional processes along Bayou Sara would continue unabated and eventually result in the loss of up to 4.9 acres of palustrine forested (PFO) wetland located just to the south of proposed revetment at Reach 1 extending southward along the top of the bank adjacent to Bayou Sara and ending at the proposed revetment for Reach 2 (see Figure 2 in Appendix F). This would be considered a minor, localized loss of wetlands.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

A wetlands survey of the proposed project corridor was conducted on October 27, 2016 by Arcadis Design and Consultancy. Visible indicators of wetland vegetation, hydrology and soils were recorded, and assessed using the technical guidelines and methods for wetland delineations in the USACE Wetland Delineatio Manual and the USACE Regional Supplement to this manual for the Atlantic and Gulf Coastal Plan Region.

Per the Biological Resources and Wetland Findings Report, dated March 20, 2017, approximately 0.09 acres of the PFO wetland would be permanently lost to the revetment due to the placement of 79.5 cubic yards (CY) of block mats. Vegetation removal along an existing access road within this wetland adjacent to portions of Reach 2 north of the Oyster Bar would also occur. This portion of the access road is approximately 375 feet long and covers 0.17 acre. Vegetation would be removed using hand tools. Timber mats would be placed over the access road section within the PFO wetland surface, if necessary. Upon completion of revetment construction, access roads would be restored to pre-project conditions. Clearing would be limited to the minimum required for construction and the use of wetland areas outside the construction limits would be prohibited for support activities, including borrow sites, parking and access road use. The proposed action would include all practicable measures to minimize harm to wetlands that may result from this project. See also Section 7.0 Conditions and Mitigation Measures.

An August 8, 2016 SOV request was sent to LDEQ and USEPA, Region 6 Wetlands Section. LDEQ responded that if any of the proposed work is located in wetlands or other areas subject to USACE jurisdiction, USACE should be contacted regarding permitting issues. The R6 Wetlands Section responded that a preliminary review indicated that jurisdictional waters of the U.S. occur on the proposed site. USEPA does not object to the project as proposed and recommended coordination with the USACE New Orleans District (NOD) to verify permits needed.

A Pre-Construction Notice for Nationwide Permit (NWP) 13 coverage and the Biological Resources and Wetland Findings Report was sent to the USACE NOD on March 21, 2017 (West Feliciana Parish, 3/21/17). USACE NOD required West Feliciana Parish to purchase 0.1 acre of bottomland hardwood restoration from an approved wetlands mitigation bank. On February 20, 2018, West Feliciana Parish purchased 0.1 acre of credit from Cypress Plantation Mitigation Bank. The wetland impacts from construction of the proposed action would be expected to be minor. The purchase of the mitigation bank credits is judged by USACE NOD to be suitable mitigation for this impact.

A water quality certification (WQC) from the issuing state, LDEQ in this case, is required prior to the issuance of the relevant federal license or permit. For this project, a USACE CWA § 404 permit is required for placement of fill and revetment materials in Bayou Sara and on wetlands adjacent to this bayou. Per USACE letter dated March 9, 2018, USACE issued a MVN-2017-0368-CQ Nationwide Permit-13 for this project. LDEQ issued WQC 160629-02 for the USACE Reissuance of NWPs, including NWP 13, to the USACE NOD on February 14, 2017. The WQC is subject to the State of Louisiana NWP Regional Conditions, February 2017.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

In addition to the PFO wetlands identified October 27, 2016, the wetlands survey also identified a palustrine emergent (PEM) wetland located just north of Reach 2 below the OHWM for Bayou Sara that covers an area of 0.07 acre (see Figure 6). This wetland would be permanently lost to the additional revetment that would be constructed between Reaches 1 and 2 (Arcadia, 3/20/17).

Construction of this revetment would protect the PFO wetland adjacent to Reach 3 along the east bank as well as the portion of Ferdinand Street between the Casting Field and Oyster Bar. Since 1909, several blocks of the Bayou Sara town site have been eroded away as Bayou Sara cut eastward toward Ferdinand Street (see Figure 4 in the SHPO Consultation Letter, Appendix E). The revetment would likely be designed very similar to proposed action revetments along Reaches 1 and 2, and would be expected to deflect erosional energy preventing the further eastward movement of the bayou.

Vegetation would be removed using hand tools. Timber mats would be placed over the access road section within the PFO wetland surface, if necessary. Upon completion of revetment construction, access roads would be restored to pre-project conditions. Clearing would be limited to the minimum required for construction and the use of wetland areas outside the construction limits would be prohibited for support activities, including borrow sites, parking and access road use). All practicable measures to minimize harm to wetlands that may result from this project would be taken. Should this alternative become the preferred, FEMA EHP and the applicant would coordinate with USACE to determine what permits and mitigation would be required.

4.2.2 Hydrology and Floodplains

EO 11988, Floodplain Management, requires federal agencies to avoid direct or indirect support or development within or affecting the 1% annual chance Special Flood Hazard Area (SFHA) (i.e., the 100-year floodplain) or, for "Critical Actions," within the 0.2% annual chance SFHA (i.e., the

500-year floodplain), whenever there is a practicable alternative (U.S. President 1977). FEMA's regulations for complying with EO 11988 are found at 44 CFR § 9, Floodplain Management and Protection of Wetlands (1980).

Floodplains are defined as the lowland and relatively flat areas adjoining inland and coastal waters, including at a minimum that area subject to a 1% or greater chance of flooding in any given year. FEMA's regulations for complying with EO 11988 are found at 44 CFR Part 9.

FEMA uses Flood Insurance Rate Maps (FIRMs), created by the National Flood Insurance Program, as the best available flood data. According to the FIRM Community Panel Number 22045 0006B, Effective Date of February 13, 1979, the lower portions of Bayou Sara to the west of St. Francisville downstream to the confluence with the Mississippi River are in Zone A, which is defined as the area inundated by a 1% annual chance of flooding for which no Base Flood Elevations (BFE) have been determined. Per 44 CFR 9.11(d)(4) "there shall be no encroachments, including fill, new construction, substantial improvements of structures or facilities, or other development within a designated regulatory floodway that would result in any increase in flood levels within the community during the occurrence of the base flood discharge. Until a regulatory floodway is designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within the base floodplain unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community."

The applicant hired Arcadis Design and Consultancy to conduct and H & H Study. A single-beam bathymetric survey was conducted on Bayou Sara in March 2016 by Morris P. Hebert, Inc., an Arcadis subcontractor, to gather data to support the hydrographic analysis. A 100-year flow of 40,329 cubic feet per second (cfs) for Bayou Sara was used to alter the model upstream boundary. On the downstream side, the Lower Mississippi River (LMR) was assumed to be under normal flow conditions. Additional simulations were conducted to assess flow velocity and size the riprap for bank protection (Arcadis, 5/31/16 and 5/5/17).

Water surface elevations (WSEs) were calculated at the following locations to estimate pre-project and post-project conditions:

- At River Mile (RM) 302.8, approximately 37 miles upstream from the Bayou Sara confluence
- At the confluence of LMR and Bayou Sara (RM 265.8) and
- At Baton Rouge (RM 228.5)(Arcadis, 5/31/16)

No Action Alternative

Under the "No Action" alternative, natural erosional processes would continue to reshape the floodplain. Aerial imagery from 1998 – 2014 indicate variable rates of erosion from 4 – 14 feet/year. An image of the project footprint overlain on the 1909 United States Geological Survey (USGS) St. Francisville Quadrangle Map (see Figure 4; page 11 of GOHSEP letter, Appendix E)

indicates that the last mile of Bayou Sara has migrated eastward eroding away several blocks of the Bayou Sara townsite over the past 100+ years.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

Per the H & H Addendum dated May 15, 2017, the Hydraulic Engineering Center – River Analysis System (HEC-RAS) model results showed a maximum increase in WSE of 0.70 feet in Bayou Sara when the Mississippi River discharge is very low (approximately 400,000 cfs), such as in August and September. The results of the H & H showed no change in WSEs in cross-sections near the revetments when stages were at or higher than the 100-year BFE. For downstream cross-sections near the Mississippi River, there was no observable differences in WSE due to implementation of the project (Arcadis, 5/15/17). The model results show that the proposed revetments would not increase the WSE in Bayou Sara or the Mississippi River more than one (1) foot and that their design satisfies the EOs 11988 and 11990, and the FEMA regulation at 44 CFR 9.11(d)(4).

The overall impact of the proposed action on the hydrology and floodplain of Bayou Sara and the Mississippi River would be expected to be negligible (Arcadis, 5/31/16). The West Feliciana Parish Code requires a development permit for revetment construction to be obtained from the Local Floodplain Administrator. See also Section 7.0 Conditions and Mitigation Measures.

All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to GOHSEP and FEMA for inclusion in the permanent project files. New construction must also be compliant with current codes and standards. See the 8-Step Process in Appendix F.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

If this alternative would be chosen for the proposed project, the HEC-RAS model would be run for a 100-year flood scenario to simulate post-project conditions upstream and downstream from the revetment to determine WSEs and compared to the pre-project conditions on Bayou Sara as described under the proposed action alternative. The HEC-RAS model run would also utilize the bathymetric survey data as described under the proposed action alternative. The overall impact of the proposed action on the hydrology and floodplain of Bayou Sara and the Mississippi River would be determined based on the model results.

All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to GOHSEP and FEMA for inclusion in the permanent project files. The applicant is required to coordinate with the local floodplain administrator regarding floodplains permit(s) prior to the start of any activities. New construction must be compliant with current codes and standards.

4.2.3 Surface Water and Water Quality

Bayou Sara (approximate drainage area of 1,400 square miles) originates near Woodville, Mississippi, flows 12 miles across the state line, drains a large portion of West Feliciana Parish,

and flows southward 31 miles from the state line before reaching the project site. Bayou Sara flows into the Mississippi River approximately 1,200 feet from the downstream-most portion of the revetment.

An unnamed tributary to Bayou Sara discharges approximately 540 feet upstream of the planned revetment for Reach 1. Outflow from the southernmost pond at the St. Francisville STP flows through a 12-inch culvert beneath the access road and discharges to this unnamed tributary approximately 500 feet to the west of the lagoon (Arcadis, 3/20/17).

The Mississippi River at Bayou Sara, RM 265.83, has a drainage area of 1,129,400 square miles, 99% of which is in the U.S. The watershed of the river covers 41% of the U.S. Water levels in the river can fluctuate up to 33 feet. The Mississippi River at Bayou Sara is part of an 85-mile subsegment from the Old River Control structure just above the Mississippi state line downstream to Monte Sano Bayou, located just upstream from Baton Rouge, that has been designed as impaired for primary contact recreation (PCR) due to suspected impairment from fecal coliform. PCR is defined as recreational contact, such as swimming, skiing or diving, where the probability of ingesting water is considerable. Bayou Sara has also been designated as impaired for PCR due to fecal coliform from the Mississippi state line to the river. The suspected sources of impairment for Bayou Sara include sanitary sewer overflows and sanitary collection system failures. In addition to the St. Francisville STP, there are at least 22 known small sources of sanitary wastewater discharge in the Bayou Sara watershed which have LPDES discharge permits (all but four (4) have less than 1,000 gallons/day discharge). Recreational fishing has been observed in Bayou Sara in 2016. Even though Bayou Sara is impaired for fecal coliform, the 2016 Water Quality Integrated Report for Louisiana shows that Bayou Sara water quality fully support its designated fish and wildlife propagation (FWP) use. Mississippi River water quality at Bayou Sara fully supports its designated FWP and drinking water source uses. Water quality in Bayou Sara and the Mississippi River fully supports their designated Secondary Contact Recreation (SCR) uses. SCR is defined as fishing, boating and other activity where contact with the water is either incidental or accidental, and the probability of ingesting water is minimal.

Fish collected from the LMR by LDEQ have been analyzed for over 100 toxic chemicals. Fish tissue samples did not have detectable levels for 95% of the chemicals tested. The levels of toxic chemicals that were detected were all below the U.S. Food and Drug Administration standards for edible fish. Neither Bayou Sara or the LMR are included in the LDEQ list of water bodies that have advisories issued for fish consumption due to the presence of mercury in fish tissues (Caffey et al, 2002; LDEQ, 6/26/17).

No Action Alternative

Adverse impacts to water quality from fecal coliform in Bayou Sara and the Mississippi River would continue unless sanitary sewer upgrades are completed to eliminate/reduce sanitary overflows and system failures. Overall water quality would remain unchanged. In addition, sediment impacts and erosion would continue to occur at the site.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

The construction of the two (2) revetment sections would extend a combined length of 1,991 feet along the east bank of Bayou Sara and would result in the replacement of approximately 17,270 CY of material below the OHWM including 121 CY of block mats, 367 CY of compacted fill, and 16,781 CY of riprap. The area of fill placement below the OHWM is 2.06 acres (Arcadis, 3/29/17).

During construction increased erosion and sedimentation of streambanks would occur, but would be minimized by establishing cofferdams at the revetment construction limits. The downstream movement of eroded materials would be limited to the revetment footprint by the cofferdams and would be permanently fixed in place by geotextile fabric, then anchored with the riprap materials. After completion of the revetments, sediment loads in the lowermost 1,200 feet of Bayou Sara would be reduced due to the decreased erosion from the armoring of the two (2) upstream bends along the east banks. Some scouring of Bayou Sara below the revetments would be expected. Construction workers would utilize sanitary facilities at the STP or use portable toilets, if necessary. Project construction would not result in any appreciable increase in sanitary flows to the STP or to Bayou Sara and would not contribute to water quality impairment from fecal coliform in Bayou Sara or the Mississippi River. The unnamed tributary to Bayou Sara west of the STP would not be effected by the revetment.

Appropriate erosion controls would be implemented to prevent runoff and sediment from the excess cut displacement area from reaching the STP lagoon outflow. All work below the OHWM would be permanently stabilized at the earliest practicable date. This work would be done during low-flow periods to the maximum extent possible. Impacts to Bayou Sara from construction of the proposed action would be expected to be minor. The level of suspended sediment discharge on the LMR is estimated at over 150 million metric tons (MMT)/year. Impacts to the Mississippi River from construction of the proposed action would be negligible (Arcadis, 3/20/17; USACE, 12/21/16; U.S. Fish and Wildlife Service (USFWS, 2013; USGS, 1995). See also Section 7.0 Conditions and Mitigation Measures.

LDEQ provided the following responses to FEMA EHP's August 8, 2016 SOV request:

- If project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater (not part of project).
- A Sewage Sludge and Biosolids Use of Disposal Permit is required if the project will include a sanitary wastewater treatment facility (it does, but the St. Francisville STP does not require this permit; the volume of sludge sludge it generates is so low that removal from the lagoons is not necessary).
- If water system improvements include water softeners, contact LDEQ Water Permits to determine if special water quality-based limitations are necessary for softener generated wastewaters (not part of the project).

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

The construction of an additional revetment section between Reaches 1 and 2 would extend a distance of approximately 1,000 feet along the east bank of Bayou Sara in addition to the 1,991 LF for the proposed action alternative revetments for a total distance of approximately 2,990 feet. Approximately 25,940 CY of material would be placed below the OHWM including 180 CY of block mats, 550 CY of compacted fill and 25,200 CY of riprap. The area of fill placement below the OHWM would be an estimated 3.1 acres.

Appropriate erosion controls would be implemented to prevent runoff and sediment from the excess cut displacement area from reaching the STP lagoon outflow. All work below the OHWM would be permanently stabilized at the earliest practicable date. This work would be done during low-flow periods to the maximum extent possible. FEMA EHP would coordinate with resource agencies, however, overall impact to surface water from construction of a continuous revetment would be expected to be slightly greater than the proposed action, while remaining a localized, minor adverse effect.

4.2.4 Ground Water

The Safe Drinking Water Act (SDWA) was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The Southern Hills Regional Aquifer System in southeastern Louisiana has been designated as a Sole Source Aquifer (SSA) under the § 1424(e) of the SDWA. Federally funded projects reviewed by USEPA under the SSA Program include construction projects involving discharge of storm water, such as the Bayou Sara Streambank Stabilization. The SSA designation area for this aquifer spans ten (10) Parishes in Louisiana including West Feliciana Parish. In southeastern Louisiana, the aquifer system has been divided into as many as 13 aquifer units. These units include aquifers in alluvial and upland deposits consisting of ten (10) sand layers between 400 and 2,800 foot depths. Groundwater resources in the vicinity of the project site include the Evangeline and Jasper equivalent aquifers. The Evangeline Equivalent Aquifer System includes the “800-foot,” “1,000-foot,” “1,200-foot,” “1,500-foot,” and “1,700-foot” sands of the Baton Rouge area. The Jasper Equivalent Aquifer lies below the Jasper system. The division in the aquifer units is based on the presence of clayey confining layers interbedded with sandy aquifer units within the system’s sedimentary sequence. These aquifer units are recognized to collectively operate as a single aquifer system (USEPA; Buono, 1983; Kuniansky et al, 1989; Kuniansky, 1989; USGS, 2014).

No Action Alternative

There would be no effect on the quality of groundwater underlying the site.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

Project construction would not have an adverse effect on the quality of groundwater underlying the site.

SOV requests were sent to the USEPA Region 6 SSA Program and LDEQ on October 21 and August 8, 2016. The LDEQ SOV response dated September 12, 2016, indicated that all precautions should be observed to protect the groundwater and that if any hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at (225) 219-3640 is required (see Attachments1 and 2 in Appendix C). The USEPA SSA Program response from December 14, 2016 stated that the project should not have an adverse effect on the quality of groundwater underneath the project corridor (see Appendix D). See also Section 7.0 Conditions and Mitigation Measures.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Project construction is not expected to have an adverse effect on the quality of groundwater underlying the site. Should this alternative become the proposed project FEMA EHP would submit SOV requests to resources agencies and impacts would be reassessed based on the agency responses.

4.3 Biological Resources

4.3.1 Federally Protected Species and Critical Habitats

The Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1543) prohibits the taking of listed, threatened, and endangered species unless specifically authorized by permit from the USFWS or the National Marine Fisheries Service (NMFS). "Take" is defined in 16 U.S.C. 1532 (19) as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering (50 CFR § 17.3).

Section 7(a)(2) of the ESA requires the lead federal agency to consult with either the USFWS or the NMFS, depending which agency has jurisdiction over the federally listed species in question, when a federally funded project either may have the potential to adversely affect a federally listed species, or a federal action occurs within or may have the potential to impact designated critical habitat. The lead agency must consult with the USFWS, the NMFS, or both (Agencies) as appropriate and will determine if a biological assessment (BA) is necessary to identify potentially adverse effects to federally listed species, their critical habitat, or both. If a BA is required, it will be followed by a biological opinion from the USFWS, the NMFS, or both depending on the jurisdiction of the federally listed species identified in the BA. If the impacts of a proposed federal project are considered negligible to federally listed species, the lead agency may instead prepare a letter to the Agencies with a "May Affect, but Not Likely to Adversely Affect" determination requesting the relevant agency's concurrence. This final EA serves to identify potential impacts and meet the ESA § 7 requirement by ascertaining the risks of the proposed action and alternatives to known federally listed species and their critical habitat, as well as providing a means for consultation with the Agencies.

Unless otherwise permitted by regulation, the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703-712) prohibits pursuing; hunting; taking; capturing; killing; attempting to take, capture,

or kill; possessing; offering for sale; selling; offering to purchase; purchasing; delivering for shipment; shipping; causing to be shipped; delivering for transportation; transporting; causing to be transported; carrying or causing to be carried by any means whatever; receiving for shipment, transportation, or carriage; or exporting; at any time or in any manner, any migratory bird or any part, nest, or egg of any such bird, that is included on the list of protected bird species (General Provisions; Revised List of Migratory Birds 2013). The USFWS is responsible for enforcing the provisions of this Act.

Pallid sturgeon (PS) is an endangered species that inhabits the Mississippi River. No other federally-listed threatened and endangered (T & E) species are listed for West Feliciana Parish. The Cat Island National Wildlife Refuge Draft Comprehensive Conservation Plan identifies the LMR in West Feliciana Parish within the potential range of the Interior Least Tern (ILT). ILT foraging habitat is present along Bayou Sara, but no barren sandbars suitable for ILT nesting were found during the October 2016 wetlands survey (USFWS, 8/11/16; Arcadis, 3/26/17; USFWS, March 2015).

The main channels of the Mississippi and Missouri Rivers provide 3,350 miles of habitat for the federally-endangered PS. Most PS reported from the LMR, which runs from the Ohio River confluence downstream have been captured immediately below the Old River Control structures, located over 40 miles upstream from Bayou Sara. As of 2012, over 1,050 miles of revetment have been constructed on the banks of the LMR as part of USACE's Channel Improvement Program (CIP). As of 2013, over 500 PS have been captured in the LMR. PS population size has not been quantitatively defined within the LMR. The PS comprised 2.2% of fish captured on winter set trotlines, and ranked fifth in relative abundance out of 22 species collected during two (2) years of trotline sampling at Vicksburg and Tunica, Mississippi. Telemetry studies in the LMR have shown use of multiple channel habitats by larger size classes of PS, such as point bars, secondary channels, island tips, natural banks, and river engineering structures, such as wing dikes and revetted banks. Telemetry monitoring of sonic tagged individuals has shown that PS occur throughout most of the 950-mile reach of the LMR. There is also evidence that the LMR PS population can sustain removal of substantial numbers of individuals from the population. PS recruitment in the LMR has been documented by the capture of multiple age classes and annual mortality is low (< 12%). Since the PS was listed as endangered in 1990, the status of the species has improved and is considered stable. Recent studies of the Mississippi River have shown that suitable PS habitat is available in unimpounded reaches, such as the LMR. Fisheries surveys conducted in the LMR between RM 240 and RM 273 near St. Francisville and the Entergy River Bend Station (RBS) did not encounter any threatened or endangered species. Habitat modifications from the CIP has not adversely affected the status of PS in the LMR. **(**USFWS, 2013 and 2014; USACE, 2014; LMRCC, 2015; Entergy Operations, 2008). Arcadis recommended a determination of no effect for PS in the Biological Resources and Wetlands Finding Report.

The Mississippi River Flyway hosts the world's largest bird migration. Approximately 70% of migratory waterfowl in the U.S. use the flyway. Cat Island National Wildlife Refuge (NWR) covers 9,623 acres, is located slightly over two (2) miles west of Bayou Sara and is also a priority bird conservation area (see Figure 8). Cat Island is also known as Tunica Swamp, which covers a total of 36,500 acres of bottomland forests that provide habitat for migratory and wading birds. A total of 177 avian species have been recorded in the RBS vicinity.

In addition to the listed pallid sturgeon, the project area may provide nesting habitat for the bald eagle (*Haliaeetus ieucocephalus*) which was officially removed from the List of T & E Species as of August 8, 2007. However, the bald eagle remains protected under the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) and the MBTA (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.). The Louisiana Department of Wildlife and Fisheries (LDWF) has not collected comprehensive bald eagle survey data since 2008, and new active, inactive, or alternate nests may have been constructed within the proposed project area since that time.

In southern Louisiana parishes, eagles typically nest in mature trees (e.g., baldcypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water. Bald eagles may also nest in mature pine trees near large lakes in central and northern Louisiana.

No Action Alternative

The "No Action" alternative would entail no project and, therefore, would have no impact on species federally listed as threatened or endangered or on federally-listed critical habitat.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

The composition and abundance of PS forage species in the lower most portions of Bayou Sara may change as a result of revetment construction. The PS is a bottom-dwelling species that is not generally found in shallow depths and would not be expected to occur in Bayou Sara (USACE, 2015; Arcadis, 3/21/17).

"Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat."

"A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12."

"If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected (e.g. adverse, beneficial, insignificant or discountable) by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license Sub-Recipients, can be found in the "Endangered Species Consultation Handbook" at http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF or by contacting our office at the number above."

The USFWS indicated that one (1) threatened, endangered, or candidate species should be considered in an impacts analysis for the proposed project. According to the USFWS, there is one (1) species critical habitat located wholly or partially within the project area: that of the Pallid Sturgeon (*Scaphirhynchus albus)* (Appendix D).

An informal online consultation with the USFWS Louisiana Ecological Services Office (ESO) on August 11, 2016 determined that the proposed project is not an activity that would affect a federally listed T & E species or critical habitat, and that no further ESA coordination with USFWS is necessary. On February 8, 2018 FEMA EHP submitted a SOV to the USFWS ESO since the one (1) year period for the informal online consultation had expired. USFWS online response stated "Based on the information provided in this report, as well as any pertinent correspondence and documentation saved to the project file at our office (if applicable), the Service concurs with your "Not Likely to Adversely Affect (NLAA)" determination for the following species- Pallid Sturgeon" Due to the NLAA determination, FEMA prepared a BA for the project. This BA was submitted to USFWS on (April 10, 2018). FEMA has again made a "May Affect, but Not Likely to Adversely Affect" determination for the Pallid sturgeon. This determination was made based upon the following features within the BA: implementation of the Section 6.0 Recommended Conditions/Conservation Measures, the behavioral attributes and biological needs of the species, and existing habitat conditions within the action area. Per the documentation provided, the water in Bayou Sara is normally too low and too warm for Pallid sturgeon, and any approved construction work would be done in the fall during low water, outside the Pallid sturgeon spawning season.

USFWS concurred with FEMA EHP's determination on June 27, 2018. The letter also states "Section 7 Consultation for the proposed action is concluded. To ensure continued compliance with ESA, reinitiate consultation when: 1) new information reveal that the action may affect listed species or designated critical habitat in a manner or to an extent not considered in this consultation; 2) the action is modified in a manner that causes effects to listed species or designated critical habitat not considered in this consultation; 3) a new species is listed or critical habitat designated that the action may affect.

The USFWS developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at:
http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf

If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then USFWS requires an evaluation to be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary.

In accordance with the MBTA of 1918 (as amended), please be advised should the project area be located in or near wetland habitats which may be inhabited by colonial nesting waterbirds and/or seabirds, additional restrictions may be necessary.

Colonies may be present that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries. That database is updated primarily by (1) monitoring previously known colony sites and (2) augmenting point-to-point surveys with flyovers of adjacent suitable habitat. Although several comprehensive coast-wide surveys have been recently conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to our colonial nesting waterbird guidance on the Louisiana Ecological Services Office (LESO) Web page https://www.fws.gov/lafayette/Migratory _Birds/MigBird. html.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Construction of this alternative would result in similar determinations as the proposed alternative. Should this alternative become the proposed action, FEMA EHP would conduct a BA and consult with USFWS.

4.3.2 Vegetation and Wildlife

The Fish and Wildlife Coordination Act provides the basic authority for the USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It also requires Federal agencies that construct, license, or permit water resource development projects to first consult with the Service and State fish and wildlife agency regarding the impacts on fish and wildlife resources and measures to mitigate these impacts.

The Mississippi River Flyway hosts the world's largest bird migration. Approximately 70% of migratory waterfowl in the U.S. use the flyway. Cat Island National Wildlife Refuge (NWR) covers 9,623 acres, is located slightly over two (2) miles west of Bayou Sara and is also a priority bird conservation area (see Figure 8). Cat Island is also known as Tunica Swamp, which covers a total of 36,500 acres of bottomland forests that provide habitat for migratory and wading birds. A total of 177 avian species have been recorded in the RBS vicinity. A total of 88 species of reptiles and amphibians are known or expected on the NWR. A diverse population of mammalian species are present or are historically known to occur at Cat Island NWR. Terrestrial mammals found at the RBS site, located four (4) miles downstream of Bayou Sara on the Mississippi River, that would be expected to be present in the project corridor include beaver, bobcat, red fox, mink, opossum, cottontail and swamp rabbits, raccoons, skunks, fox and gray squirrels, and white-tailed deer (USACE, 2015; USFWS, 2015; Entergy Operations, 2008; North American Native Fishes Association).

The NatureServe Network lists 89 fish species present in the Bayou Sara-Thompson Creek watershed (FishMap.org). Several fish species, such as gars, bowfin, common carp, buffalos,

channel and blue catfish, white bass, crappie, and freshwater drum forage in the floodplains of the LMR, which includes the project corridor, during high water periods. Muskrat and river otter have also been documented at the RBS site.

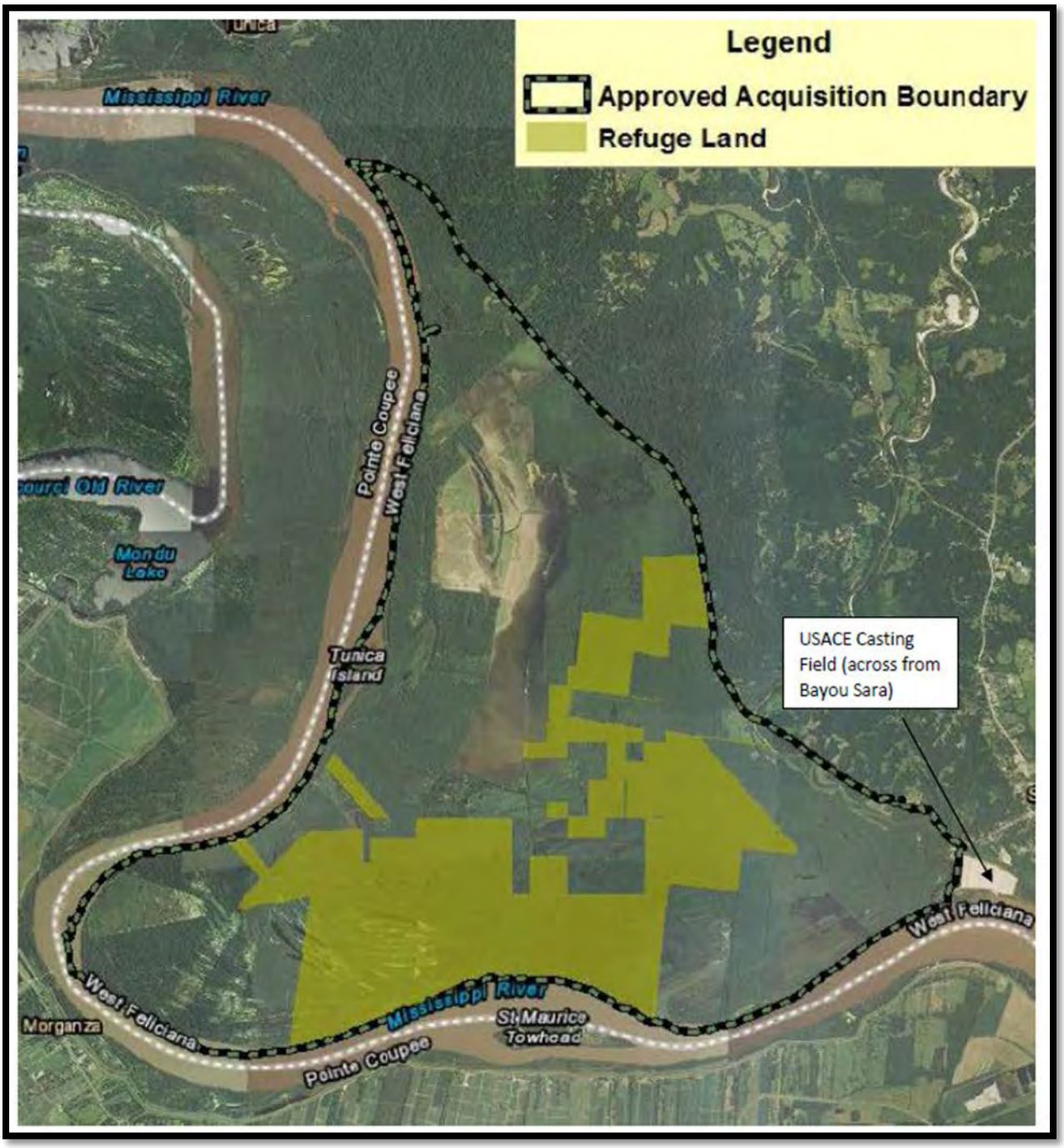

Figure 8: Cat Island NWR Location Map
(Cat Island NWR Draft Comprehensive Conservation Plan and EA, March 2015)

Icthyoplankton surveys of larval fishes near the RBS site have documented 45 species with drums, herrings, minnows and suckers representing 95% of the species collected. A total of 195

freshwater fish species have been documented in the river, which is 1/3 of the total of these species found in North America. Most fish in the LMR spawn in backwater habitats. Commercial harvest in the Upper Mississippi River (UMR) is dominated by common carp, buffalos (bigmouth and smallmouth), catfishes (channel and flathead), and freshwater drum. These same UMR species are also dominant in the LMR commercial fishery (Entergy Operations, 2008).

The Louisiana Natural Heritage Program (LNHP) species list for West Feliciana Parish includes 15 animal and 21 plant species (see the LWF Species by Parish list at http://www.wlf.louisiana.gov/wildlife/species-parish-list?id=274&type1=All. This LNHP list includes five (5) avian, four (4) mammalian, four (4) fish one (1) amphibian (salamander), and one (1) insect species. The avian species include the Bald eagle, which is protected under the Bald and Golden Eagle Protection Act.

The mammalian species in this list includes the Louisiana Black Bear (LBB), which has been delisted from the Federal T & E species list in March 2016 due to the successful recovery of this species. However, the Black Bear remains protected under Louisiana State Law, and LDWF continues to actively manage this subspecies. The Service and LDWF have developed a plan to extensively monitor the status of the Louisiana black bear for 7 years following its delisting (until year 2022). That monitoring will be undertaken to detect any potential population decreases or threat increases that may warrant the implementation of measures to ensure that the Louisiana black bear remains secure from risk of extinction.

The Mississippi River is characterized by strong, variable flows and heavy sediment loads that constantly scour benthic habitat. Aquatic vegetation is mostly limited to filamentous algae on floating and anchored objects, such as fallen trees along the banks. High turbidity in the LMR limits the growth and production of phytoplankton and other primary producers, limiting food and habitat resources for riverine aquatic species. Scour from the high sediment load in the river exposes gravel and bedrock on the bottom, which limits the growth and production of the benthic community. Over 150 MMT/year of suspended sediment is discharged to the LMR annually (Entergy Operations, 2008).

More than 110 taxa of planktonic algae have been collected from the river at the Entergy RBS nuclear plant, located approximately four (4) miles downstream from the Bayou Sara confluence. Zooplankton surveys of the river near RBS have resulted in the identification of more than 140 invertebrate taxa.

No Action Alternative

The "No Action" alternative would entail no project and, therefore, would have no impact on vegetation, migratory birds or other wildlife.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

Clearance trees and vegetation to create temporary access roads through existing woodlands would result in the temporary loss of 0.9 acres of riparian vegetation, which would result in a negligible loss of foraging habitat for terrestrial species, such as the LBB (this clearance activity would result in permanent loss of the wetland area covered by this access road as stated in Section 4.2.1). No

suitable nesting habitat for the LBB was identified near the project corridor. After construction, riparian vegetation along the access road would be restored (Arcadis, 3/20/17).

During construction fish and other motile animals would likely avoid the project site. The revetments would not appreciably reduce the foraging area for these species. The revetments would provide an increase in habitats for organisms that live on rock surfaces, but there would be a decrease of 2.06 acres of habitat for organisms that live in soft substrates (area below the OHWM) that is converted to rock substrate (USACE, 12/21/16; Arcadis, 3/20/17). This change in benthic habitat would be localized.

A USACE Engineer Research and Development Center Environmental Laboratory review of the environmental effects of many stream stabilization projects revealed the following impacts from riprap on aquatic resources:

- Impacts to warm water aquatic organisms are generally beneficial. The list of fish species that have benefited from riprap projects includes sturgeon, paddlefish, striped bass, flathead and blue catfish, and freshwater drum.
- Armor techniques favor species that use interstitial voids as shelter or cover, and usually result in an increase in macroinvertebrate biomass and density (Fischenich, 2003).

The overall impacts to vegetation and wildlife would be minor. No impacts to avian species would be expected. In response to FEMA EHP SOV request dated August 8, 2016, LDWF responded "After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats within Louisiana's boundary are anticipated for the proposed project. No state or federal parks, wildlife refuges or scenic streams are known at the specified site within Louisiana's boundaries."

If at any time any species that are tracked by the LNHP are encountered, contact the LNHP Data Manager at 225-765-2643 (see Appendix D). See also Section 7.0 Conditions and Mitigation Measures.

During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the LESO webpage: https://www.fws.gov/lafayette/Migratory _Birds/MigBird. html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers. php).

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

The area of riparian vegetation clearance for access roads through woodlands along Bayou Sara would be increased by up to 0.45 acre in addition to the 0.9 acre clearance area for the proposed action. There would be a decrease of 3.1 acres of habitat for organisms that live in soft substrates (area below the OHWM) that is converted to rock substrate. This change in benthic habitat would be localized. The overall impacts to vegetation and wildlife would be as stated for

the proposed action. FEMA EHP would consult with LDWF to ensure all impacts resources are identified.

4.4 Cultural Resources

The consideration of impacts to historic and cultural resources is mandated under § 101(b)4 of NEPA as implemented by 40 CFR, Parts 1501-1508. Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to take into account their effects on historic properties (i.e., historic and cultural resources) and allow the Advisory Council on Historic Preservation (ACHP) an opportunity to comment. FEMA has chosen to address potential impacts to historic properties through the "Section 106 consultation process" of the NHPA as implemented through 36 CFR, Part 800.

In order to fulfill its Section 106 responsibilities, FEMA has initiated consultation on this project in accordance with the "Programmatic Agreement Among the Federal Emergency Management Agency, the Louisiana State Historic Preservation Officer (SHPO), the Governor's Office of Homeland Security and Emergency Preparedness, and Participating Tribes" executed on December 21, 2016 (2016 Louisiana State-Specific Hazard Mitigation Grant Program Programmatic Agreement (LA Statewide PA); see https://www.fema.gov/media-library/assets/documents/128322). The *LA Statewide PA* was created to streamline the Section 106 review process.

The "Section 106 process" outlined in the *LA Statewide PA* requires the identification of historic properties that may be affected by the proposed action or alternatives within the project's area of potential effects (APE). Historic properties, defined in § 101(a)(1)(A) of NHPA, include districts, sites (archaeological and religious/cultural), buildings, structures, and objects that are listed in or determined eligible for listing in the National Register of Historic Places (NRHP). Historic properties are identified by qualified agency representatives in consultation with interested parties. The *LA Statewide PA* was created to streamline the Section 106 review process. Below is a consideration of various alternatives and their effects on historic properties.

No Action Alternative

This alternative would not include any FEMA undertaking; therefore FEMA has no further responsibilities under § 106 of the NHPA.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

A review of this alternative was conducted in accordance with the *LA Statewide PA*. Historic Properties within the APE were identified based on FEMA's review of the NRHP database, the *Louisiana Cultural Resources Map* provided by SHPO, historic map research, and an archaeological site visit conducted by FEMA Historic Preservation (HP) staff on July 28, 2016. This data was evaluated by FEMA using the NRHP Criteria. FEMA additionally verified that there are no standing structures located within the APE. The APE is not located within a listed or eligible National Register Historic District, nor is the APE located within the view-shed of a property individually listed in the NRHP. Based on the results of FEMA's desktop review and the July 28, 2016, site visit, FEMA determined that the Bayou Sara Bank Stabilization Project (BSBSP), as

proposed, would affect portions of the former village of Bayou Sara. Bayou Sara was first identified through archival research in 1983 by National Park Service (NPS) archaeologists conducting a cultural resources study for the USACE. During that time NPS conducted a site visit and performed limited surface collection. This investigation resulted in the recordation of Archaeological Site 16WF37 (Bayou Sara; Greene et al., 1984). At the time the presumed function of the site was classified as a trading post and townsite. No determination regarding the eligibility of Site 16WF37 for inclusion in the NRHP was made.

FEMA's background research indicated that only a portion of the former village of Bayou Sara was included within the recorded boundary of Site 16WF37, and FEMA's July 28, 2016, site visit did not provide enough information to determine the extent and the NRHP eligibility of Site 16WP37. In November of 2016, FEMA contracted Coastal Environments, Inc. (CEI) to conduct a Phase I archaeological survey of the BSBSP area. The Phase I archaeological survey identified historic features and artifacts associated with the former village both at the ground level and within the exposed cut-banks of Bayou Sara throughout the majority of the project area. Based on the results of the aforementioned survey, CEI submitted an LA SHPO Site Form Update proposing to increase the boundary of 16WF37 to encompass the entire former extent of the village of Bayou Sarah as is indicated in historic map overlays (Carpenter and Kelly 2017). On March 7, 2017, SHPO adopted the proposed site boundary change increasing the total size of the site from 0.98 acres (0.39 hectares; ha) to 122.73 acres (49.66 ha); encompassing the majority of the BSBSP APE.

The purpose of the NRHP is to list properties that are "significant in American, history, architecture, archaeology, and culture (NHPA § 101(a)(1)." Typically, archaeological sites are evaluated on Criterion D, though other criteria may apply as well. The quality of significance is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association; and (d) that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4). Based on the aforementioned Identification and Evaluation, FEMA has determined that there is one (1) historic property (Site 16WF37; Bayou Sara) as defined in 36 CFR 800.16(l) within the BSBSP project area and that Site 16WF37 is eligible for NRHP under Criterion D for purposes of this Section 106 review. As proposed, the BSBSP includes ground disturbing activities that would affect this historic property in a way that will directly affect the characteristics that make the property eligible for the NRHP and per 36 CFR 800.6 constitute an adverse effect. Therefore, FEMA has determined a finding of Adverse Effect to Historic Properties for this Undertaking.

Following Stipulation II.C.5(b) of the *LA Statewide PA*, FEMA requested that West Feliciana Parish Government (Applicant) consider ways to revise the Scope of Work (SOW) to substantially conform to the standards, and/or avoid or minimize adverse effects for National Register listed or eligible traditional cultural properties and/or archaeological properties. As a result, the proposed SOW for this project was re-examined, and based on hydraulic studies, it was determined that the overall project footprint could be reduced to minimize potential impacts to cultural and wetland resources while also decreasing total project costs by eliminating the portion of the revetment between Reaches 1 and 2, which is evaluated in this EA as the Considered Alternative (Appendix E). In an effort to further minimize the construction footprint and potential effects to Site 16WF37, the Applicant has committed to using existing access roads to the maximum extent possible and

staging construction activities from within the previously disturbed stream channel as is feasible. The current proposed action project design in Appendix A reflects these minimization efforts.

Since it would be impossible to avoid adversely effecting those portions of Site 16WF37 contained within the eroding bank, even with the footprint minimization measures, in accordance with II.C.6(a) of the *LA Statewide PA*, Abbreviated Consultation Process, on April 10, 2016, FEMA initiated consultation with SHPO,and the Tribes, with the proposal to resolve the adverse effects of the undertaking through the implementation of the *LA Statewide PA,* Appendix C Treatment Measure (TM; not an appendix to this EA), IX: Archaeological Research Design and Data Recovery Plan (Phase III) and TM III: Public Interpretation.

FEMA EHP has determined that the significance of site 16WF37 can be documented through archaeological data recovery and believes that the adverse effects of the undertaking would be adequately mitigated through the implementation of TMs IX and III, which are fully described in Appendix E. The Phase III process would be anticipated to record enough information so that the complete or partial destruction of the site within the proposed action footprint would not result in the loss of significant amount of archaeological data.

SHPO concurrence with the proposed use of these TMs and the Phase III research design was received May 08, 2017 (see Appendix E). Consultation with the following affected Tribes was conducted per 36 CFR §800.2(c)(2)(i)(B):

- Choctaw Nation of Oklahoma (CNO)
- the Coushatta Tribe of Louisiana
- the Eastern Shawnee Tribe of Oklahoma
- the Jena Band of Choctaw Indians
- Kialegee Tribal Town
- the Mississippi Band of Choctaw Indians
- Muscogee Creek Nation
- the Seminole Nation of Oklahoma (SNO) and
- the Tunica-Biloxi Tribe of Louisiana

The SNO provided written concurrence on May 12, 2017. Additionally, the CNO responded on May 10, 2017, with the determination "that since there are no known Choctaw cultural or sacred sites located in the APE, the Choctaw Nation Historic Preservation Department deferred to the other consulting parties." The remaining consulted tribes did not object within the regulatory timeframes; therefore, in accordance with Stipulation II.C.4 of the PA and 36 CFR part 800.5(c)1, FEMA may proceed with funding the undertaking assuming concurrence. Additionally, the applicant must comply with the NHPA conditions described in this document (Louisiana Unmarked Human Burial Sites Preservation Act and Inadvertent Discovery Clause; These Conditions are specified in Section 7.0).

Copies of FEMA's April 10, 2016 consultation letter were also sent to the GOHSEP, West Feliciana Parish Government, the West Feliciana Historical Society, and the ACHP along with a description of the application of these TMs to the proposed action (Appendix E). FEMA also posted a public notice of the intended use of these formal TMs on the website hosted by the

Louisiana Department of Culture Recreation and Tourism: http://www.crt.state.la.us/dataprojects/culturalassets/fema106/, for a 15-day comment period and received no objections to FEMA's proposed resolution of the adverse effect (Appendix E). This notice was also posted on the following West Feliciana Parish website: http://wfparish.org/news/2017/4/fema-seeking-public-comment. Furthermore, FEMA notified the ACHP of this determination and provided documentation of all responses received in correspondence dated May 18, 2017 (see Appendix E).

The Phase III research design builds on the results of the Phase I archaeology survey, and is intended to collect data from the archaeological site, through sampling of cultural deposits, and the identification and excavation of additional historic features, analyze artifacts to determine their integrity and significance. The research design specifically proposes to excavate between four (4) and six (6) test units within the Reach 1 and 2 revetment footprints. Each test unit would consist of a one (1) meter x one (1) meter hand-excavated area to isolate cultural material for further processing, documentation, and study in accordance with the Louisiana Division of Archaeology' Phase III Standards (http://www.crt.state.la.us/cultural-development/archaeology/section-106/field-standards/phase-iii-data-recovery/index) and the ACHP's *Recommended Approach for Consultation on Recovery of Significant Information for Archaeological Sites* (64 FR 27085). Furthermore, FEMA would require the production of a detailed map that includes all features within, and in reasonably close proximity to the archaeological APE. Following completion of the Phase III archaeological fieldwork and analysis, FEMA, GOHSEP, and West Feliciana would consult with SHPO, participating Tribes, and others, as appropriate, to design an education or public interpretive plan in compliance with TM III.

FEMA EHP also emphasizes that the remaining area of site 16WF37 between Ferdinand Street, Bayou Sara and the project footprints, would not be destroyed by construction of the proposed action, and would to a certain extent be protected and preserved from further erosion and washout from Bayou Sara, which has already eroded away several blocks of the former townsite as shown in Figure 4 of the SHPO Consultation Letter in Appendix E Implementation of these measures along with the TMs would reduce potentially major impacts to cultural resources to a moderate level. The mitigation requirements to complete the Phase III Data Recovery Process for TM IX and the Public Interpretation for TM III have been added to Section 7.0.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

The considered alternative would impact a larger area within the footprint of the form town of Bayou Sara than the proposed action would, the Considered Alternative would likely result in an Adverse Effect to portions of Site 16WF37 and would require consultation under Section 106 of the NHPA. FEMA would follow its Section 106 review procedures, described previously in this section, if this proposed action is submitted to FEMA for funding consideration. Any additional conditions or requirements would be documented at that time.

4.5 Socioeconomic Resources/Issues

4.5.1 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed on 11 February 1994. This EO directs federal agencies to make achieving environmental justice part of their missions by identifying and addressing, as appropriate, disproportionately high adverse human health, environmental, economic, and social effects of their programs, policies, and activities on minority and/or low-income populations.

The proposed revetments are located in the southwest corner of Census Tract (CT) 9518, which includes the southeast portion of West Feliciana Parish. CT 9518 is divided into four (4) Block Groups (BGs). The southern tip of BG 9518.003 includes the strip of land between Bayou Sara and Ferdinand Street and continues northward between the St. Francisville city limit and Bayou Sara. The southwest edge of BG 9518.002 lies to the east of Ferdinand Street and continues northward to include the entire St. Francisville city limit plus an area to the southeast of town between the Barrow Fork River (also known as Alligator Bayou), Thompson Creek and the Mississippi River. The two (2) other BGs within CT 9518 are located over 2.5 miles to the east of the project corridor. A summary of racial population statistics for these BGs compared to Louisiana and the U.S. are presented in Table 2.

Table 2. Summary of Racial Data

Racial Group	United States	Louisiana	BG 9518.002	BG 9518.003
White	77.1%	63.2%	49.04%	82.71%
Black	13.3%	32.5%	49.29%	16.06%
Hispanic	17.6%	5%	0%	4.31%
Asian	5.6%	1.8%	1.1%	0%

Block Groups (BG) 9518.002 and 9518.003 are two (2) of the four (4) BGs within Census Tract 9518.
(Source: U.S. Census Bureau, 2016; NEPAssist, 7/27/17)

BG 9518.003 has a greater proportion of white population relative to the U.S. and Louisiana. This BG has a smaller proportions of Hispanic and Asians than the U.S. and Louisiana. The proportion of black residents in this BG is greater than the U.S. average, and less than ½ the percentage of black residents in Louisiana. The population of BG 9518.002 is evenly balanced between black and white residents. The percentage of black residents in this BG is higher than the Louisiana and U.S. averages while the proportion of white populations is less than the U.S and Louisiana averages.

In 2014, the federal poverty level for a family of four was set at $23,834. The percentage of the population in CT 9518 with an income below the poverty line in 2015 was 18.9%, which is below the Louisiana poverty rate of 19.8%, but greater than the U.S. poverty rate of 13.5%.

No Action Alternative

There are no residents or dwellings within the project corridor. The Oyster Bar, located at 11101 Ferdinand Street adjacent to the planned revetment in Reach 2, is a small bar and restaurant. This business may eventually be eroded away and undercut by the continued natural migration of the Bayou Sara channel. The loss of this business would not have a significant effect to the local economy, but would adversely affect the business owner and employees. No adverse effects on populations near the project corridor would be anticipated if no action is taken. However, the continued erosion of the bank would impact the STP and affect the populations being serviced by this utility.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

During construction, the loss or reduction of available parking and increased noise from truck traffic and construction equipment may result in temporary disruption and loss of business at the Oyster Bar. At the completion of construction, normal business activity would be expected to resume. The slowdown of business activity during construction may result in reduced revenue for the Oyster Bar, and reduced wages for its workers, but would not be significant community level economic impact. No adverse effects to any populations near the project would be expected. The proposed improvements would prevent impacts to the STP and avoid adverse effects to the populations being serviced by this utility.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Long-term impacts to the Oyster Bar would be similar to those described under the proposed action, as would the short-term impacts, however the construction period would likely be longer. No adverse effects on populations near the project corridor would be expected under this alternative. No mitigation would be required for this issue.

4.5.2 Public Health and Safety

Public safety resources in St. Francisville include police, fire, ambulance and Enhanced Universal Emergency Number (E911) Services. The St. Francisville Police Department (SFPD) is located at 11936 Ferdinand Street. The St. Francisville Fire Department is next door to the SFPD at 11922 Ferdinand Street. These locations are just over one (1) mile from the St. Francisville STP. The West Feliciana Parish Fire Department can provide additional technical rescue capabilities including water rescues, if needed on Bayou Sara. Emergency Medical Services and transport in West Feliciana Parish are provided by West Feliciana Parish Hospital located at 5266 Commerce Street in St. Francisville, which is approximately 1.2 road miles from the STP. Two (2) ambulances with Advanced Life Support and advanced cardiac care capability are staffed 24 hours a day. These ambulances can send patient information directly to emergency room physicians, which reduced door-to-door service time. E911 services are provided by the 911 Communications District, which was created by the West Feliciana Parish Police Jury. Recreational activities occurring on Bayou Sara include hiking, boating, fishing and canoeing (WFPH; Arcadis, 3/20/17).

No Action Alternative

Under the "No Action" alternative there would be no new project and the existing public health and safety resources would not be effected. Eventually, however, unmitigated streambank erosion would result in the erosion and undercutting of the St. Francisville STP treatment lagoons. Considerable expenditure would result from having to site and construct a replacement STP to provide adequate treatment of sewage from the St. Francisville sanitary system.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

No effects to local emergency services would be expected under the Proposed Action Alternative. Public access to the St. Francisville STP is restricted by a chain link fence. Operations personnel would continue to access the STP via a locked access gate at the northeast corner off Ferdinand Street. All construction activities would be conducted in accordance with the Occupational Health and Safety Administration (OSHA) Construction Industry Standards at 29 CFR 1926, including the cofferdam requirements at 29 CFR 1926.802. Appropriate signage and access barriers would be placed adjacent to the revetments prior to the start of construction activities to alert Bayou Sara recreationists of project activities.

Recreational use of Bayou Sara cannot be restricted under Louisiana's public trust doctrine, which allow the public to use navigable rivers for activities related to navigation, such as boating and fishing (Louisiana 20th Judicial District Court). During the construction period for the proposed action, implementation of a "no wake" rule in the project corridor is recommended to ensure that boating activities do not create waves that could overtop the coffer dams set up for revetment construction.

Temporary fencing between the Oyster Bar parking lot and adjacent working areas would also be desirable to prevent public access to Reach 2. It is not known at this time if any overhead power lines at the STP would need to be temporary removed to provide adequate clearance for equipment/vehicle access to the Staging and Excess Cut Placement Areas at the STP. Should the distribution power line at the STP need to be relocated, proper circuit lock-out, tag-out, deactivation and de-energizing procedures would be followed prior to moving the power line, and to re-energize the overhead line once they have been relocated. These procedures would be required to comply with the OHSA Power Line Safety regulations at 29 CFR 1926.1407-1411, and comply with the National Electrical Safety Code and National Electric Code, as appropriate. See also Section 7.0 Conditions and Mitigation Measures.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Impacts to public health and safety would be expected to be the same as stated for the proposed action. The proposed action mitigation measures would also be expected to be sufficient for implementing this alternative.

4.6 Noise

Noise is commonly defined as unwanted or unwelcome sound, and most commonly measured in decibels on the A-weighted scale (dBA), which is the scale most similar to the range of sounds that the human ear can hear. Sound is federally regulated by the Noise Control Act of 1972, which charges the USEPA with preparing guidelines for acceptable ambient noise levels. USEPA guidelines, and those of many other federal agencies, state that outdoor sound levels in excess of 55 dB day-night average sound level are "normally unacceptable" for noise-sensitive land uses including residences, schools, or hospitals.

Construction equipment and vehicles that would likely be used at the site include cranes, trucks, backhoes, graders, compressors, generators, bulldozer, dump trucks, excavators, front end loaders, pumps, and compactors. Noise levels measured 50 feet from these vehicles and equipment ranges from 76 dBA for pumps, 80 dBA for backhoes, 85 dBA for dozers, to 88 dBA for trucks.

There are no noise-sensitive receptors, such as residences, schools, and day care centers in the immediate vicinity of the project site. The nearest residence, church, and day care facilities are approximately 600, 1100 and 2300 feet away, respectively. St. Francisville students attend public schools in the community of Bains, located two (2) miles north of town. There are no nursing homes within the St. Francisville town limits (St. Francisville Churches webpage at http://www.stfrancisville.net/residents/churches-in-town.htm.; West Feliciana Parish Schools webpage at http://www.wfpsb.org/contact_us.).

No Action Alternative

There would be no change the ambient noise environment in the project corridor.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

Residents along Ferdinand Street would experience minor increases in noise from project traffic during the construction period. Recreationists would be expected to avoid travel along Bayou Sara during project construction. Fishing and boating activities on the Mississippi River would not be expected to be effected by project construction noise. Project construction activities would be limited to normal working hours, which would not include evening and night time hours, and would not be expected to adversely affect St. Francisville residents. These noise impacts would be considered to be negligible.

If noise levels from project construction create incompatible uses on adjoining properties, the West Feliciana Parish Code Chapter 115, § 115-1 requires the use of buffers or screens to make adjoining uses compatible. See also Section 7.0 Conditions and Mitigation Measures.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

The noise effects from construction of the revetment would be the same as state for the proposed action. Buffers or screens would be required if construction noise levels created temporary incompatibilities with the use of adjoining properties per the Parish Code Chapter 115.

4.7 Excavation and Waste Management Issues

4.7.1 Excavated Material Management

The objectives of the Resource Conservation and Recovery Act (RCRA) are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. RCRA regulates the management of solid waste (e.g., garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals.

Paper, plastic, and glass bottles were visible in the eroded streambank adjacent to the STP during the July 28, 2016 site visit. On January 20, 2017 LDEQ received a citizen's complaint regarding trash and debris washing into Bayou Sara at this same location. The Bayou Sara streambank is also eroding away the edge of the paved area behind the Oyster Bar in Reach 2.

The Phase I archaeological investigation found buried artifacts within the historic footprint of the Bayou Sara townsite, which covers all of the project corridor, including glass, brick, ceramics, asphalt paving, metal, and rubble.

No Action Alternative

No excavation of the Bayou Sara streambed would occur. There would be no need to manage excavated materials; however, it is possible that additional trash and debris that is buried in the streambank adjacent to the STP would be eroded and released into Bayou Sara. Such releases would be considered a minor adverse impact to Bayou Sara.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

Visual assessments of the Bayou Sara townsite debris that are excavated from the streambank and placed in the Excess Cut Placement Area would be made. Inert material, which is defined as not being chemically or biologically reactive and will not decompose, would not be separated from the excavated soils. Any visibly non-inert, modern trash and solid waste that has been excavated and placed within the Excess Cut Placement Area would be segregated from the rest of the materials and containerized, along with the trash observed in the Reach 1 streambank for offsite disposal at a permitted solid waste disposal facility. Removal and segregation of non-inert materials from the streambank for proper disposal would prevent the eventual erosion of these materials into Bayou Sara and prevent future impacts to water quality. These activities would be considered to have a minor beneficial impact.

The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and toxic waste in accordance with all local, state, and Federal requirements. The applicant/construction contractor shall not offer solid waste to transporters or disposal facilities that have not received authorization and/or the required permits necessary to receive and/or manage the generators solid waste. All coordination pertaining to these activities should be documented and copies forwarded to GOHSEP and FEMA as part of the permanent project files. An SOV was prepared and sent to LDEQ on August 9, 2016. LDEQ responded on September 12,

2016 (Appendix D). The SOV response stated that if any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at (225) 219-3640 is required. All precautions must also be taken to protect workers from hazardous constituents. See also Section 7.0 Conditions and Mitigation Measures.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Additional excavation of streambank material along Reach 3 would likely be needed to provide proper slopes for the revetment materials. The volume of excavated materials would be expected to be 50% greater than the volume removed along Reaches 1 and 2 or about 6,600 CY. These materials would also be managed in the Excess Cut Placement Area. If this 0.87-acre area is insufficient to adequately manage this volume of material, it would be moved to another suitable location within the STP grounds and enlarged.

Visual assessments of material excavated from the streambank and placed in the Excess Cut Placement Area would be conducted to identify and remove non-inert trash and debris for containerization and property disposal.

4.7.2 Hazardous Material Management

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, authorizes USEPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment, that might come from any source. Superfund also grants USEPA authority to force parties responsible for environmental contamination to clean it up or to reimburse response costs incurred by USEPA.

The Superfund Amendments and Reauthorization Act of 1986 created the Emergency Planning and Community Right-to-Know Act (EPCRA). EPCRA regulations establish several types of reporting obligations for facilities that store or manage specified chemical, including chemicals used by the construction industry, such as solvents.

The Toxic Substances Control Act (TSCA) allows USEPA to collect data on chemicals to evaluate, assess, mitigate, and controls risks which may be posed by their manufacture, processing, and use. TSCA regulates polychlorinated biphenyl (PCB) in electrical equipment, including pole-mounted transformers (PMTs) which are present on overhead power lines between the Staging Area and STP lagoons.

No Action Alternative

There would be no need to manage hazardous materials used in construction equipment since no construction would occur. The normal chlorination of STP effluent in the chlorine contact chamber would continue (LDEQ, 5/29/12). The use of chlorine gas for this purpose would continue. No hazardous materials impacts would be expected.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

The PCB status of PMTs at the STP is not known. Per NEPAssist, no CERCLA, TSCA, radiation, toxic release, Brownfields or hazardous waste sites have been identified at or near the project corridor (Accessed at http://nepassisttool.epa.gov/nepassist/entry.aspx.) Project construction would be expected to encounter minimal or no hazardous materials or toxic waste during access road clearance, excavation, or fill activities. Spills of fuels, oils, and hydraulic fluids from vehicles and equipment used in construction could reach the streambed and adjacent soils and vegetation. The construction crew would be equipped with spill control supplies, such as sorbent pads, to quickly stop the release of these materials and promptly containerize any contaminated materials and/or sediment/soil. Leaky vehicles and equipment would be taken out of service, if required, and repaired prior to being placed in service again at the project site. Adverse effects to Bayou Sara and floodplain soils from spills and leaks would not be expected. No permits for hazardous materials and toxic waste management and disposal would be anticipated to be needed.

If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations. The contractor would be required to take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction area.

The construction contractor shall comply with CERCLA hazardous substance release reporting requirement, if an applicable release occurs. An SOV was prepared and sent to LDEQ on August 9, 2016. LDEQ's response from September 12, 2016 stated that if any hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at (225) 219-3640 is required. Precautions should also be taken to protect workers from hazardous constituents (see Appendix D). Notify the National Response Center (NRC) at 800-424-8802 if an oil discharge to water occurs. See also Section 7.0 Conditions and Mitigation Measures

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Impacts from the management of hazardous materials would be the same as those described under the proposed action. Mitigation measures would also be the same as stated for the proposed action.

4.8 Traffic and Transportation

Ferdinand Street provides access to the St. Francisville STP, the USACE Casting Fields site, the Oyster Bar restaurant at 11101 Ferdinand Street, and a boat launch site on the Mississippi River. Recreationists also park in the Oyster Bar parking lot to access Bayou Sara.

No Action Alternative

There would be no changed to traffic volume or traffic patterns on Ferdinand or surrounding local streets.

Proposed Action: Construct two (2) Revetments Adjacent to the STP and the Oyster Bar

Project construction would produce a localized increase in traffic from the haul trucks transporting 22,720 CY of concrete block mats, riprap stone, compacted fill and timber mats to the project corridor. The number of trips required to bring all of these materials to the project corridor would be dependent on the sizes of haul trucks used. Over 1,800 trips would be required if 20-ton capacity trucks were used (based on 1.67 tons/CY of riprap). With an anticipated construction timeframe of at least three (3) months, this level of project construction traffic would temporarily increase overall daytime traffic on Ferdinand Street. Vehicular traffic would be maintained on Ferdinand Street during the construction period. Parking and project haul traffic conflicts at the Oyster Bar may occur. These traffic and transportation effects would be considered negligible.

Coordination of haul truck delivery schedules with the STP operators and the Oyster Bar is recommended. West Feliciana Parish and St. Francisville do not have any local requirements for hauling or road permits. Coordination with the St. Francisville Maintenance Department is required to determine the need for traffic management measures during the project construction period. See also Section 7.0 Conditions and Mitigation Measures.

Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar

Project construction would produce a localized increase in traffic from the haul trucks transporting 25,940 cubic yards of concrete block mats, riprap stone, compacted fill, and timber mats to the project corridor. The number of trips required to bring all of these materials to the project corridor would be dependent on the sizes of haul trucks used. Over 2,100 trips would be required if 20-ton capacity trucks were used, which would be approximately 300 more trips than would be required under the proposed action. With an anticipated construction timeframe of up to several months, this level of project construction traffic would temporarily increase overall daytime traffic on Ferdinand Street. Vehicular traffic would be maintained on Ferdinand Street during the construction period. Parking and project haul traffic conflicts at the Oyster Bar may occur. These traffic and transportation effect would be considered negligible.

Coordination of haul truck delivery schedules with the STP operators and the Oyster Bar would be recommended. Coordination with the St. Francisville Maintenance Department would also be required to determine the need for traffic management measures during the project construction period.

5.0 CUMULATIVE IMPACTS

The President's CEQ regulations state that the cumulative impact of a project represents 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).

In its comprehensive guidance on cumulative impacts analysis under NEPA, CEQ notes that "the range of actions that must be considered includes not only the project proposal, but all connected and similar actions that could contribute to cumulative effects" (Regulations for Implementing the Procedural Provisions of the NEPA 2005). The term, "similar actions," may be defined as "reasonably foreseeable or proposed agency actions [having] similarities that provide a basis for evaluating the environmental consequences together, such as common timing or geography" (40 CFR § 1508.25[a][3]).

Because some effects may be irrelevant or inconsequential to decisions about the proposed action and alternatives, the focus of the cumulative effects analysis should be narrowed to important issues of national, regional, or local significance. To assist agencies in this narrowing process, CEQ (2007) provides a list of several basic questions to be considered, including: (1) Is the proposed action one of several similar past, present, or future actions in the same geographic area; (2) Do other activities (governmental or private) in the region have environmental effects similar to those of the proposed action?; (3) Have any recent or ongoing NEPA analyses of similar or nearby actions identified important adverse or beneficial cumulative effect issues?; and (4) Has the impact been historically significant, such that the importance of the resource is defined by past loss, past gain, or investments to restore resources?

It is normally insufficient when conducting a cumulative effects analysis (CEA) to merely analyze effects within the immediate area of the proposed action. Geographic boundaries should be expanded for cumulative effects analysis and conducted on the scale of human communities, landscapes, watersheds, or airsheds. Temporal frames should be extended to encompass additional effects on the resources, ecosystems, and human communities of concern. A useful concept in determining appropriate geographic boundaries for a CEA is the project impact zone, that is, the area (and resources within that area) that could be affected by the proposed action. The area appropriate for CEA will, in most instances, be a larger geographic area occupied by resources outside of the project impact zone (CEQ 2007).

The resource categories described in Sections 4.1 through 4.8 that have the potential for minor or moderate environmental effects are wetlands, surface water and water quality, vegetation and wildlife, cultural resources, public health and safety, and excavated material management. The regions of influence (ROI) considered for CEA for this EA are as follows:

- Wetlands: Bayou Sara downstream from the STP to the confluence with the Mississippi River plus the adjacent bottomland hardwood forest and it associated wetlands on the west side of Bayou Sara including the Cat Island NWR
- Surface Water/Water Quality, Vegetation and Wildlife, and Excavated Material Management: Bayou Sara downstream from the STP to the confluence with the Mississippi River
- Cultural Resources: The former Bayou Sara townsite including the St. Francisville Casting Field

Past, present and reasonably forseeable future actions for the project area are discussed further in this section to determine the potential for these environmental resources to be effected in a cumulative significant manner. Past and present projects in the vicinity of the Bayou Sara Streambank Stabilization Projects include:

- A Riverfront Concept Plan (RCP) for the vicinity of the Bayou Sara/Mississippi River confluence
- the USACE St. Francisville Articulated Concrete Mattress (ACM) Casting Field at 11376 Ferdinand Street, which is located on the former Bayou Sara townsite
- Redevelopment of the old St. Francisville High School property to the north of the RRP parcel
- A Riverfront Redevelopment Plan (RRP) for an industrial property at 4664 Princeville Road located adjacent to the northwside of the STP

In 2005, the U.S. Congress authorized funding for a study to determine the feasibility of a riverfront development to enhance public access and recreation along lower Bayou Sara and the Mississippi Riverfront. An RCP was developed by Gulf Engineers' and Constructors (GEC) for the USACE NOD. This plan consisted of conceptual sketches of various facilities in this area including pedestrian trails, parking, bicycle lanes along Ferdinand Street, public shelters, restrooms, picnic areas, an overlook/amphitheater, a promenade/bridge, a lawn area, visitor center/ecocenter, café and a boardwalk/fishing platform extending into Bayou Sara downstream from the Oyster Bar (USHR, 2005; CEC, 2010). As of 2017 these concept plans have not been further developed.

Certain features of the RCP, such as roadway modifications, parking areas, trails, overlook/amphitheater, public shelter, restrooms and a boardwalk/fishing platform in Bayou Sara, could contribute to localized impacts to wetlands along Bayou Sara. Additional wetland jurisdictional determinations would be needed to determine wetland impacts from these facilities. Combined with the projected loss of 0.09 wetland acres for the proposed action, these potential wetland impacts would not be expected to be significant given that designs for the locations of such facility along and/or near Bayou Sara would be expected to be informed by additional wetlands survey data so that facility designs could be maximized to avoid or minimized further effects to wetlands, and the fact that the 10,473 acres of bottomland hardwood forest and its associated wetlands within the Cat Island NWR would continue to be protected. The boardwalk/fishing platform component of the RCP is the only feature that could directly impact Bayou Sara during construction. Combined with the proposed action, this structure would not create a locally significant impact to Bayou Sara water quality. The RCP roadway modifications, parking areas, trails and boardwalk/fishing platform features of the RCP would be expected to have negligible effects.

The RCP roadway modifications and some of the trails are located on the Bayou Sara townsite footprint and would require additional archaeological determinations to avoid or minimize loss to historic resources. The completion of additional archaeological work would be expected to provide sufficient data so impacts to these resources could be minimized and avoided. The effects of these activities to historic resources in combination with the Phase III data recovery effort for the proposed action would not be expected to be locally significant.

The development of the Casting Field probably caused significant damage to artifacts associated with the Bayou Sara townsite. This site appears to occupy the eastern half of the townsite as shown

on the 1909 USGS Bayou Sara Quadrangle Map. No mitigation was likely required since the NHPA was not enacted until after site development in 1966.

Activities and features at the USACE ACM Casting Field include the operation of a concrete batch plant; the bulk delivery of bulk cement, fly ash, sand and gravel by river barge; the washing of fine aggregates; the casting, curing and repair of ACM; drainage ditch maintenance, and the fueling and lubrication of vehicles and equipment (the west portion of the Casting Field is shown in Figures 4, 7 and 8).–There is very little potential for Casting Field operations to effect the proposed project due to the presence of a levee embankment at an elevation of 49 feet above sea level around its entire perimeter, which would prevent any stormwater or process wastewaters from migrating eastward toward Bayou Sara. Estimates of the river crest at Bayou Sara indicate this river level may have been exceeded seven (7) ties since 1961 when Casting Field operations began. Also the outfalls at the facility discharge to the Mississippi River downstream from Bayou Sara (LDEQ, 4/4/14; USACE, November 2014; West Feliciana Parish, 2015).

Planning efforts for the RRP are being led by the St. Francisville Area Foundation and the Center for Planning Excellence (CPEX) in Baton Rouge. The RRP parcel is over 70 acres in size and was previously used as a cannery and pallet manufacturing facility. Redevelopment ideas for this parcel include single family residential, cabins, a boutique hotel and additional commercial developments, such as a brewery, restaurant/brewpub, and a recreational outfitter. The southern portion of this parcel has freshwater pond wetlands that may be enlarged to improve bird habitat. Hiking trails through forested slopes areas are also envisioned (West Feliciana Parish Geoportal; CPEX).

The ground surface of the RRP parcel slopes to the southwest. Ferdinand Street is at a 50-foot elevation, and would prevents drainage from this parcel from reaching the STP and Bayou Sara. The RRP would not affect wetlands, surface water, water quality or cultural resources within the ROIs for these resources.

The old St. Francisville High School property covers 21 acres and sits on top of a ridge. The West Feliciana Parish School Board (WFPSB) hired Urban Design Associates (UDA), Pittsburgh to craft a master plan to guide the redevelopment of this property. UDA recommends residential development of 50 unit grouped into three (3) clusters along with a small public park. The master plan is scheduled to be finalized in the fall of 2017 prior to the WFPSB marketing the property for sale and issuing a formal request for proposal for detailed site plan (The Advocate, 8/2/17). This redevelopment project would not be expected to affect wetlands, vegetation, wildlife, surface water, water quality or cultural resources within the ROIs for these resources.

FEMA EHP also assessed potential impacts from the following activities near the project corridor and found they would not have effects within the stated ROIs for the resources undergoing CEA:

- USACE's annual maintenance dredging of the LMR from RM 320 to RM 233.8, which begins upstream of Bayou Sara and the Old River Control Structure and ends at Wilkerson Point, and
- Landing and embarkation activities at the end of Ferdinand Street conducted by the American Queen Steamboat Company (AQSC) riverboat cruises

FEMA EHP also assessed the potential for the following previously funded FEMA projects in West Feliciana Parish to effect resources and determined that they would not have effects within the stated ROIs for the resources undergoing CEA:

- Elevation of two (2) residential structures in the11000 block of Ferdinand Street.
- Safe rooms and wind retrofits at four West Feliciana Parish buildings.

An earlier proposal by Entergy to construct and operate an additional nuclear reactor at the RBS site was also withdrawn in December, 2015.

FEMA EHP is not aware of any other proposed projects near St. Francsiville that have the potential to effect environmental resources of the project corridor and result in potential significant cumulative impacts when combined with the impacts from the BSBSP.

6.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

A public notice was published in The Advocate for five (5) days, Monday, August 20, 2018 and ending on Friday, August 24, 2018. This public notice was also published in the St. Francisville Democrat (journal of record), the Clinton Watchman, and The Zachary Advocate & Plainsman on consecutive Thursdays, August 23, 2018 and August 30, 2018. A 30 day comment period, began on Monday, August 20, 2018 and concluded on Wednesday, September 19, 2018 at 4 p.m. There were no comments received. A copy of the Public Notice is attached in Appendix G.

The Draft EA and Draft FONSI was available for review at the West Feliciana Library, at 5114 Burnett Road in St. Francisville, LA 70775. The documents were also published at FEMA's website at http://www.fema.gov/resource-document-library.

The state and federal agencies consulted were:

- U.S. Army Corps of Engineers (USACE)
- Louisiana Department of Environmental Quality (LDEQ)
- Louisiana Department of Natural Resources (LDNR)
- Louisiana Department of Wildlife and Fisheries (LDWF)
- U.S. Environmental Protection Agency (USEPA)
- Louisiana State Historic Preservation Officer (SHPO)
- U.S. Fish and Wildlife Service (USFWS)

Tribal organizations consulted are listed in Section 4.4.

7.0 CONDITIONS AND MITIGATION MEASURES

Based upon the studies and consultations undertaken for this EA, the following conditions and mitigation measures must be taken by the applicant prior to and during project implementation. The following conditions must be met as part of the implementation of the project. Failure to comply with these conditions may jeopardize federal funds:

The following conditions must be met as part of the implementation of the project. Failure to comply with these conditions may jeopardize federal funds:

- The Applicant must follow all applicable local, state, and federal laws, regulations, and requirements and obtain and comply with all required permits and approvals prior to initiating work.
- Applicant must follow all conditions listed in U.S. Army Corps of Engineers MVN-2017-0368-CQ Nationwide Permit-13
- Applicant must, install and monitor appropriate erosion and sediment controls, and stabilization practices.
- Applicant must obtain and/or update all necessary approvals and environmental permits regarding this proposed project.
- If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.
- All precautions should be observed to protect the groundwater of the region.
- All precautions should be observed to control nonpoint source pollution from construction activities. Louisiana Department of Environment Quality (LDEQ) has stormwater general permits for construction areas equal to or greater than one (1) acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-9371 to determine if your proposed project requires a permit.
- If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit is required. An application or Notice of Intent will be required if the sludge management practice includes preparing biosolids for land application or preparing sewage sludge to be hauled to a landfill.
- Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore, if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.
- Any renovation or remodeling must comply with Louisiana Administrative Code (LAC) 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.
- Vehicle operation times should be kept to a minimum. Area soils must be covered and/or wetted, if necessary, during construction to minimize dust
- After construction of revetments, restore existing access roads to pre-project conditions.
- Use all practicable measures to minimize hazards to wetlands.

- Conduct revetment construction activities during low-flow periods to the maximum extent possible.
- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.
- If any species that are tracked by the Louisiana Natural Heritage Program (LNHP) are encountered, contacting the LNHP Data Manager at 225-765-2643 is required.
- Use existing access roads to the maximum extent possible.
- Execute the Phase III Data Recovery Project (LA Statewide PA TM IX).
- Develop and implement Public Interpretation (LA Statewide PA TM III).
- Louisiana Unmarked Human Burial Sites Preservation Act: If human bone or unmarked grave(s) are present within the project area, notify the West Feliciana Parish Sheriff's Office within 24 hours of discovery. The Applicant shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within 72 hours of discovery.
- Construction activities must comply with Occupational Safety and Healthy Act (OSHA) Construction Industry Standards.
- Implementation of a "no wake" zone on Bayou Sara during construction near the revetments is recommended.
- Installation of temporary fencing between the Oyster Bar parking lot and the Reach 2 revetment is also recommended.
- The following steps should be taken to comply with West Feliciana Parish Code Chapter 115: Install, if necessary, a screen or a buffer between uses in order to minimize the harmful impact of noise, dust and other debris, motor vehicle headlight glare or other artificial light intrusion, and other objectionable activities or impacts conducted on or created by an adjoining or nearby use. Install silt fences, if necessary, to prevent storm and run-off erosion, particularly along embankments on water ways and road ways.
- The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance with all local, state and Federal agency requirements. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files.
- The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and toxic waste in accordance with all local, state and Federal requirements.
- Notification to the National Response Center at 800-424-8802 if an oil discharge to water occurs.
- The construction contractor shall comply with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substance release reporting requirement, if an applicable release occurs.

- If spills of fuels, oils or hydraulic fluids from vehicles and equipment occur, use sorbent pads or other spill control supplies to stop the release of these materials and promptly containerize any contaminated materials and/or sediment/soil. Leaky vehicles and equipment must be taken out of service for repair before returning them to service. If any hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at (225) 219-3640 is required.
- If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations.
- Failure to comply with these conditions may make part of all of the project ineligible for FEMA funding.
- During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the LESO webpage: https://www.fws.gov/lafayette/Migratory _Birds/MigBird. html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers. php).
- The applicant must review the National Bald Eagle Management (NBEM) Guidelines is available at: http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the Bald and Golden Eagle Protection Act (BGEPA).
- If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then USFWS requires an evaluation to be performed to determine whether the project is likely to disturb nesting bald eagles. The applicant is required to conduct the evaluation on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files
- U.S. Fish and Wildlife Service (USFWS) recommends that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to the colonial nesting waterbird guidance on the Louisiana Ecological Services Office (LESO) Web page https://www.fws.gov/lafayette/Migratory _Birds/MigBird. html.

The following conservation measures for Pallid sturgeon must be employed by construction personnel as a requirement of FEMA funding:

- All personnel related to the construction project will receive worker awareness training on the Pallid sturgeon. This training will include at a minimum: the laws protecting the sturgeon (Endangered Species Act of 1973) as a federally threatened species, a definition of "*take*" as it applies to the Endangered Species Act § 3.19, the fines and possible imprisonment for *take* of a sturgeon, and images of the sturgeon as it is likely to be seen in Bayou Sara and the Mississippi River. All personnel must sign a worker awareness training *sign-in sheet* as a record of their attendance and training received. Any new workers that did not receive the initial training will need to be trained before working in or near construction areas.
- Informational signs will be posted at visible locations in any construction area where in-water work occurs, including all project-related vessels. The signs will have an image of a sturgeon as it is likely to be seen in Bayou Sara, the federal listing status of the sturgeon, possible punishment for *take* of a sturgeon, and phone numbers to immediately call in the event a sturgeon is seen: USFWS's Lafayette Field Office, (337) 291-3100, and the LNHP, (225) 765-2800.
- These informational signs will be weather-proofed (laminated) and large enough so that they can be read from a distance of 20 feet. Signs will be posted prior to and for the duration of the construction project.
- One (1) person per construction site will be made responsible by their crew lead (if not the lead personally) to call the phone numbers stated above in the event a sturgeon is sighted.
- All construction personnel will be responsible for monitoring water-related activities for the presence of sturgeons as part of their regular duties.
- The following are special conditions that will be followed in the event a sturgeon is sighted within 100 yards of the project area:
    i. All construction personnel will have "*Stop Work"* authority if they see a sturgeon within 50 feet of a construction activity, including moving vessels.
    ii. All vessels will operate at no-wake/idle speeds within 100 yards of the work area.
    iii. In-water sediment barriers or siltation barriers will need to be re-secured and monitored.
    iv. Work will only resume without restriction when a previously sighted sturgeon is greater than 100 yards away from the project area.
- Construction work shall only be done during fall low water, outside the spawning season of Pallid sturgeon.

- Per 44 CFR 9.11(d)(4) "there shall be no encroachments, including fill, new construction, substantial improvements of structures or facilities, or other development within a designated regulatory floodway that would result in any increase in flood levels within the community during the occurrence of the base flood discharge. Until a regulatory floodway is designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within the base floodplain unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community."
- Coordination with the West Feliciana Parish Floodplain Administrator is required.
- 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the National Flood Insurance Program. The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the LA GOHSEP and FEMA for inclusion in the permanent project files.
- Sediment control features (Best Management Procedures [BMPs]) will be implemented on land to limit sediment delivery to the Bayou Sara and Mississippi River. Sediment control features will be required around all dredged material, unclean gravel, sand, and/or soil stockpiles. These features may include, but would not be limited to: sediment (silt) fences, straw wattles (fiber rolls), straw bales, sandbag barriers, plastic sheeting, storm drain inlet protection, and street sweeping/vacuuming. As with any stormwater control methods, the implementation of the appropriate controls will be dictated by the type and amount of sediment being controlled and the forecasted environmental conditions. Monitoring of sediment control features will be required prior to and during rain events to ensure control features are installed correctly and are functioning properly.
- In-water silt barriers (turbidity curtains) will be utilized within the Bayou Sara for all aspects of the project, including bank cut and installation of geo-fabric and riprap. Silt barriers will need to be installed in a manner that contains the dislodged sediments within the immediate work area.
- The applicant agrees that if it receives any Federal aid as a result of the attached project application, it will accept responsibility, at its own expense if necessary, for the routine maintenance of any real property, structures, or facilities acquired or constructed as a result of such Federal aid. Routine maintenance shall include, but not be limited to, such responsibilities as keeping vacant land clear of debris, garbage, and vermin; keeping stream channels, culverts, and storm drains clear of obstructions and debris; and keeping detention ponds free of debris, trees, and woody growth.
- The choice of erosion control measure to be employed will be based on the type and duration of disturbance. For example, areas disturbed due to heavy equipment may receive mulch or hydroseeding to control sediment runoff, as needed.

- Any floating debris will be trapped by the silt barrier and removed from the water, and in-water work will only be conducted when waters are calm enough to allow for the efficacy of the silt barrier system. Disposal of all debris will conform to local, state, and federal laws and standards.
- In-water work and all BMPs identified above may be subject to additional stipulations based on permitting requirements by the U.S. Army Corps of Engineer under § 10 of the Rivers and Harbors Act of 1899 and § 404 of the Clean Water Act under the Nationwide Permit No. 13 (Bank Stabilization), dated March 9, 2018.
- Applicant must comply with all conditions listed in following permits: The Louisiana Department of Environmental Quality (LDEQ) issued the Water Quality Certification (WQC) 160629-02 for the USACE Reissuance of Nationwide Permits, including NWP 13, to the New Orleans District (NOD) on February 14, 2017. The WQC is subject to the State of Louisiana NWP Regional Conditions, February 2017.
- All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to GOHSEP and FEMA for inclusion in the permanent project files. New construction must also be compliant with current codes and standards.

8.0 CONCLUSIONS

Construction of the proposed project at the proposed location was analyzed based on the studies, consultations, and reviews undertaken as reported in this EA. The findings of this EA conclude that the proposed action at the proposed site would result in no significant adverse impacts to geology and soils, air quality, wetlands and waters of the U.S., hydrology and floodplains, surface water and water quality, groundwater, federally protected species, vegetation and wildlife, cultural resources, socioeconomic resources, environmental justice, public health and safety, noise, excavated and hazardous materials management, or traffic and transportation under the Proposed Action Alternative. Furthermore, this EA concludes that the proposed action at the proposed site would not result in cumulative impacts on the affected environment.

During project construction, short-term minor adverse impacts to wetlands and waters of the U.S., surface water and water quality, vegetation and wildlife are anticipated. The management of excavated material from the revetments is expected to provide a minor beneficial impact. Cultural resource impacts from excavation and development of the revetments along Bayou Sara are expected to result in a moderate adverse impact with the implementation of the planned Phase III archaeological data recovery project. Effects to other resources analyzed were rated as negligible. The conditions listed in Section 7.0 have been incorporated to mitigate and minimize these effects. Based upon the studies and consultations undertaken in this EA, no significant impacts are anticipated from the proposed project. Therefore, FEMA presently finds the proposed action meets the requirements for a FONSI under NEPA and the preparation of an EIS will not be required (see Appendix G). If new information is received that indicates there may be significant adverse effects, FEMA would then revise the findings and issue a second public notice, for additional comments. However, if there are no significant comments, new information or design changes, this Draft EA will become the Final EA.

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10.0 LIST OF PREPARERS

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Appendix A

Site Photos

Photographic Log of July 28, 2018 Site Inspection
Bayou Sara Bank Stabilization

Photo 1 View from east bank of Bayou Sara, looking northeast/upstream along Bend 2 (July 28, 2018). Cars (right, background) are parked along Ferdinand Street.

Photo 2 View from east bank of Bayou Sara, looking north/upstream along Bend 2 (July 28, 2018).

Photo 3 View from Bend 1, near the east bank of Bayou Sara at Hydrographic Cross Section B, looking northeast across bench area (July 28, 2018). St. Francisville sewage treatment pond is beyond fence (background). During the March 22, 2016 hydrographic survey, this location was under 10 feet of water.

Photo 4 View from east bank of Bayou Sara, looking southwest/downstream (July 28, 2018).

Photo 5 View from east bank of Bayou Sara, looking west/upstream (July 28, 2018).

Appendix B

90% Construction Plans

EXCERPTED SUPPORTING DOCUMENTATION FROM WEST FELICIANA PARISH, LOUISIANA BAYOU SARA BANK STABILIZATION PROJECT

JANUARY 2017

90% SUBMITTAL

Prepared by Arcadis and Manchac Consulting Group

For a full version of this report, the general public can send a request to FEMA-NOMA@dhs.gov, tel: 225 267-2962, fax: 225-346-5848 or by mail to: DEPARTMENT OF HOMELAND SECURITY-FEMA, ATTN: EHP-Bayou Sara Bank Stablization, 1500 MAIN STREET, BATON ROUGE, LOUISIANA 70802.

PARISH PRESIDENT
KEVIN COUHIG

PARISH COUNCIL
SYDNEY PICOU WALKER - AT LARGE
MELVIN YOUNG - DISTRICT A
JOHN THOMPSON - DISTRICT B
MEL PERCY - DISTRICT C
WILLIAM "BILL" MAY III - DISTRICT D

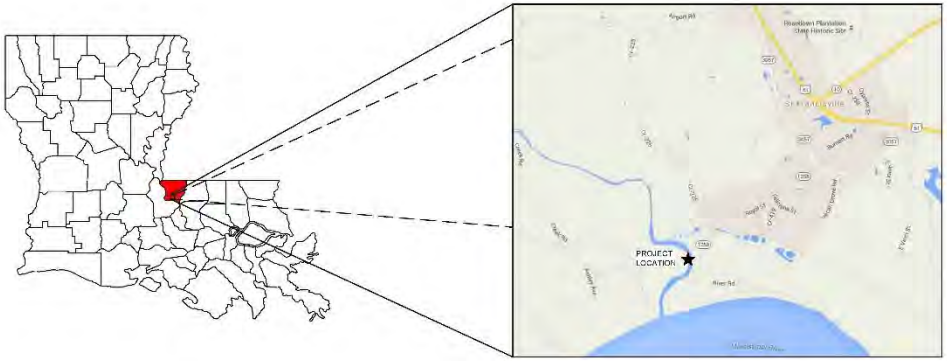
WEST FELICIANA PARISH

WEST FELICIANA PARISH, LOUISIANA

BAYOU SARA BANK STABILIZATION PROJECT

JANUARY 2017

90% SUBMITTAL



VICINITY MAP

PROJECT LOCATION

PREPARED BY:

Manchac CONSULTING GROUP, INC.
10542 S. Glenstone Place
Baton Rouge, Louisiana 70810

ARCADIS

DRAWING INDEX

PRELIMINARY
NOT FOR
CONSTRUCTION

NOTES

GENERAL:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING REQUIRED SECURITY TO PROTECT THE WORK, ITS EQUIPMENT, TOOLS, ETC, AND ANY EQUIPMENT STORED ON SITE OR ELSEWHERE.

2. EXISTING UTILITIES, STRUCTURES AND OTHER FEATURES ARE SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS. ENGINEER DOES NOT GUARANTEE THAT EXISTING CONDITIONS ARE SHOWN ABSOLUTELY CORRECT. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHOULD VERIFY AND AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES THAT OCCUR DUE TO CONSTRUCTION OPERATIONS. ANYTHING NOT SHOWN ON THESE DRAWINGS SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND SHALL NOT CONSTITUTE AN EXTRA, UNLESS APPROVED BY THE ENGINEER.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY PROTECTING EXISTING STRUCTURES, UTILITIES, TREES, SHRUBS, AND OTHER ADJOINING FACILITIES AND REPAIR OR REPLACE DUE TO DAMAGE CAUSED BY CONTRACTOR.

4. THE CONTRACTOR SHALL CONTACT THE ENGINEER IMMEDIATELY CONCERNING ANY CONFLICTS ARISING DURING CONSTRUCTION OF ANY IMPROVEMENTS CALLED FOR IN THE CONSTRUCTION DOCUMENTS (PLANS AND SPECIFICATIONS).

5. KEEP ACCESS ROADS TO EXISTING PLANT OPEN AT ALL TIMES DURING CONSTRUCTION. STAGING AREA SHALL BE USED FOR CONTRACTOR'S PERSONNEL, PARKING, MATERIAL AND STORAGE. INTERFERENCE WITH EXISTING PLANT OPERATIONS WILL NOT BE ALLOWED. PROVIDE TEMPORARY ALL-WEATHER ACCESS ROADS AS NEEDED TO MAINTAIN ACCESS TO ALL UNLOADING AREAS AND OTHER AREAS OF PARKING, EGRESS AND REGRESS, THROUGHOUT THE DURATION OF THE PROJECT.

6. THE INFORMATION PROVIDED IN THESE PLANS IS SOLELY TO ASSIST THE CONTRACTOR IN ASSESSING THE NATURE AND EXTENT OF CONDITIONS WHICH MAY BE ENCOUNTERED DURING THE COURSE OF WORK. ALL PROSPECTIVE BIDDERS ARE DIRECTED, PRIOR TO BIDDING, TO CONDUCT WHATEVER INVESTIGATIONS THEY MAY DEEM NECESSARY TO ARRIVE AT THEIR OWN CONCLUSIONS REGARDING THE ACTUAL CONDITIONS THAT WILL BE ENCOUNTERED AND UPON WHICH THEIR BIDS SHALL BE BASED.

7. OBTAIN ALL REQUIRED CONSTRUCTION PERMITS PRIOR TO COMMENCEMENT OF WORK.

10. CONTRACTOR SHALL CONTACT LOUISIANA ONE CALL AT (800) 272-3020 AT LEAST 5 WORKING DAYS PRIOR TO CONSTRUCTION TO LOCATE EXISTING UTILITIES, INCLUDING PIPELINES, WITHIN THE PROJECT SITE. THE CONTRACTOR SHALL CONDUCT THE WORK IN SUCH A MANNER AS TO COOPERATE AND MINIMIZE INCONVENIENCES WITH UTILITIES. ANY UNIDENTIFIED PIPES OR STRUCTURES WHICH MAY BE DISCOVERED WITHIN THE LIMITS OF THE PROJECT SHALL NOT BE DISTURBED . CONSTRUCTION SHALL NOT BE PREFORMED AT THESE LOCATIONS WITHOUT APPROVAL FROM THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING PIPELINE AND UTILITY OPERATIONS AT LEAST 72 HOURS IN ADVANCE OF WORK.

11. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING UTILITY LOCATIONS, INCLUDING PIPELINES, PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES TO ANY EXISTING UTILITIES CAUSED BY THE CONTRACTOR'S NEGLIGENCE. THE DAMAGE SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.

12. THE CONTRACTOR SHALL VISIT THE SITE OF WORK TO BECOME FAMILIAR WITH THE LOCAL CONDITIONS AND WHAT EFFECTS THE CONDITIONS MAY HAVE ON THE ACCESS AND CONSTRUCTION. PLANS AND SPECIFICATIONS ARE COMPLEMENTARY; WHAT IS REQUIRED BY ONE IS BINDING AS IF REQUIRED BY ALL. REFER TO SECTION 00700 (GENERAL CONDITIONS) PART 3.03 FOR NOTE ON RESOLVING DISCREPANCIES BETWEEN PLANS AND SPECIFICATIONS.

13. THE PROJECT IS WITHIN AND ADJACENT TO ENVIRONMENTALLY SENSITIVE AREAS. CONTRACTOR SHALL AVOID/MINIMIZE IMPACTS TO THESE AREAS DURING THE COURSE OF WORK. OWNER RESERVES THE RIGHT TO SUSPEND WORK AT ANY TIME IF IMPACTS OCCUR UNTIL SATISFACTORY CORRECTIVE MEASURES ARE IMPLEMENTED BY CONTRACTOR.

14. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, EXISTING ELEVATIONS AND CONDITIONS SHOWN ON THE DRAWINGS PRIOR TO ORDERING MATERIAL, COMMENCEMENT OF CONSTRUCTION, AND PREPARATION OF SHOP DRAWINGS. THE ENGINEER SHALL BE NOTIFIED OF ALL DISCREPANCIES.

15. THE CONTRACTOR SHALL BE FAMILIAR WITH EXISTING SOIL CONDITIONS AT THE WORK SITE. GEOTECHNICAL INFORMATION IS PROVIDED IN THE GEOTECHNICAL REPORT.

16. SUBSTANTIAL CHANGES TO THE TOPOGRAPHY AND BATHYMETRY OF THE PROJECT SITE MAY HAVE OCCURRED SINCE THE SURVEY SHOWN ON THESE DRAWINGS. ACTUAL LOCATION OF CONSTRUCTION CENTERLINES OF PROPOSED WORK WILL BE DETERMINED BY ENGINEER PRIOR TO CONSTRUCTION BASED ON RESULTS OF CONTRACTOR'S PRE-CONSTRUCTION SURVEY.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE ADJACENT LAND OWNERS AT LEAST 5 WORKING DAYS PRIOR TO MOBILIZATION.

18. PURSUANT TO THE PERMITS AND RESPONSIBILITIES CLAUSE, THE CONTRACTOR IS REQUIRED TO CONTACT THE FOLLOWING ADMINISTRATOR OF THE STATE LAND OFFICE OR HIS REPRESENTATIVE TO NOTIFY THE OFFICE WHEN CONSTRUCTION WILL COMMENCE IN THE STATE OWNED SEASHORE, STATE LANDS, AND/OR STATE WATER BOTTOMS:

    STATE LAND OFFICE
    DIVISION OF ADMINISTRATION
    JOHN LAVIN, PUBLIC LANDS ADMINISTRATOR
    MOBILE: (225)342-4575

STREAM GEOMOPHOLOGY

1. THE HYDROLOGY, HYDRAULICS, AND SCOUR FOR THE 100 YEAR FLOOD EVENT WERE TAKEN FROM THE ADVANCED CIRCULATION (ADCIRC) MODEL FOR THE 100 YEAR STORM (2016).
   a. CROSS SECTION MAXIMUM VELOCITY*: 13 FEET PER SECOND.
   b. AVERAGE WIDTH OF CHANNEL IS 275 FEET.
   c. TOTAL MAXIMUM POTENTIAL SCOUR DEPTH: 7.14 FEET
   d. RADIUS OF CURVATURE IS 705 FEET FOR REACH 1 AND 455 FEET FOR REACH 2 BENDS.

*CROSS SECTION MAXIMUM VELOCITY IS TAKEN AS THE VELOCITY AT THE LOCATION IN THE CROSS SECTION WITH THE GREATEST DEPTH AVERAGED VELOCITY.

GEOTECHNICAL

1. VALUES OF % CLAY/SILT FOR SOIL PROPERTIES WERE DERIVED FROM THE FOLLOWING SOURCES:
   a. GEOTECHNICAL BORINGS OF THE PROJECT SITE PERFORMED BY PSI WITH A REPORT DATE OF NOVEMBER 17, 2016.
   b. THE SOILS ARE PREDOMINANTLY CLAYS IN THE UPPER 26 FEET. BELOW THIS DEPTH THE SOILS ARE PREDOMINANTLY SAND IN THE NORTH AND CLAY IN THE SOUTH, SEE PSI REPORT FOR MORE SPECIFIC INFORMATION.

RIPRAP

1. PROVIDE WIDE-GRADED AND WELL-GRADED ANGULAR STONE WITH A D50 OF 22 INCHES AS SHOWN IN TABLE 1 A.THE STONE SHALL CONSIST OF FIELD STONE OR ROUGH UNHEWN QUARRY STONE
   a. THE STONE SHALL BE HARD AND ANGULAR AND OF A QUALITY THAT WILL NOT DISINTEGRATE ON EXPOSURE TO WATER OR WEATHERING
   b. THE SPECIFIC GRAVITY OF THE INDIVIDUAL STONES SHALL BE AT LEAST 2.5. SPECIFIC GRAVITY OF 2.64 USED FOR CALCULATIONS.
2. THE ROCK RIPRAP SIZE AND THICKNESS IS IN ACCORDANCE WITH THE FOLLOWING METHODS WITH THE U.S. ARMY CORPS OF ENGINEERS' (USACE'S) ENGINEERING MANUAL EM-1110-2-1601, RESULTING IN A DESIGN ROCK D50 SIZE OF 22 INCHES.
   a. MINIMUM SAFETY FACTOR (FS) = 1.2.
3. IV. CROSS SECTION MAXIMUM VELOCITY = 13 FEET PER SECOND.
4. GRADING PER THE LOUISIANA DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES (2006). PART I-GENERAL PROVISIONS, SECTION 711-RIPRAP (SEE TABLE 1 ON RIGHT HAND SIDE OF PAGE).

FILTER FABRIC

USE CLASS D FABRIC PER THE LOUISIANA DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES (2006), PART X-MATERIALS, SECTION 1019- GEOTEXTILE FABRIC AND GEOCOMPOSITE SYSTEMS. (SEE TABLE 2 ON RIGHT HAND SIDE OF PAGE).

1. FILTER MATERIAL TO MEET REQUIREMENTS OF THE AASHTO M288-06.

NOTES CONTINUED

2. WOVEN SILT FILM GEOTEXTILES (I.E. GEOTEXTILES MADE FROM YARNS OF A FLAT, TAPE LIKE CHARACTER) WILL NOT BE ACCEPTED.

3. THE FILTER FABRIC MUST BE PLACED SO THAT THE UPSTREAM SECTIONS OVERLAP THE DOWNSTREAM SECTIONS.

POLE GAUGES:

1. PRODUCT: 2 INCH OD x .065 INCH WALL x 1.87 INCH ID 1020 DOM A513 ROUND STEEL TUBE OR EQUIVALENT.

2. LENGTH: 8 FEET LENGTHS.

ABBREVIATIONS

℄	CENTER LINE
CY	CUBIC YARD
DIA	DIAMETER
⌀	DIAMETER
EXIST	EXISTING
LB	POUND
LF	LINEAR FEET
MAX	MAXIMUM
MIN	MINIMUM
MM	MILLIMETER
NO	NUMBER
NTS	NOT TO SCALE
R	RADIUS
SL	SAMPLE LINE
SF	SQUARE FOOT
SY	SQUARE YARD
TYP	TYPICAL
µM	MICROMETER
VAR	VARIES

SURVEY INFORMATION

PREPARED BY:
MORRIS P. HEBERT

DATE OF HYDROGRAPHIC SURVEY WAS 3/22/2016

HORIZONTAL COORDINATES INDICATED HEREIN ARE REFERENCED TO THE LOUISIANA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (NAD 83), SOUTH ZONE, US FT. VERTICAL ELEVATIONS ARE RELATIVE TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), US FT. GEOID12A, AS DERIVED FROM A GLOBAL POSITIONING SYSTEM (GPS) STATIC SURVEY

SURVEY CONTROL TABLE			
POINT #	NORTHING	EASTING	ELEVATION
1	823055.0700	3261291.9700	47.79
2	823956.4280	3261462.0510	49.00

DRAWING LEGEND

EXISTING: CENTERLINE; MAJOR CONTOUR LINE; MINOR CONTOUR LINE; DRAINAGE FLOW DIRECTION

PROPOSED: CENTERLINE; MAJOR CONTOUR LINE; MINOR CONTOUR LINE; GEOTEXTILE FABRIC; RIPRAP FILL; BLOCK MAT; COMPACTED FILL; ACCESS TO BE CLEARED; STAGING AREA; EXCESS CUT PLACEMENT AREA

SECTION DESIGNATION

SUB-TITLE
SECTION (1 / CRR-04)
SCALE

SECTION NUMBER CORRESPONDING TO SECTION CUT SYMBOL

SHEET NUMBER WHERE SECTION IS CUT OR "-" IF SECTION IS CUT ON SAME SHEET AS CALL OUT

TABLE 1			
IN-PLACE PROTECTION RIPRAP GRADATION REQUIREMENTS			
RIPRAP CLASS	STONE SIZE (LB)	SPHERICAL DIAMETER (FT)	PERCENT OF STONE SMALLER THAN
130 LB	650	2	100
	260	1.46	45-100
	130	1.17	15-50
	40	0.79	0-15

TABLE 2		
PROPERTY	TEST METHOD	D
AOS, METRIC SIEVE, µM, MAX.	ASTM D4751	212
GRAB TENSILE, N, MIN.	ASTM D4632	800
% ELONGATION @ FAILURE, MIN.	ASTM D4632	50
% ELONGATION @ 200 N, MAX.	ASTM D4632	–
BURST STRENGTH, N, MIN.	ASTM D3787	1,290
PUNCTURE, N, MIN.	ASTM D4833	330
TRAPEZOID TEAR STRENGTH, N, MIN.	ASTM D4533	220
PERMITTIVITY, SEC-1, MIN.	ASTM D4491	1
GRAB TENSILE STRENGTH RETAINED AFTER WEATHERING 150 H, UVA LAMPS, %, MIN.	ASTM D4632, ASTM G154	70
GRAB TENSILE STRENGTH RETAINED AFTER WEATHERING 500 H, UVA LAMPS, %, MIN.	ASTM D4632, ASTM G154	–

AREA	ACREAGE
STAGING AREA	0.95
EXCESS CUT PLACEMENT AREA	0.87

ITEM	REACH 1	REACH 2	TOTAL
BLOCK MAT (SF)	36,526	38,963	72,440
RIPRAP (INCLUDES 20% LOSSES) (CY)	8,347	11,702	20,050
COMPACTED FILL (INCLUDES 20% LOSSES) (CY)	289	960	1,249
GEOTEXTILE (SF)	86,608	103,067	189,675
CUT (CY)	2,860	1,530	4,390
POLE GAUGES (UNIT)	13	13	26

ACCESS ROADS	LENGTH (LF)
EXISTING	3,331
CLEARED	490
TO BE CLEARED	1,971
TOTAL	5,492

LA One Call

PRIOR TO WORK COMMENCEMENT, THE CONTRACTORS IS RESPONSIBLE FOR FINAL VERIFICATION OF THE LOCATION OF THE UTILITIES SHOWN ON THESE PLANS. THE CONTRACTOR SHALL CALL LOUISIANA ONE CALL (811 OR 800-272-3020) AND CITY PARISH DEPARTMENT OF PUBLIC WORKS TO HAVE UTILITIES LOCATED PRIOR TO CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE UTILITY COMPANIES FOR ALL AREAS OF CONSTRUCTION.

NO.	DATE	DESCRIPTION	BY

REVISIONS

WEST FELICIANA PARISH
BAYOU SARA BANK STABILIZATION PROJECT

GENERAL NOTES, LEGEND & ABBREVIATIONS

ARCADIS

Manchac

DESIGNED BY: D. DEHON
DRAWN BY: B. SIMPSON
CHECKED BY: B. MCMANN
CROSS CHECKED BY: P. TSCHIRKY
DATE: JANUARY 2017

SHEET NUMBER G-02

REACH	BEGIN STA.	END STA.
REACH 1	14+44.93	22+33.98
REACH 2	32+20.97	40+94.77

COORDINATE TABLE

PT NO	DESC	NORTHING	EASTING
1000	TBK BEGIN R1	826099.0915	3280919.1511
1001	TOE BEGIN R1	826038.7925	3280954.3127
1002	TBK END R1	825836.4201	3281682.5579
1003	TOE END R1	825822.8049	3281564.8245
1004	TBK BEGIN R2	824612.3856	3281627.5085
1005	TOE BEGIN R2	824635.3303	3281523.3910
1006	TBK END R2	823981.7584	3280947.7976
1007	TOE END R2	824061.0747	3280904.8448

LEGEND:
- = ACCESS ROAD
- = ACCESS TO BE CLEARED
- = STAGING AREA
- = EXCESS CUT PLACEMENT AREA
- = DIRECTION OF FLOW

PLAN

0 100 200 400 600

SCALE IN FEET

PRELIMINARY NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

WEST FELICIANA PARISH
BAYOU SARA BANK STABILIZATION PROJECT

OVERALL SITE PLAN

ARCADIS
Manchac Consulting Group, Inc.

DESIGNED BY:	D. DEHON
DRAWN BY:	B. SIMPSON
CHECKED BY:	B. MCMANN
CROSS CHECKED BY:	P. TSCHIRKY
DATE:	JANUARY 2017

SHEET NUMBER C-01

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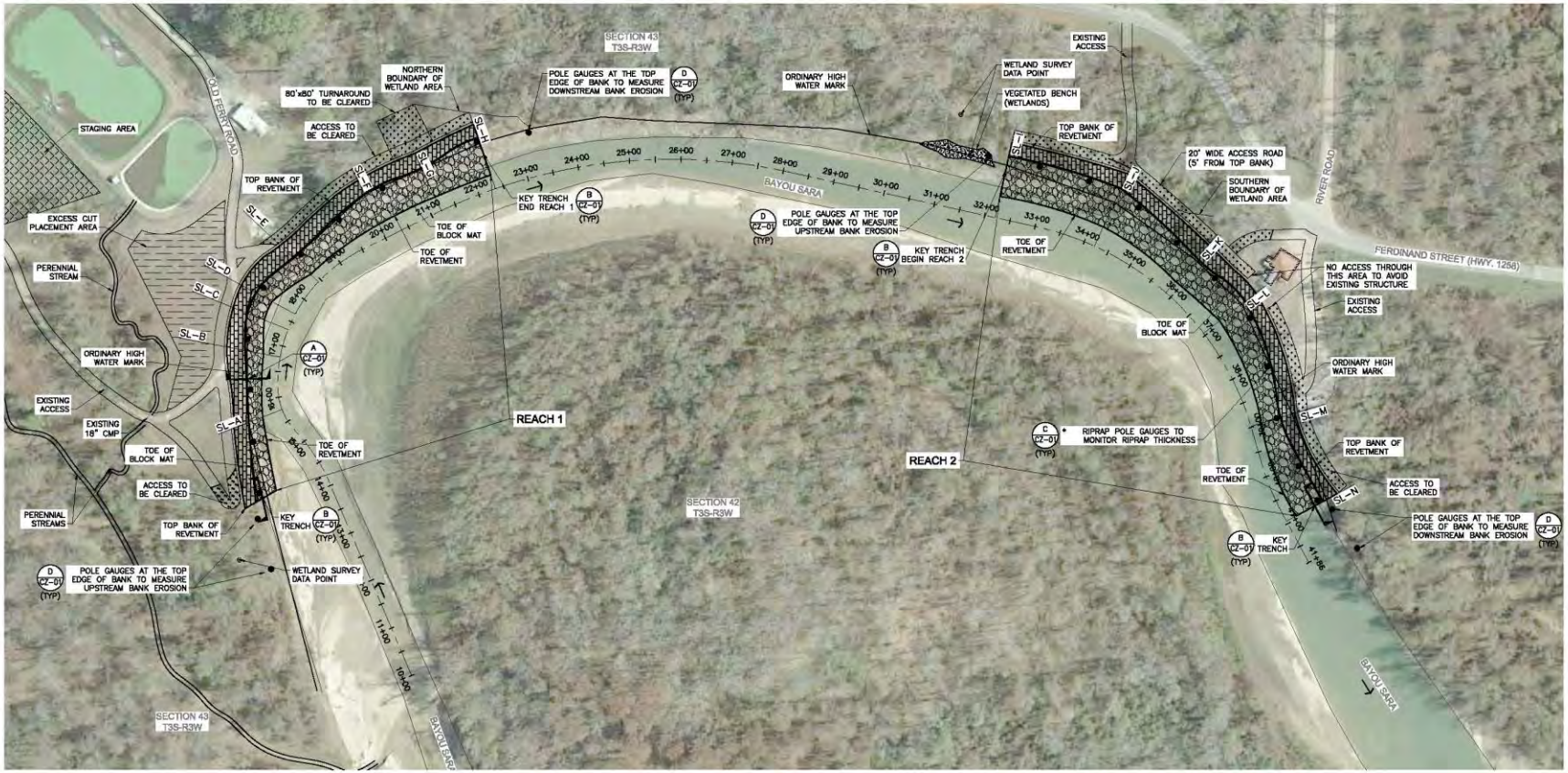

REACH	BEGIN STA.	SAMPLE LINE	END STA.	SAMPLE LINE
REACH 1	14+44.93	N/A	22+33.98	SL-H
REACH 2	32+20.97	SL-I	40+94.77	SL-N

NOTE:
* POLE GAUGES SHALL BE INSTALLED ALONG THE ENTIRE REVETMENT APPROXIMATELY 3 FEET BELOW THE TOE OF BLOCK MAT SPACED 100' APART ALONG THE ENTIRE ALIGNMENT.

PLAN
0 50 100 200 300
SCALE IN FEET

LEGEND:
- = ACCESS ROAD
- = ACCESS TO BE CLEARED
- = BLOCK MAT
- = RIPRAP FILL
- = STAGING AREA
- = EXCESS CUT PLACEMENT AREA
- = POLE GAUGE
- = DIRECTION OF FLOW

PRELIMINARY NOT FOR CONSTRUCTION

NO.	DATE	DESCRIPTION	BY

REVISIONS

WEST FELICIANA PARISH
BAYOU SARA BANK STABILIZATION PROJECT

SITE PLAN

ARCADIS
Manchac Consulting Group, Inc.

DESIGNED BY: D. DEHON
DRAWN BY: B. SIMPSON
CHECKED BY: B. MCMANN
CROSS CHECKED BY: P. TSCHIRKY
DATE: JANUARY 2017

SHEET NUMBER
C-02

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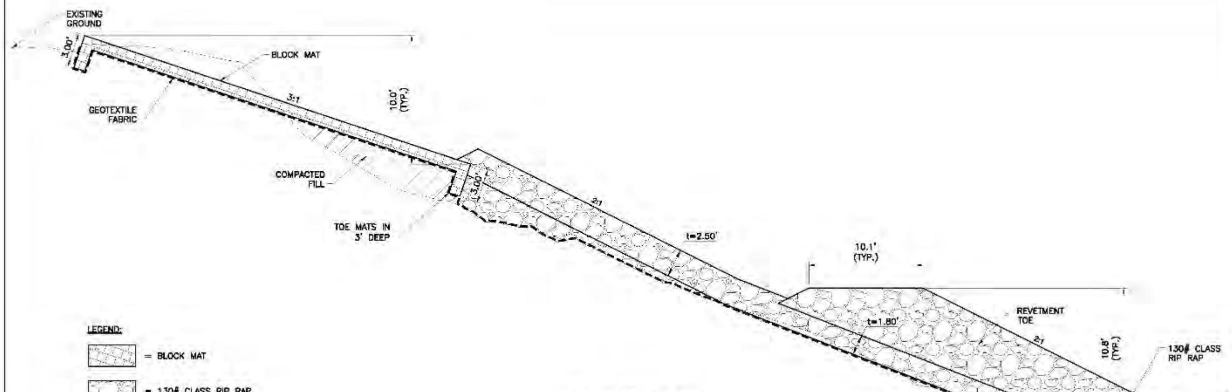
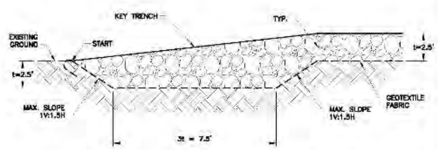


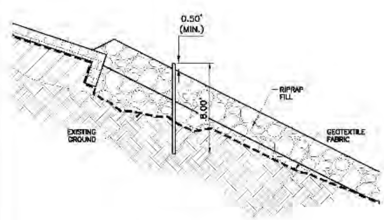
TYPICAL SECTION A
DETAIL A
NTS

T.B.D.

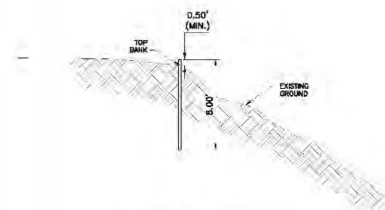
BLOCK MAT START & TERMINATION FROM MANUFACTURE
DETAIL
NTS



TYPICAL SECTION B
DETAIL B
NTS



RIPRAP POLE GAUGE
DETAIL C
NTS



UPSTREAM & DOWNSTREAM EDGE OF BANK POLE GAUGE
DETAIL D
NTS

NOTES:

1. POLE GAUGES – USE 2 INCH DIA ROUND STEEL TUBE TO CONSTRUCT POLE GAUGES.
2. INSTALL RIPRAP POLE GAUGES PRIOR TO PLACING RIPRAP.

PRELIMINARY
NOT FOR
CONSTRUCTION

NO.	DATE	DESCRIPTION	BY

REVISIONS

WEST FELICIANA PARISH
BAYOU SARA BANK STABILIZATION PROJECT

TYPICAL SECTIONS & DETAILS

ARCADIS

Manchac

DESIGNED BY: D. DEHON
DRAWN BY: B. SIMPSON
CHECKED BY: B. MCMANN
CROSS CHECKED BY: P. TSCHIRKY
DATE: JANUARY 2017

SHEET NUMBER
CZ-01

Appendix C

Hydrologic and Hydraulic (H & H) Studies (H & H Analysis + 30% Engineering Design; H & H Analysis + No Rise Addendum)

EXCERPTED SUPPORTING DOCUMENTATION FROM WEST FELICIANA PARISH, LOUISIANA BAYOU SARA STREAMBANK STABILIZATION

Hydraulic and Hydrologic (H&H) Analysis 30% Engineering Design Prepared by Arcadis and Manchac Consulting Group, dated May 31, 2016

For a full version of this report, the general public can send a request to FEMA-NOMA@dhs.gov, tel: 225 267-2962, fax: 225-346-5848 or by mail to: DEPARTMENT OF HOMELAND SECURITY-FEMA, ATTN: EHP-Bayou Sara Bank Stablization, 1500 MAIN STREET, BATON ROUGE, LOUISIANA 70802.

Manchac
CONSULTING GROUP, INC.

ARCADIS
Design & Consultancy
for natural and
built assets

1810
WEST FELICIANA PARISH

BAYOU SARA STREAMBANK STABILIZATION

- Hydraulic and Hydrologic (H&H) Analysis
- 30% Engineering Design

May 31, 2016

BAYOU SARA STREAMBANK STABILIZATION

- Hydraulic and Hydrologic (H&H) Analysis
- 30% Engineering Design

Brett McMann, P.E.
Project Engineer

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Prepared by:

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Louisiana 70816
Tel 225 292 1004
Fax 225 218 9677

Our Ref.:

LA003333.0001.00002

Date:

May 31, 2016

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CONTENTS

TABLES

FIGURES

FIGURES (CONTINUED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

AOS	Apparent Opening Size
cfs	Cubic Feet per Second
FHWA	Federal Highway Administration
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HEC-RAS	Hydrologic Engineering Center River Analysis System
HUC	Hydrologic Unit Code
H&H	Hydraulic and Hydrologic
LADOTD	Louisiana Department of Transportation and Development
LiDAR	Light Detection and Ranging
MPH	Morris P. Hebert, Inc.
NAVD88	North American Vertical Datum of 1988
NFF Program	National Flood-Frequency Program
RM	River Mile
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

1 INTRODUCTION

This technical report identifies the data and methodology that were used to complete the Hydraulic and Hydrologic (H&H) Analysis for the mitigation and stabilization of Bayou Sara's riverbanks due to rapidly increasing stream bank erosion. The H&H Analysis was conducted to demonstrate how severe the streambank erosion conditions are along Bayou Sara near its confluence with the Mississippi River and determine the most effective streambank mitigation protection. Based on the H&H data compiled from the analysis, it was concluded that the most effective mitigation solution for the Bayou Sara streambank stabilization would be comprised of strategically armoring the two bends of Bayou Sara within the project location. This would provide the highest level of erosion protection for areas identified in the Application and Benefit Cost Analysis. Stone armoring the northern bend (Bend #1) within the project area would provide mitigation protection for the Sewer Treatment Pond Facility, which serves more than 700 customers and the northeastern section of Ferdinand Street (Figure 1).

Figure 1. Sewer Treatment Pond and Ferdinand Street Location

Historical aerial photography allowed estimation of the top of bank. It was calculated that, between 1998 and 2014, the observed erosion rate in this section was, on average, approximately 10 feet per year.

Approximately 3.4 acres of land was lost as shown in this 2013 image (Figure 2). Stone armoring the southern bend (Bend #2) would provide mitigation protection for the central/southeastern section of Ferdinand Street, the U.S. Army Corps of Engineers (USACE) access to the 210-acre Casting Fields, Oyster Bar (a commercial structure), the River Landing, and a local boat launch (Figure 1). The H&H Analysis substantiated the 1.6-year Recurrence Interval for sustained erosion that is occurring along the project site. The H&H Analysis also validated the engineer-estimated damages that would be a direct result if both the Sewer Treatment Pond and Ferdinand Street were compromised by erosion and continued land loss. The continued funding of Phase 1 from the Federal Emergency Management Agency for this project is critical to provide a mitigated solution for the ongoing streambank erosion of Bayou Sara and the sustained property losses in the immediate project area. This project will provide immediate erosion mitigation protection for the two critical cut bank sections of Bayou Sara that were identified as a direct result of the H&H Analysis.

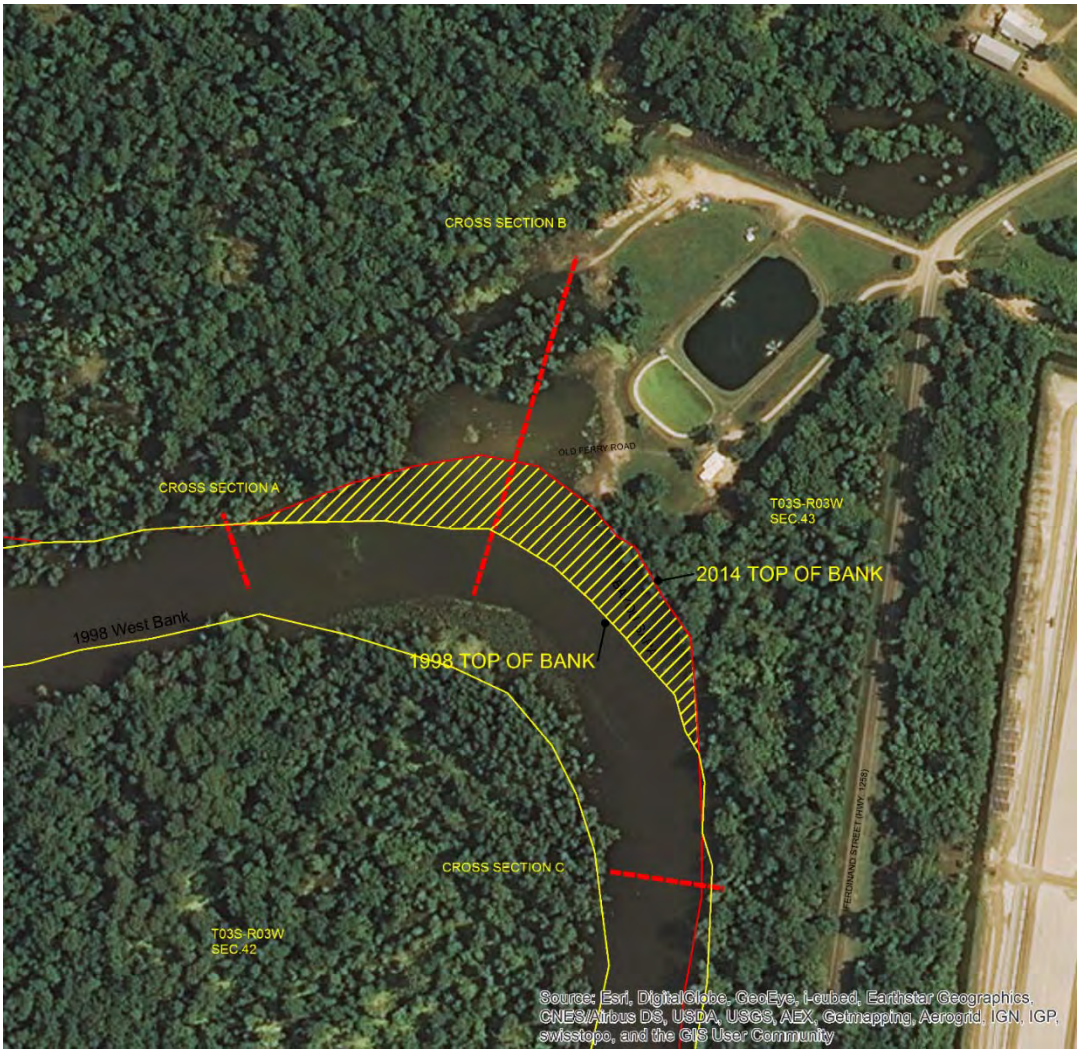

Figure 2. Land Loss between 1998 and 2014

2 DATA COLLECTION AND MODELING SUMMARY

2.1 Data Collection: Survey

The site survey consisted of performing a single-beam bathymetry survey in order to gather data to support the hydrographic analysis. The area surveyed is from the intersection of Bayou Sara with the Mississippi River to approximately 1.25 miles north in Bayou Sara. Morris P. Hebert, Inc. (MPH) surveyed eight transects spaced approximately every 900 feet within Bayou Sara on March 22, 2016 (Appendix A). MPH performed the survey utilizing a 19-foot vessel with a 90-horsepower outboard motor with a draft of 1.5 feet. A Trimble Digital Surface Model 232 Differential Global Positioning System receiver and antenna were set up approximately 5 feet from the stern of the vessel. The antenna was approximately 1.5 feet above the roof of the cabin of the vessel while the single-beam echosounder was mounted directly below the global positioning system (GPS) receiver. The survey was conducted utilizing GPS-Navigation survey methods and sub-meter accuracies as defined by manufacturers' specifications. MPH utilized a 4-degree beam width Transducer with Odom Echotrac to perform the survey work. All raw data were collected and processed in HYPACK® survey software.

Unusually high water at the time of the survey prevented topographic survey services from being performed. Due to these conditions, additional transects were performed with the single-beam bathymetry in an attempt to capture the necessary data. Once the survey was completed, MPH performed on-site quality assurance/quality control of the collected data.

In order to reference the collected data to North American Vertical Datum of 1988 (NAVD88) elevations, MPH set a control point on site. The control point can be described as "*TO REACH THE MONUMNENT FROM THE INTERSECTION OF HWY 61 AND HWY 3057, TRAVEL SOUTH ON HWY 3057 FOR 1.0 MI TO THE JUNCTION WITH HWY 1258/FERDINARD ST. TURN LEFT ON HWY 1258/FERDINARD STAND TRAVEL SOUTHWEST FOR 1.8 MI TO THE END OF THE ASPHALT ROAD. THE STATION IS ON THE LEFT APPROXIMATELY 20 FT NORTH OF THE END OF THE ASPHALT ROAD, 25 FT WEST OF THE CENTERLINE OF THE ROAD, AND 3 FT EAST OF THE FENCE LINE. IT IS A 3/4" IRON ROD WITH CAP DRIVEN TO GROUND LEVEL.*" A combination Trimble R8 global navigation satellite system (GNSS) (base)/R8 GNSS (rover) GPS Receiver was used to continually monitor water elevations throughout the duration of the survey. A static survey was also performed while the control point was being observed. Trimble Business Center was used to process all GPS survey data collected.

2.2 Data Collection: Modeling

The primary purpose of the one-dimensional modeling analysis was to evaluate flow velocity near the proposed river bank protection and to determine riprap size. The scope of services included obtaining topographic and bathymetric data; acquiring Mississippi River hydrodynamic data; setting up, modifying, calibrating, and validating the one-dimensional model; developing the design scenarios for model simulations; predicting the flow velocity; and sizing the riprap near the project location.

The USACE's Hydrologic Engineering Center River Analysis System (HEC-RAS) model was selected as the ideal tool because the USACE had an existing model from the 2011 high-flow event on the Mississippi River. This model was selected due to the fact that the stage of the Mississippi River is the major

contributor to stage and flow conditions in the lower reaches of Bayou Sara. Therefore, the behavior and conditions of the Mississippi River had to be fully captured and understood in order to determine flow and velocities within Bayou Sara, which are required for stone armor sizing calculations.

The USACE model domain extends from Venice, Louisiana, at River Mile (RM) 10.7 above Head of Passes to Tarbert Landing at RM 306 above Head of Passes along the Mississippi River (Figure 3). The HEC-RAS model was provided by the USACE New Orleans District, validated, and used to assess the 2011 high-flow event.

Figure 3. USACE's HEC-RAS Model Domain.

The domain was quite extensive and much larger than what was required for the Bayou Sara analysis; thus, the domain was reduced considerably to only include the project's area of interest. The model's overbank sections were augmented with bathymetric and topographic survey data collected for the project (Figure 4). HEC-RAS channel cross sections within Bayou Sara were aligned exactly with those surveyed for the project.

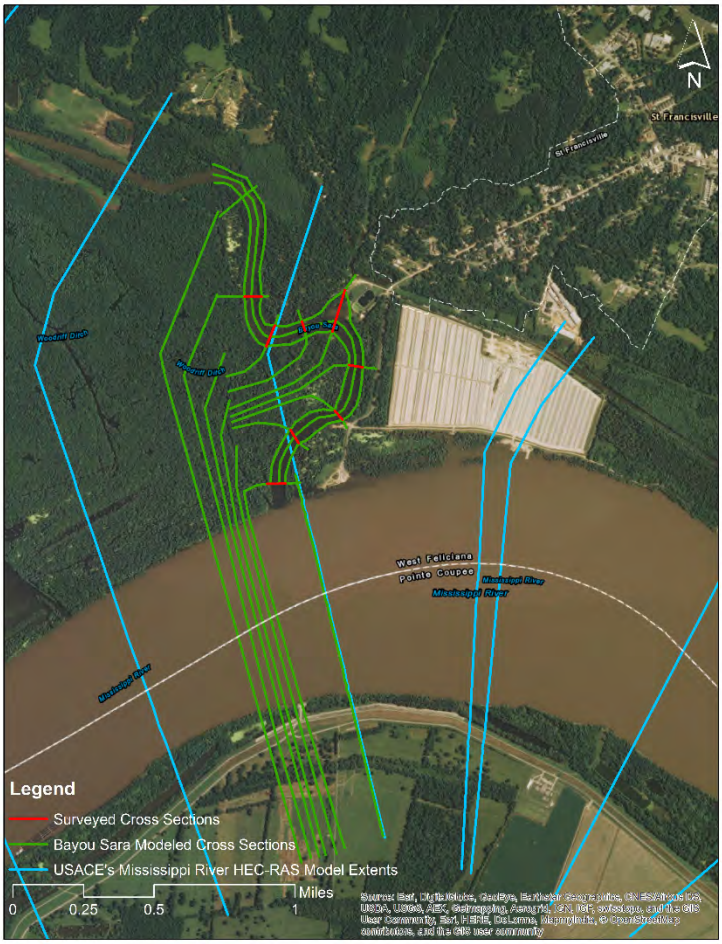

Figure 4. Bayou Sara Revised HEC-RAS Model Domain.

To show that the modification of the model does not change the validation, the model was validated for a few flood events by comparing simulated and observed stage and flow data, which are discussed in Section 2.3. Daily and hourly stage data are available at gages operated by the USACE from Tarbert Landing to the Gulf of Mexico (USACE 2016). Figure 5 depicts the gages and their locations. Only five gages provide hourly data; others provide daily data: Red River Landing, Baton Rouge, Reserve, Bonnet Carre, and New Orleans).

Figure 5. USACE Gages in Model Domain

2.3 H&H Analysis

There are no stream gages or recorded data publicly available for the volume of flow in Bayou Sara attributable to precipitation runoff. The watershed of Bayou Sara is located in the Pine Hills Region. The U.S. Geological Survey (USGS) classifies watersheds and sub watersheds into various levels of aggregation. These are characterized by Hydrologic Unit Code (HUC) values. Bayou Sara's watershed corresponds to the HUC-10 level of classification and is depicted on Figure 6. To estimate the peak flow for upstream inflow, regional regression equations (Figure 7) were used to calculate the flow rate for different return periods based on USGS National Flood-Frequency (NFF) Program's "Methods for Estimating Flood Magnitude and Frequency in Rural Areas in Louisiana, 2001" (USGS 2001).

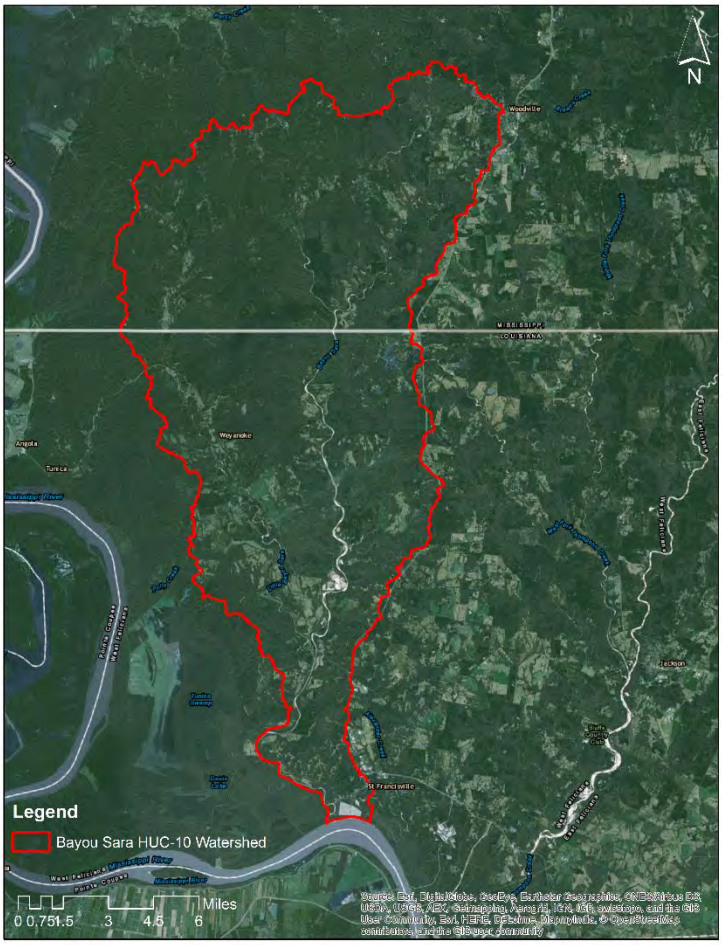

Figure 6. Bayou Sara Watershed

[Q_T, peak discharge for recurrence interval T, 2 to 500 years, in cubic feet per second; A, drainage area, in square miles; SLP, main channel slope, in feet per mile; AP, mean annual precipitation, in inches, during the period 1951-1980]

Regression equations	Standard error of estimate, in percent	Equivalent years of record
Pine Hills region		
$Q_2 = 5.80DA^{0.744}SLP^{0.374}(AP\text{-}35)^{0.796}$	±47	3
$Q_5 = 13.3DA^{0.760}SLP^{0.385}(AP\text{-}35)^{0.694}$	±42	5
$Q_{10} = 19.5DA^{0.768}SLP^{0.392}(AP\text{-}35)^{0.658}$	±41	6
$Q_{25} = 28.0DA^{0.778}SLP^{0.401}(AP\text{-}35)^{0.629}$	±43	8
$Q_{50} = 34.6DA^{0.785}SLP^{0.407}(AP\text{-}35)^{0.616}$	±46	9
$Q_{100} = 41.2DA^{0.791}SLP^{0.412}(AP\text{-}35)^{0.610}$	±49	9
$Q_{500} = 56.0DA^{0.803}SLP^{0.425}(AP\text{-}35)^{0.608}$	±57	10

Figure 7. Regional Regression Equations

The following were measured and/or assumed for the regional regression equations:

Drainage Area (DA)

DA = 448.49 square kilometers = 173.16 square miles

Main Channel Slope (SLP)

SLP = 10.08 feet per mile

Mean Annual Precipitation (AP)

AP = 56 inches

Computing the values provides the following flow rates attributable to precipitation runoff in Bayou Sara for various return frequencies as shown in Table 1 where Q_T is the peak discharge for recurrence interval T, 2 to 500.

Table 1. Bayou Sara Flow Rates and Given Return Frequencies

Discharge Recurrence Interval	Discharge (cubic feet per second)
Q_2	7,190
Q_5	13,463
Q_{10}	18,735
Q_{25}	26,476
Q_{50}	33,058
Q_{100}	40,329
Q_{500}	59,727

2.4 Model Calibration and Validation

The model domain for this study was extracted to only include the part of the USACE model from Baton Rouge, Louisiana, to Tarbert Landing (small domain) with a few cross sections added near the junction of Bayou Sara. The cross sections of Bayou Sara were constructed using Light Detection and Ranging (LiDAR) data and survey data. The boundary conditions for the Mississippi River portion of the model include upstream inflow and downstream water stage. The daily hydrograph of discharge observed at Tarbert Landing was used for the upstream boundary conditions. The daily water stage observed at Venice was used as the downstream boundary conditions.

The HEC-RAS model needed to be recalibrated because of the modifications described above. Two periods were selected: 01/01/2003 to 12/31/2003 and 01/01/2011 to 12/31/2011. The model was calibrated for the year 2003, representing a normal or average flow year, in fully unsteady flow mode. Validation was performed for the year 2011 to check the performance of the calibrated model for extreme flood events. A final Manning's n value of 0.027 was assigned to the small domain. The value is a measure of the surface roughness or friction of the model's domain. The USACE model domain assigned a Manning's n value of 0.030 to the reach between RM 306 and RM 50.2 and 0.022 to the reach between

RM 49.8 and RM 10.2. Figure 8 shows a comparison between the observed and simulated water surface elevations at Red River Landing (RM 302.8), Bayou Sara (RM 265.38), and Baton Rouge (RM 228.5) for the calibration period. Because of the consistent match between the modeled and observed data, it was concluded that the model was calibrated properly to reproduce river hydraulics in the reduced model domain.

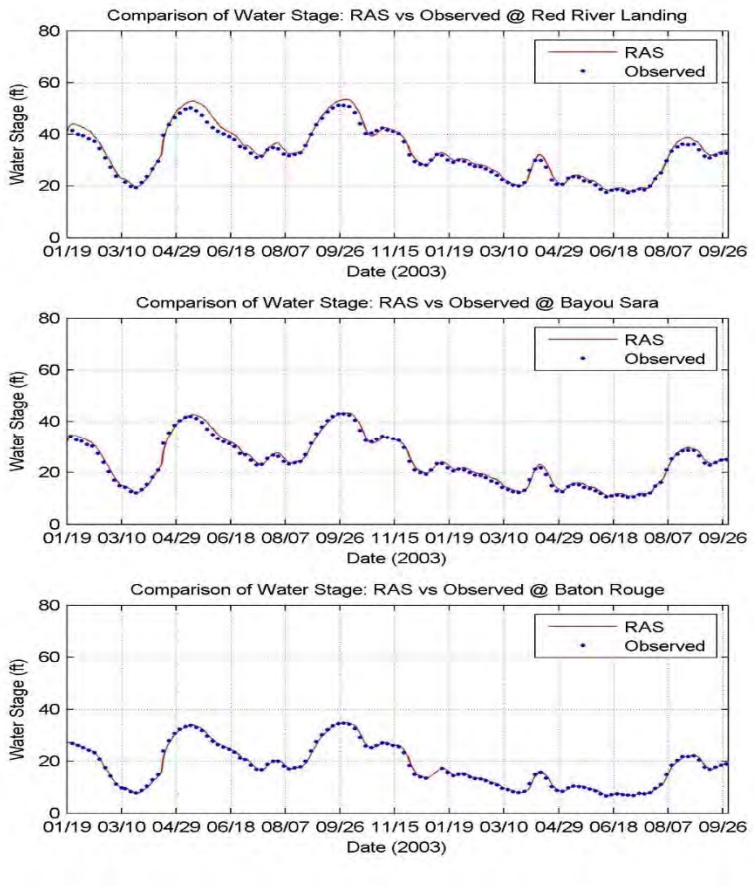

Figure 8. Model Calibration 2003

Model validation for the year 2011 was performed without any adjustments to the parameters of the existing model in order to assess model performance for extreme flood events, such as that which occurred in 2011. Figure 9 shows a comparison between the observed and simulated water surface elevation at the same locations for the validation period. Once again, due to the consistent match between modeled and observed data, it was concluded that the model was calibrated properly to reproduce river hydraulics in the reduced model domain. Following calibration and validation of model hydrodynamics, the next step was to investigate conditions of flow in Bayou Sara.

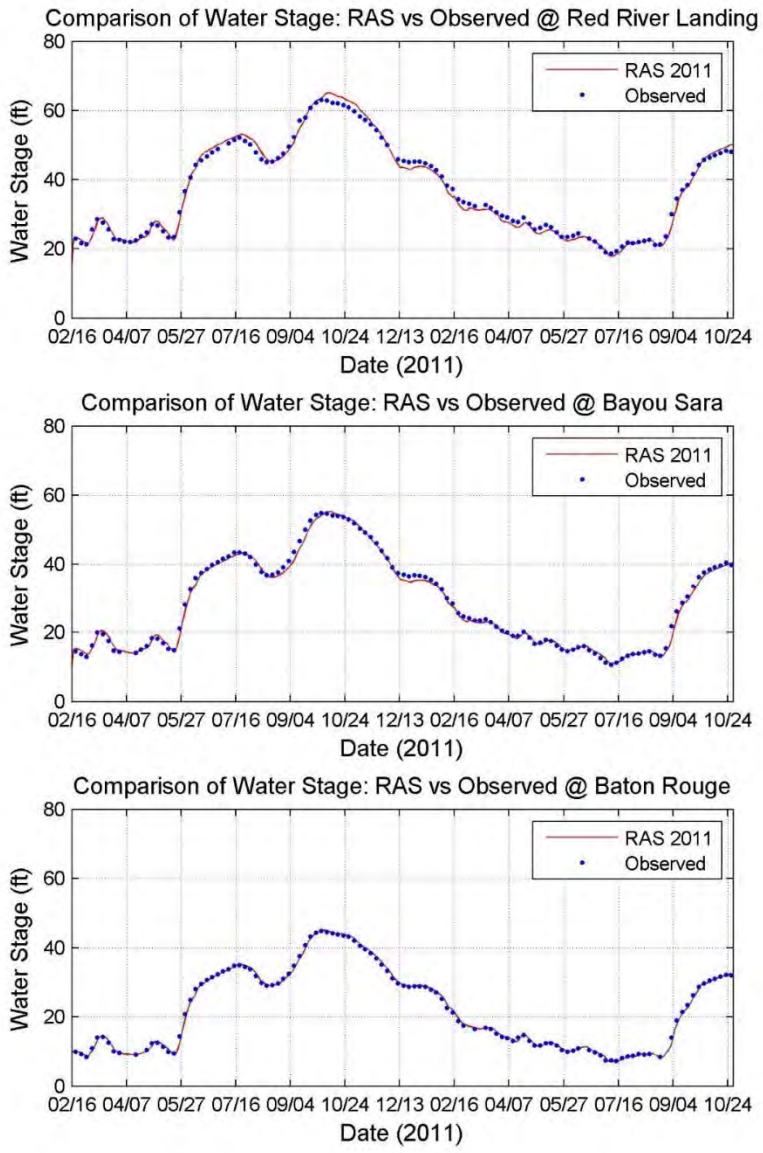

Figure 9. Model Validation 2011

2.5 Assessment of River Flow in Bayou Sara

After the HEC-RAS was calibrated and validated, additional simulations were performed to assess the river flow velocity used to size riprap armoring for bank protection. Rock riprap design is comprised of three primary steps: preliminary data analysis, rock sizing, and revetment detail design. The purpose of this H&H Analysis was to compile the data, including channel cross-section surveys, soil conditions,

historical problems, etc., and then determine the design discharge and design water surface elevation at the irregular design sections to size the riprap armor.

The water surface elevation and channel velocity time series of 2011 show that the highest flow velocities occur during low water levels. It also demonstrated that the water level in lower Bayou Sara was controlled by the water level in the Mississippi River. An example of a data analysis plot is shown on Figure 10. The upper plot shows the time series of water surface elevation and flow velocity at cross-section 14.40 (Figure 11). The lower plot shows the correlation between water surface elevation and flow velocity, which can be used for riprap design for flow velocity and water depth at different locations.

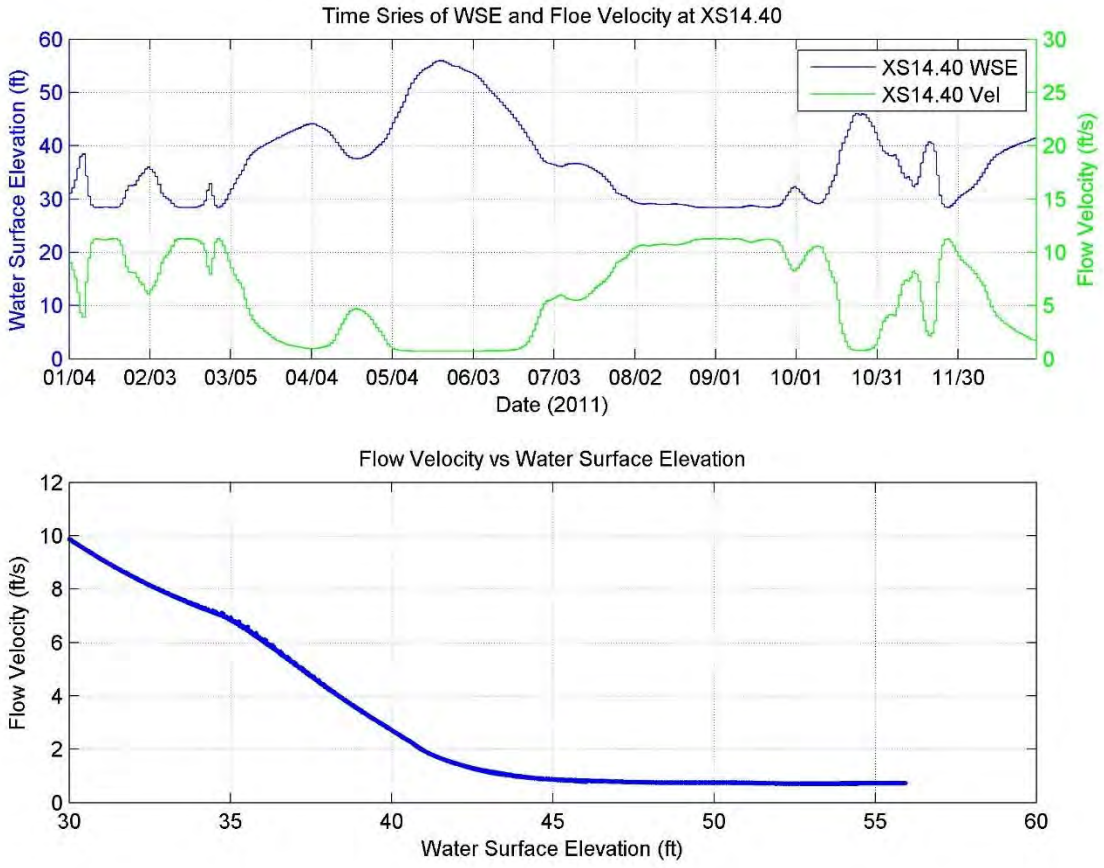

Figure 10. Water Surface Elevation and Channel Flow Velocity along Bayou Sara – 2011

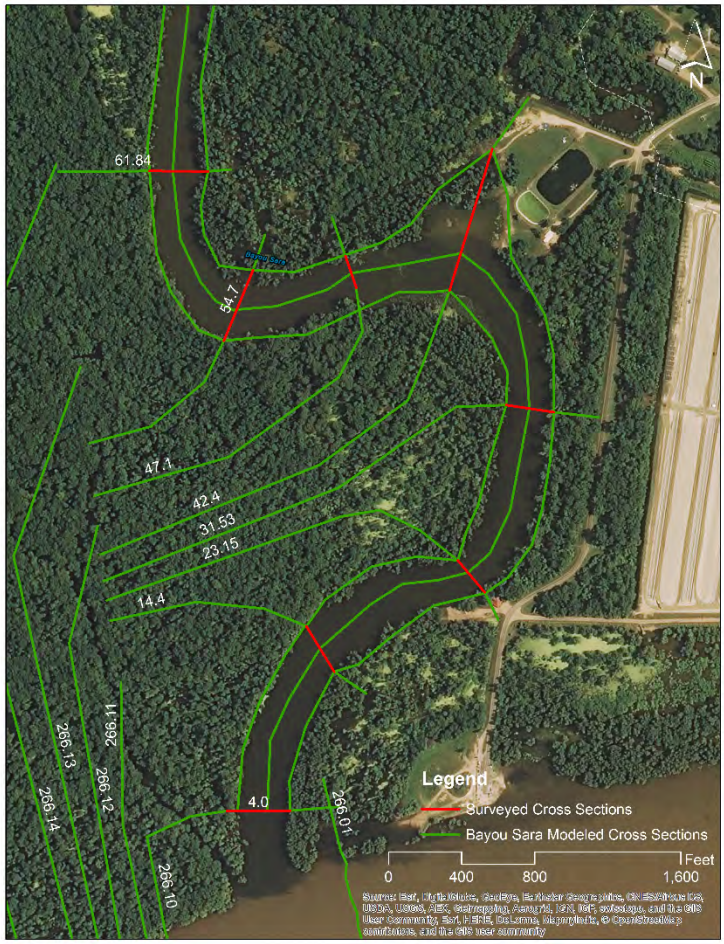

Figure 11. HEC-RAS Model Cross Sections

To provide the design flow velocity and average depth for riprap design at different locations, flow velocities for different water surface elevations at different cross-section locations were calculated. Typically, design discharges for riprap armor range from 10- to 50-year flow return frequencies. The 10-year and 50-year design discharges, which were calculated based on the USGS NFF Program regression equation discussed in Section 2.3, yielded 18,735 cubic feet per second (cfs) and 33,085 cfs, respectively, for the 10- and 50-year events. Both years 2003 and 2011 were simulated with HEC-RAS. The model results show similar correlation between water surface elevation and flow velocity. All model results (shown on Figure 12) are provided in Appendix B.

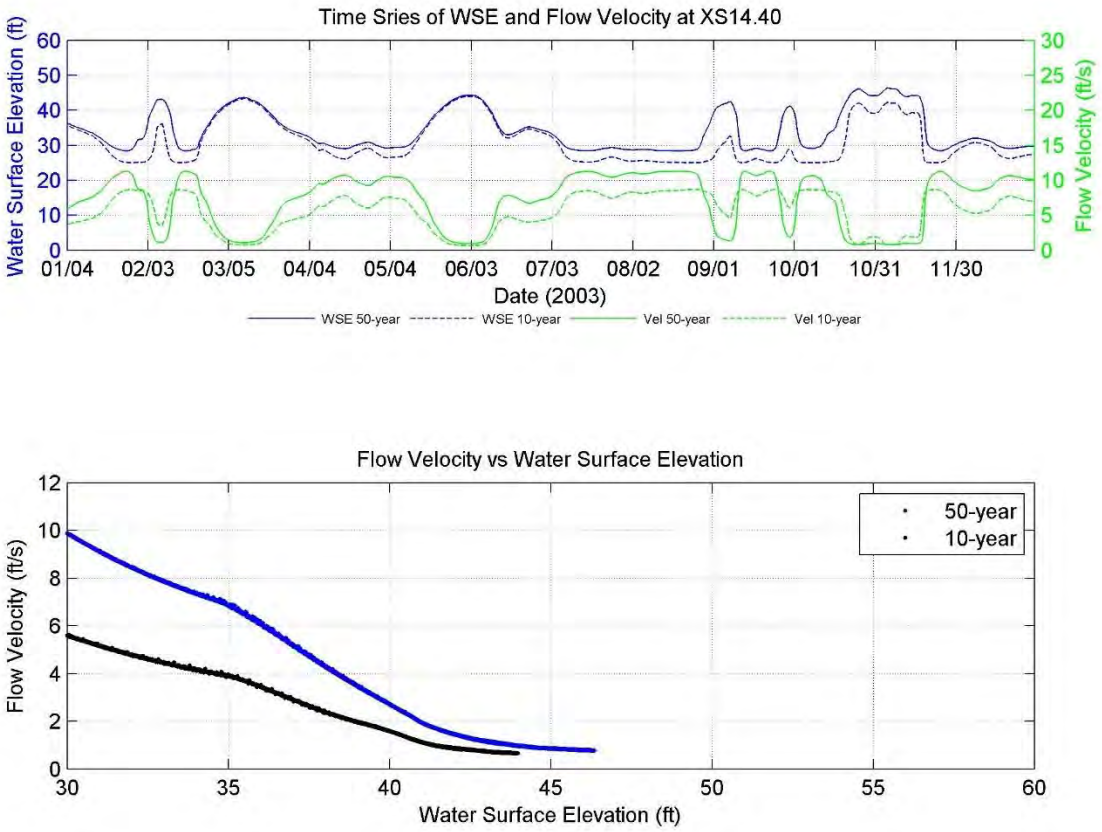

Figure 12. Flow Velocity and Water Surface Elevation at Cross-Section 14.40 during 2003

3 STONE ARMOR SIZING

3.1 Stone Armor Sizing Methodology

There are various methods for determining sufficient stone armor size to resist external forces, such as current and waves, in order to prevent stream bank erosion. This analysis focused on the Federal Highway Administration's (FHWA's) HEC-11 (1989) methodology and used USACE Engineer Manual (EM) 1110-2-1601 (1994) as a check. Riprap is classified universally by average diameter and weight. Both methods calculate a D_{50}, or mean diameter of stone class, required to resist the forces anticipated at a project location. HEC-11 and EM 1110-2-1601 calculations of D_{50} are summarized below and detailed information is provided in Appendix C. It should be noted that both methods identify a minimum bank slope standard of 1.5H:1V, with a slope of 2H:1V recommended. This analysis assumes all bank sections in the project area will be regraded to 2H:1V slopes prior to placement of armoring materials.

Riprap sizing calculations were performed using the following equation from HEC-11 methodology.

$$D_{50} = \frac{(0.00594 \times V_a^{\,3})}{(d_{avg}^{\,0.5} \times K_1^{\,1.5})} \times C$$

Where:

D_{50} = Median riprap particle size with 50% of stones within the gradation

V_a = Average velocity in the main channel

D_{avg} = Average flow depth in the main channel

K_1 = Bank angle correction factor

C = Stability and specific gravity correction factor.

This calculation yields a D_{50} of 1.3 feet, which corresponds approximately to a 130-pound riprap as classified in the Louisiana Department of Transportation and Development's (LADOTD's) "Standard Specifications for Roads and Bridges" (2006). In order to cross-check the riprap sizing, calculations were performed using HEC-11 methodology, EM 1110-2-1601.

$$D_{30} = S_f * C_s * C_v * C_t * d * \left[\frac{\gamma w}{(\gamma s - \gamma w)}^{0.5} \times \frac{V}{(K_1 \times g \times d)}\right]^{2.5}$$

Where:

D_{30} = Median riprap particle size with 50% of stones within the smaller gradation

S_f = Safety factor

C_s = Stability coefficient

C_v = Vertical velocity distribution coefficient

C_t = Thickness coefficient

D = Depth of flow

γ_w = Unit weight of water

γ_s = Unit weight of stone riprap

V = Velocity of flow

K_1 = Side slope correction factor

This calculation yields a D_{30} of 1.27 feet (converts to a D_{50} of 1.55 feet), which generally is between 130-pound and 255-pound class riprap as classified by LADOTD (2006). The primary difference between the two methods is the introduction of a safety factor in the USACE methodology. The analysis team deemed the 130-pound class stone sufficient for the project location for several reasons:

- The project is not located on a major navigable waterway; therefore, bank slope failure would not impede navigation or waterborne commerce.
- The only major infrastructure along the eroding bank (the Sewer Treatment Pond, Ferdinand Street, and a commercial property) are set back at a sufficient distance from the bank and the remedial

action plan includes re-grading the banks to a shallower 2H:1V slope; therefore, the minimum factor of safety was deemed sufficient.

- The bank armoring and re-grading is not intended to stop flooding or overtopping of Bayou Sara. The Sewer Treatment Pond, Ferdinand Street, and the Oyster Bar all flood periodically under present conditions.

3.2 Filter Layer Design

Filter layers are often required when placing riprap armoring along stream banks and shorelines to ensure that currents are unable to scour the in-situ bed material from underneath the armor layer, which could induce armor or slope failures. There are two primary filter layer types: granular aggregates and geotextile fabrics. Cost is the deciding factor for final selection of filter type. Should a granular filter be cost-effective, both the HEC-11 and EM 1110-2-1601 methodologies suggest that the minimum filter layer thickness should equate to 1 x D_{100} of the selected riprap class or 1.5 x D_{50} of the selected riprap class, whichever is greater. It also should be no less than approximately 1 foot in overall thickness. For 130-pound class riprap, the minimum filter layer thickness is approximately 2 feet if placed in the dry. If placed in the wet, the minimum layer thickness doubles to approximately 4 feet to account for uncertainties in underwater construction.

In order to ensure stability between the in-situ bed materials, filter layer, and riprap armoring, a filter ratio is calculated. This ratio is intended to ensure that piping through the filter material is prevented, while at the same time maintaining necessary permeability for drainage through the layers. Should there be a large variance between the in-situ bed material and the riprap size, more than one filter layer and layer size may be required. The filter ratio is defined in HEC-11 as:

$$\frac{D_{15}\ Coarser\ Layer}{D_{85}\ Finer\ Layer} < 5 < \frac{D_{15}\ Coarser\ Layer}{D_{15}\ Finer\ Layer} < 40$$

A limitation of this 30% level of analysis is that no geotechnical investigations have been performed and, therefore, assumptions regarding the in-situ bed material were made based on typical material found in the Mississippi River.

Should a geotextile fabric filter be deemed cost-effective and the preferred solution, several guidelines for material composition and placement must be adhered to, as outlined in HEC-11. These include:

- Fabric shall consist of long chain polymers composed of at least 85% polyolefins, polyesters, or polyamides.
- Geotextiles should not be exposed to Ultra Violet rays longer than the manufacturer's prescribed amount. According to HEC-11 *"Low resistance to ultraviolet degradation fabrics (more than 30% strength loss at 500 hours exposure ASTM D-4355) should not be exposed to sunlight for more than 7 days. Geotextiles with higher resistance to ultraviolet degradation should not be exposed for more than 30 days. NOTE: Geotextiles can be manufactured or finished to resist degradation due to prolonged exposure to ultraviolet radiation, i.e., fabrics resistant to exposure for multi-year periods (from 5 to 25 years) are not uncommon."*
- Piping Resistance (soil retention) (8).

  - Soil with 50% or less particles by weight passing U.S. No. 200 Sieve; Apparent Opening Size (AOS) less than 0.6 millimeter (mm) (greater than #30 U.S. Std. Sieve).
  - Soil with more than 50% particles by weight passing U.S. No. 200 Sieve; AOS less than 0.3mm (greater than #50 U.S. Std. Sieve).
- Permeability of fabric greater than permeability of soil.
- Minimum physical characteristics as outlined in Table 2 below. Test methods are in accordance with procedures outlined in the FHWA Geotextile Engineering Manual.

Table 2. Revetment Toe Protection Methods

Test Methods	Drainage		Erosion Control	
	Class A	Class B	Class A	Class B
Grab Strength (minimum in either principal direction), Newtons	800	356	890	400
Elongation (minimum in either principal direction), Newtons	Not Specified	Not Specified	15%	15%
Puncture Strength, Pascals	800	111	800	178
Burst Strength, Pascals	2.00E+06	-9.00E+05	2.20E+06	1.00E+06
Trapezoid Tear, Newtons	222	111	222	-133

3.3 Toe Design

Adequate toe protection is required to prevent scour-induced slope instability at the base of the revetment. Various methods for toe construction are shown on Figure 13, which is taken from EM 1110-2-1601.

EM 1601 notes *"Method A applies when toe excavation can be applied in the dry; the riprap layer may extend below the existing ground line a distance exceeding the anticipated depth of scour. If excavation quantities are prohibitive, the concept of Method D can be adapted to reduce excavation… Method D is a useful technique where water levels prohibit excavation for a toe section; it is to place a launchable section at the toe of the bank. Even if excavation is practicable, this method may be preferred for cost savings if the cost of extra stone required to produce a launched thickness equal to or greater than T plus the increase shown in Table 3-2 is exceeded by the cost of excavation required to carry the design thickness, T, down the slope. This concept simply uses toe scour as a substitute for mechanical excavation...Shape of the stone section before launching is not critical, but thickness of section is important because thickness controls the rate at which rock is released in the launching process. For gradual scour in regular bendways, the height of the stone section before launching should be from 2.5 to 4.0 times the bank protection thickness, T. For rapid scour in impinged flow environments, or in gravel bed streams, the stone section height before launching should be 2.5 to 3.0 T...Stone is lost downstream during the launching process; and the larger the scour depth, the greater the percentage of stone lost in the launching process."*

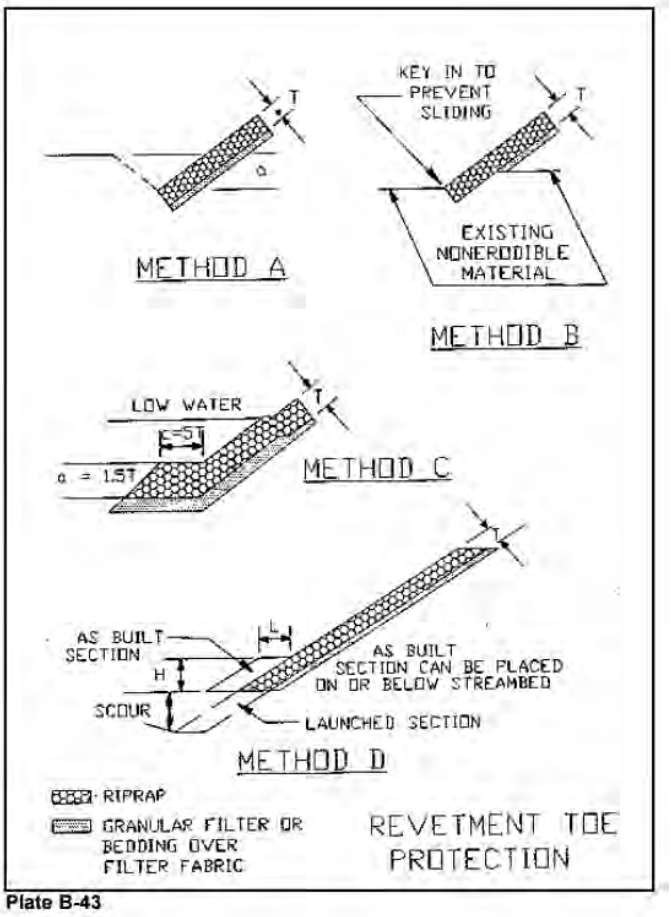

Figure 13. Revetment Toe Protection Methods

The primary consideration for toe design will be the ability to construct the revetment in the wet or dry. Because water levels can fluctuate greatly at the project location throughout the year and the computed maximum scour depth is relatively deep, Method D was selected. HEC-11 methodology computed a maximum potential scour depth of -12 feet below the Bayou Sara stream bed based on estimates of in-situ bed material grain size. This method was confirmed using the U.S. Department of the Interior-Bureau of Reclamation's Technical Guideline for Computing Degradation and Local Scour (1984), which yielded a maximum scour depth of 19 feet below the Bayou Sara stream bed. Excavating from 12 to 19 feet below the stream bed would require conditions in the stream bed of Bayou Sara to be almost entirely dry because a substantial portion of the bed would have to be excavated to ensure revetment placement to such a substantial depth below the bed. Conversely, launchable stone could be constructed in the wet or dry and would provide a contractor more options for placement and time of year to construct the feature.

Launchable stone toe dimensions were calculated and typical toe dimensions for the northern bend (SL-7 cross section) and the southern bend (SL-20 cross section) on Figure 14 below. Cross sections SL-7 and SL-20 are also referenced as Bend #1 and Bend #2.

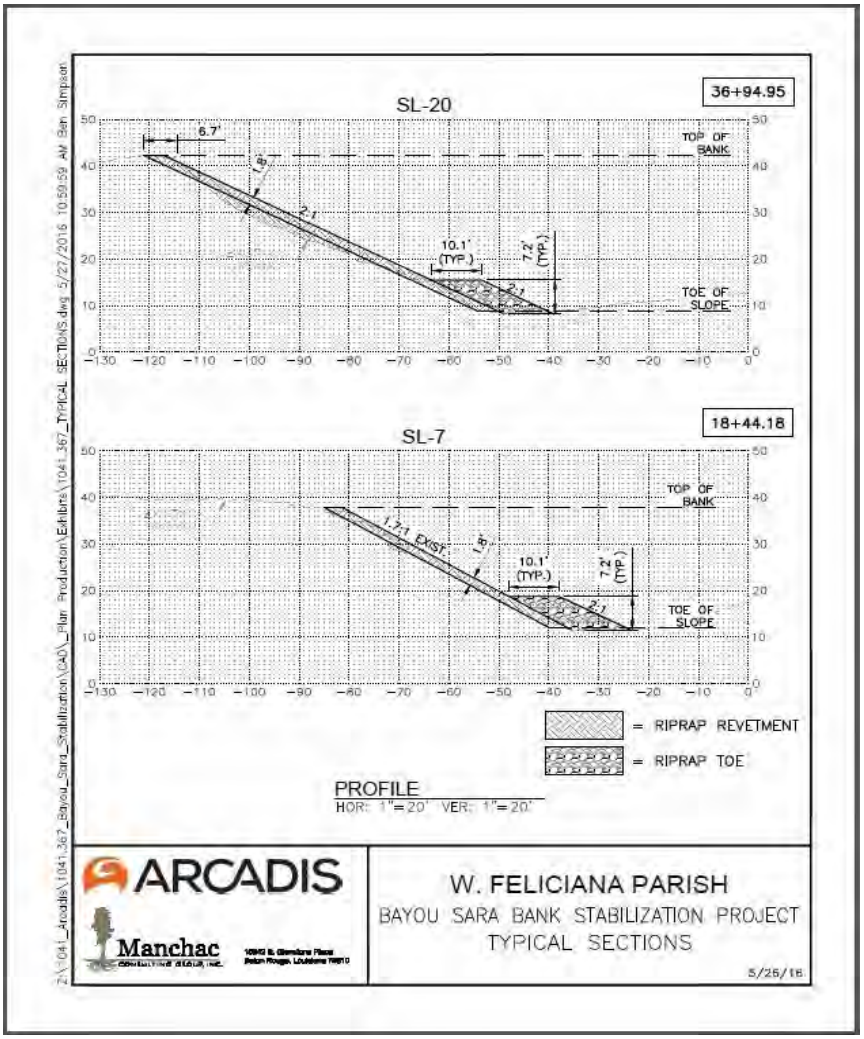

Figure 14. Typical Launchable Toe Design

4 CIVIL SITE DESIGN

Survey data from MPH were imported into AutoCAD to begin the preliminary plans. Cross sections of the Bayou Sara project site were generated according to survey data. Based on design criteria, a grading plan was developed to achieve a slope not greater than 2H:1V along the embankment. This resulted in a cross-sectional area for both the cut and fill required to achieve the design slope. The average end method was then used to calculate the cut and fill volumes. Once the bank surface was graded in the plans, the revetment and toe were placed on the slope according to the design. Volumes required for the revetment and toe were then calculated using the average end method. All quantity calculations are provided in Appendix D. Plan and profile sections of the areas to be armored are provided in Appendix E.

5 ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST

Construction is estimated to cost approximately $2.49 million for the preferred mitigation solution depending upon access route, availability of fill material, water levels in the Bayou, and material and fuel prices at time of construction. A breakdown of cost items and unit cost assumptions are provided in Table 3 below. In addition to the baseline estimate of $2.49 million for regrading and armoring the two bends within the project area, an additional cost estimate of $3.46 million was calculated for not only armoring the two bends, but also the straight section of cut bank between the two bends (Table 4). This represents an incremental cost increase of approximately $960,000 to regrade and armor the straight section of bank between the bends. The incremental cost increase was analyzed as an alternative, but not selected as the preferred mitigation solution. By strategically armoring the two bends with engineered mitigation protection measures, the preliminary opinion of probable costs for the project increased by $1,811 after the H&H Analysis and 30% Engineering Design were conducted.

Table 3. Preliminary Opinion of Probable Cost – Bends Only

Item		Quantity	Unit	Unit Cost	Total
Riprap Revetment Materials					
	Grading and Shaping	1	LS	$160,000.00	$160,000
	Geotextile Underlay	22,370	SY	$8.00	$178,960
	130# Class Riprap	19,621	CY	$85.00	$1,667,774
				Subtotal	$2,006,733
Total Estimated Material and Labor Cost					$2,006,800
Basic Engineering and Additional Services					
	Basic Services Fee (Per Office of Facility Planning and Control with 1.15 Difficulty Factor)				$200,480
	Topographic Survey				$25,000
	Geotechnical				$30,000
	Hydraulic Analysis				$50,000
	Construction Observation (based on 6-month construction duration)				$65,000
				Subtotal	$370,480
	Project and Grant Management			5.0%	$118,864
Total Estimated Engineering and Additional Services Cost					$489,344
				Total Estimated Project Cost	$2,496,140

Table 4. Preliminary Opinion of Probable Cost – Bends and Straight Section

Item		Quantity	Unit	Unit Cost	Total
Riprap Revetment Materials					
	Grading and Shaping	1	LS	$200,000.00	$200,000
	Geotextile Underlay	32,270	SY	$8.00	$258,159
	130# Class Riprap	28,120	CY	$85.00	$2,390,234
				Subtotal	$2,848,393
Total Estimated Material and Labor Cost					$2,848,400
Basic Engineering and Additional Services					
	Basic Services Fee (Per Office of Facility Planning and Control with 1.15 Difficulty Factor)				$277,140
	Topographic Survey				$25,000
	Geotechnical				$30,000
	Hydraulic Analysis				$50,000
	Construction Observation (based on 6-month construction duration)				$65,000
				Subtotal	$447,140
	Project and Grant Management			5.0%	$164,777
Total Estimated Engineering and Additional Services Cost					$611,917
				Total Estimated Project Cost	$3,460,320

6 RECOMMENDATIONS AND NEXT STEPS

Required steps for the next phase of analysis include several integral actions to complete the analysis and design. These include:

- Development of a geotechnical testing plan and collection of requisite geotechnical data to investigate the gradation and properties of the in-situ soils comprising the stream bed and banks of Bayou Sara within the project area. These data will allow for the refinement of scour depth calculations and, ultimately, refinement of the toe design. Additionally, these data will confirm that the calculated re-graded side slope dimensions are fully stable under a variety of conditions and loadings.
- Additional survey cross-section collection will enable more accurate calculation of cut/fill quantities within the project area.
- A detailed cost estimate using tools such as the RSMeans database will enable optimization of cost calculations to ensure there are sufficient funds within the project budget to armor the two bends according to industry standards as well as to investigate if additional funds would be available to armor the straight section of cut bank connecting the two bends.

- When sufficient design details are available to establish the construction footprint of the project, permitting activities should be initiated with federal and state agencies. A Joint Permit application for the Louisiana Department of Natural Resources and USACE should be initiated early in the process to avoid delays in the schedule. Permitting of geotechnical investigations may be necessary depending on method or acquisition and location.

7 REFERENCES

FHWA. 1989. Design of Riprap Revetment. Hydraulic Engineering Circular, No. 11. Publication No. FHWA-IP-89-016.

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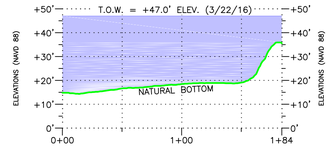
APPENDIX A

Project Location Survey

WEST FELICIANA PARISH, LOUISIANA
SECTIONS 42 & 43, T03S–R03W



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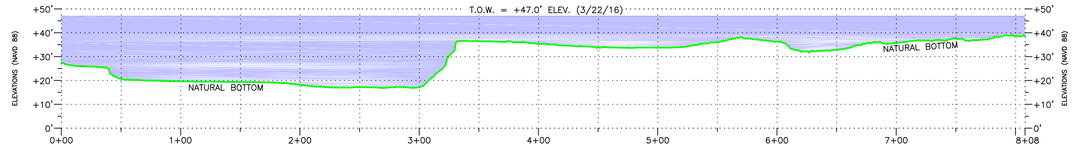

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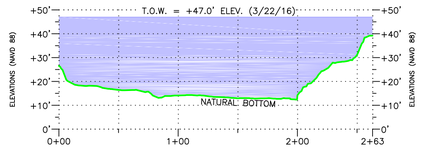

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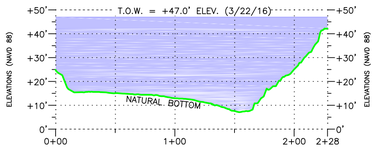

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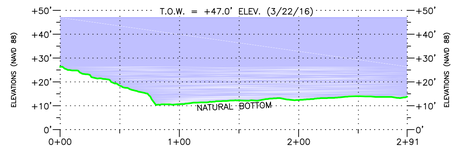

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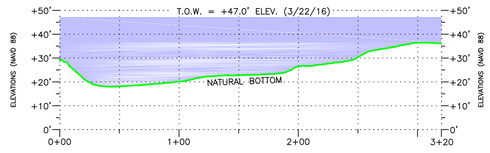

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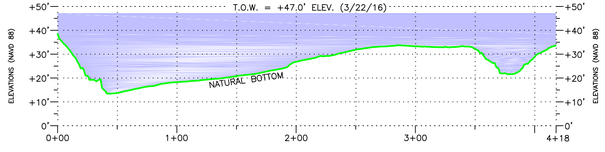

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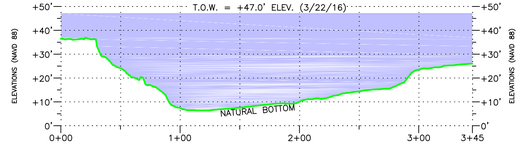

CROSS SECTION ALT H

NOTES:

DATE OF HYDROGRAPHIC SURVEY WAS 3/22/16.

HORIZONTAL COORDINATES INDICATED HEREIN ARE REFERENCED TO THE LOUISIANA STATE PLANE COORDINATE SYSTEM, NORTH AMERICAN DATUM 1983 (NAD 83), SOUTH ZONE, US FT. VERTICAL ELEVATIONS ARE RELATIVE TO NORTH AMERICA VERTICAL DATUM OF 1988 (NAVD 88), US FT. GEOID12A, AS DERIVED FROM A GLOBAL POSITIONING SYSTEM (GPS) STATIC SURVEY.

TO REACH THE MONUMNENT FROM THE INTERSECTION OF HWY 61 AND HWY 3057, TRAVEL SOUTH ON HWY 3057 FOR 1.0 MI TO THE JUNCTION WITH HWY 1258/FERDINARD ST. TURN LEFT ON HHWY 1258/FERDINARD STAND TRAVEL SOUTHWEST FOR 1.8 MI TO THE END OF THE ASPHALT ROAD. THE STATION IS ON THE LEFT APPROXIMATELY 20 FT NORTH OF THE END OF THE ASPHALT ROAD, 25 FT WEST OF THE CENTERLINE OF THE ROAD, AND 3 FT EAST OF THE FENCE LINE. IT IS A 3/4" IRON ROD WITH CAP DRIVEN TO GROUND LEVEL

THIS DRAWING WAS PREPARED FOR TOPOGRAPHIC PURPOSES ONLY, AND IS NOT A PROPERTY BOUNDARY SURVEY AND AS SUCH DOES NOT COMPLY WITH THE MOST RECENT "STANDARDS OF PRACTICE FOR PROPERTY BOUNDARY SURVEYS" AS ADOPTED BY THE LOUISIANA PROFESSIONAL ENGINEERING AND LAND SURVEYING BOARD.

NO ON–THE–GROUND EFFORT WILL BE MADE TO LOCATE AND INDICATE ALL BELOW GROUND FERROUS METAL CABLES, PIPELINES AND UTILITIES IN THE AREAS DESCRIBED ABOVE; THEREFORE, MORRIS P. HEBERT, INC. IS NOT RESPONSIBLE FOR ANY CABLES, PIPELINES, UTILITIES OR ANY OTHER BELOW GROUND STRUCTURES (INCLUDING PVC) NOT LOCATED DURING THE COURSE OF THE SURVEY. MPH'S EFFORTS DO NOT RELIEVE THE LA ONE CALL RESPONSIBILITY PRIOR TO MOBILIZATION OF EQUIPMENT AND OR EXCAVATION.

HORIZONTAL GRAPHIC SCALE
0 30' 60' 120'
0 15' 30' 60'
VERTICAL GRAPHIC SCALE

NO.	DATE	REV. BY:	REVISION

MANCHAC CONSULTING GROUP, INC.

PLAN & CROSS SECTIONS
BAYOU SARA BANK STABILIZATION
LOCATED IN
SECTIONS 42 & 43, T03S–R03W
WEST FELICIANA PARISH, LOUISIANA

Morris P. Hebert, Inc.
SURVEYING • ENGINEERING • ENVIRONMENTAL SERVICES • FIELD SERVICES • GIS
P.O. BOX 3156 • 283 CORPORATE DRIVE • HOUMA, LOUISIANA 70361 • (985) 879–2731
HOUMA, LA. • BATON ROUGE, LA. • HOUSTON, TX. • SAN ANTONIO, TX.
TEXAS SURVEY FIRM REGISTRATION NUMBER: 10193786 (HOUMA OFFICE)

DRAWN BY:	KDT	SHEET:	1 OF 1
CHKD./APPD. BY:	JCM	SCALE:	AS SHOWN
UPDATED BY:		DATE:	3/29/16
DATA BASE:	12486	JOB NO.	12486
MPH CAD FILE:	12486PNP0001A0.DWG		

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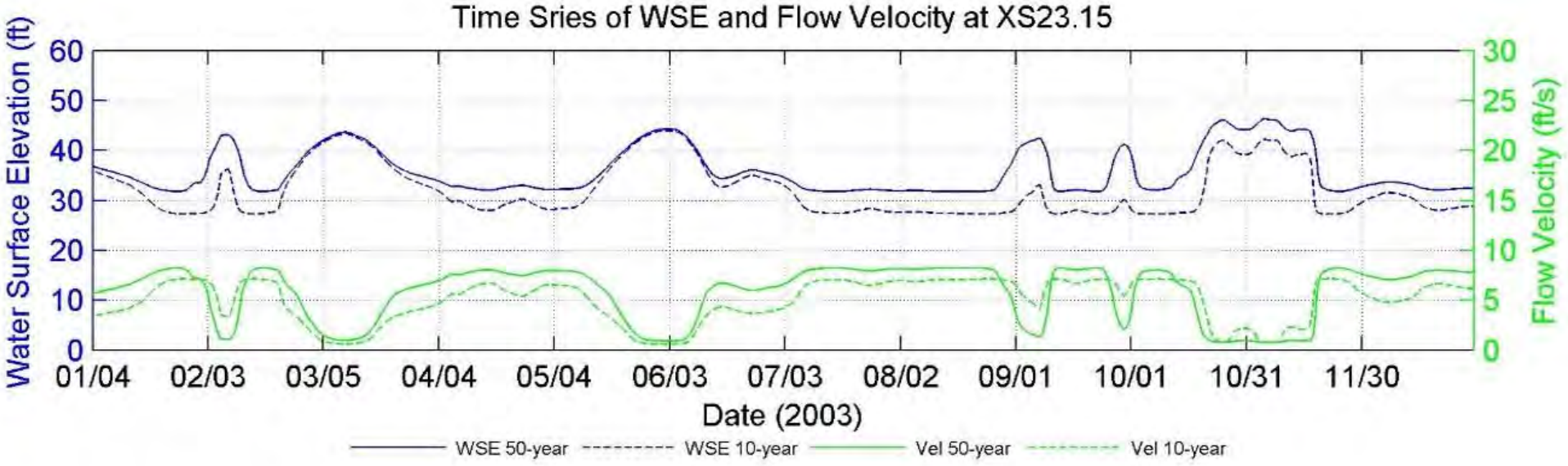
APPENDIX B

HEC – RAS Model Results


Time Sries of WSE and Flow Velocity at XS23.15
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30
20
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25
20
15
10
5
0
01/04
02/03
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05/04
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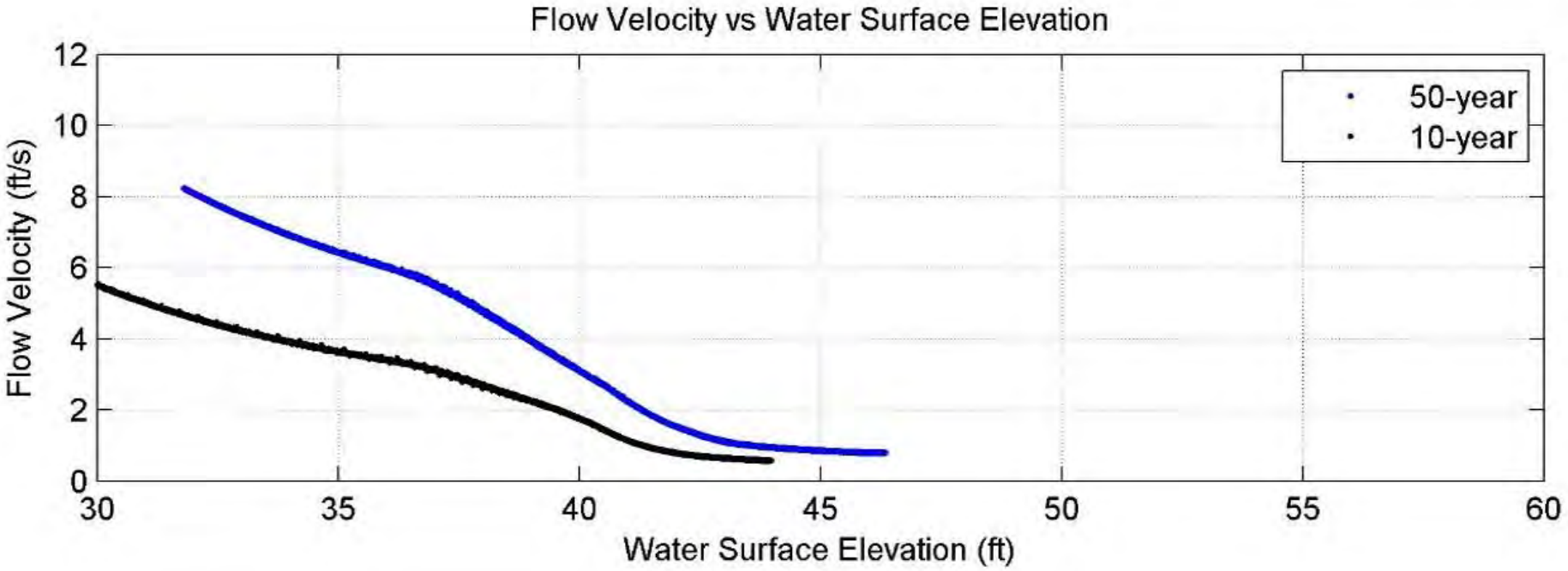
10/31
11/30
Date (2003)
WSE 50-year
WSE 10-year
Vel 50-year
Vel 10-year


Flow Velocity vs Water Surface Elevation
Flow Velocity (ft/s)
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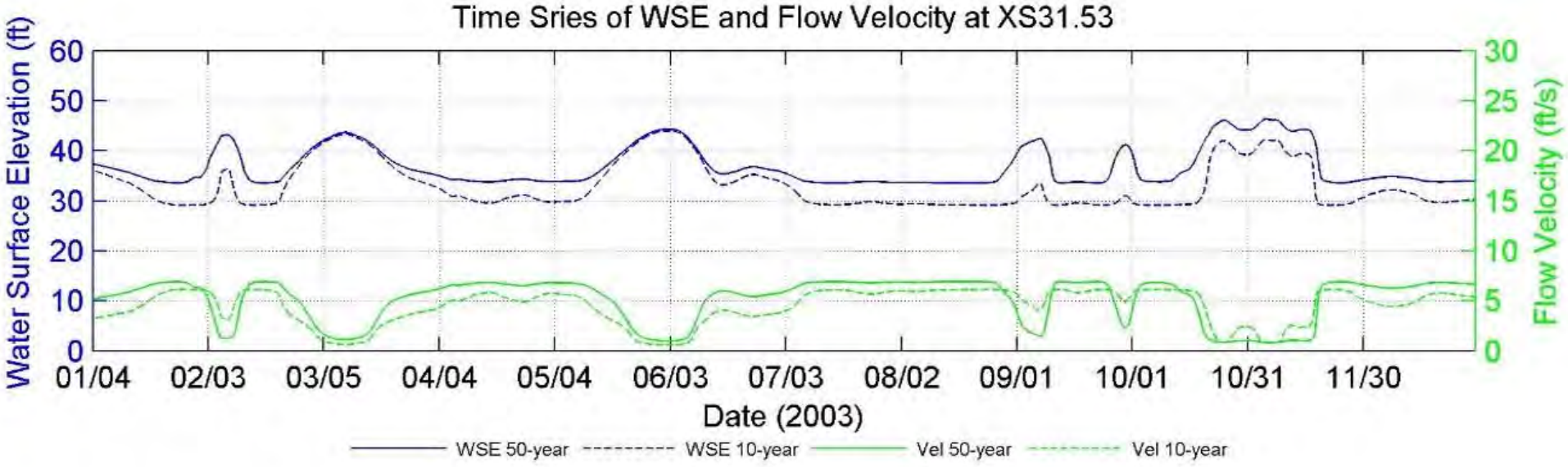
55
60
Water Surface Elevation (ft)
50-year
10-year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Water Surface Elevation (ft)
Flow Velocity (ft/s)
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40
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10
5
0
01/04
02/03
03/05
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06/03
07/03
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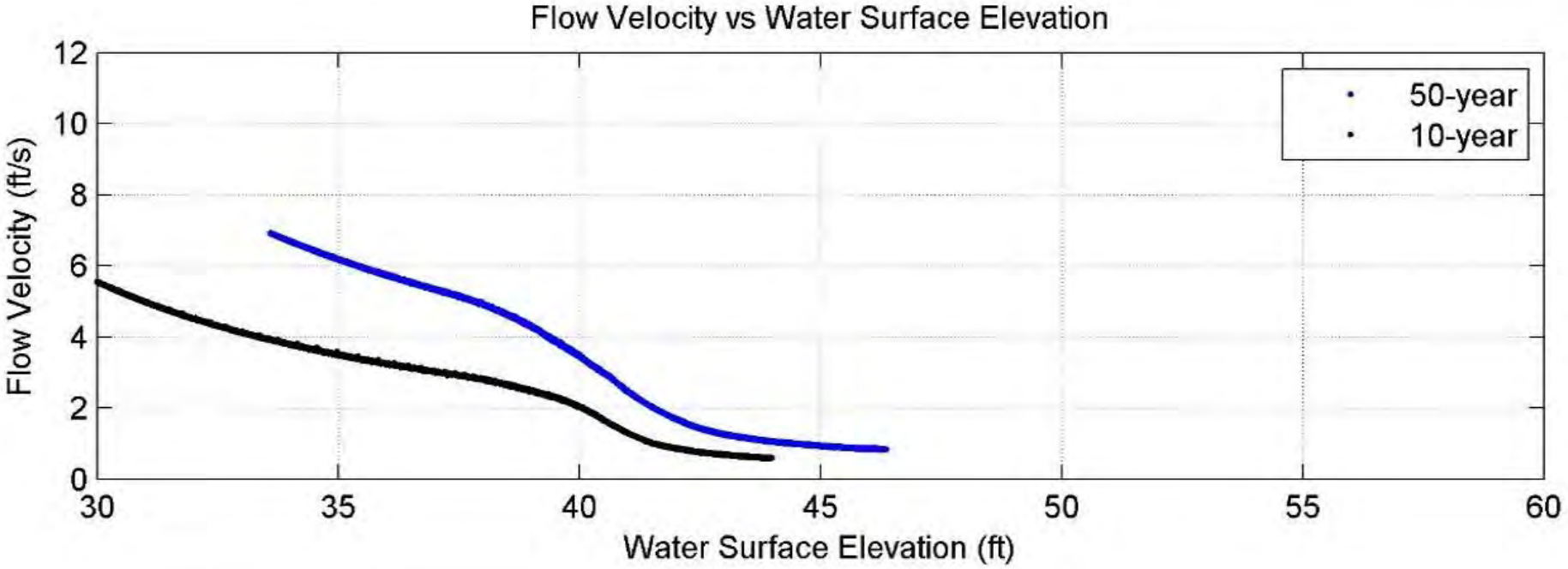
09/01
10/01
10/31
11/30
Date (2003)
WSE 50-year
WSE 10-year
Vel 50-year
Vel 10-year


Flow Velocity vs Water Surface Elevation
Flow Velocity (ft/s)
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8
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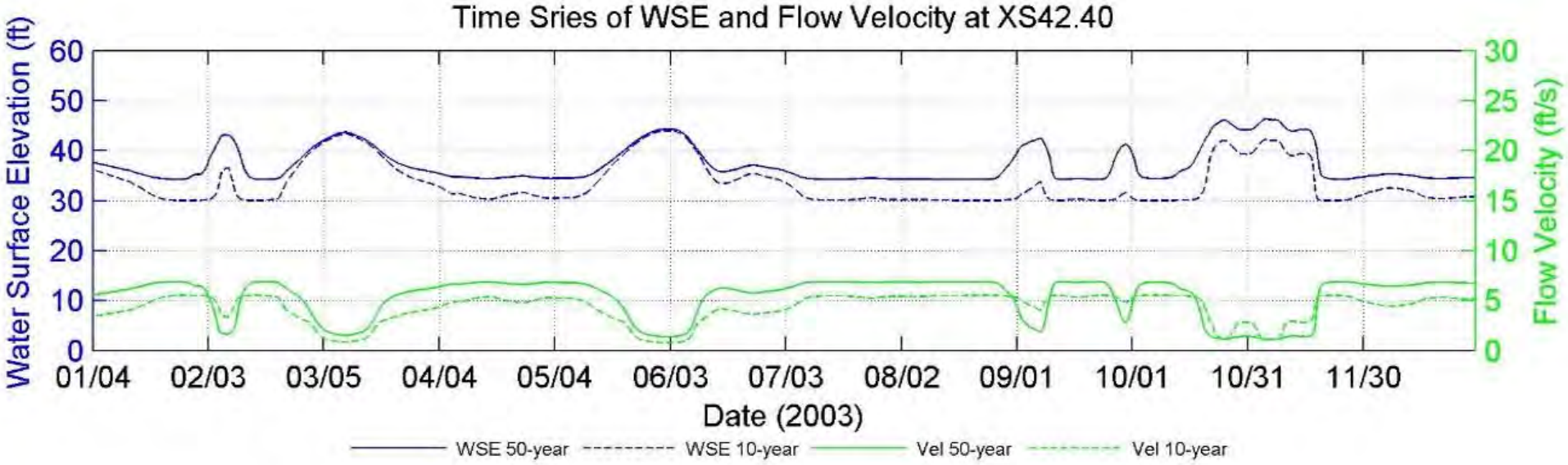
60
Water Surface Elevation (ft)
50-year
10-year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Flow Velocity (ft/s)
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10
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07/03
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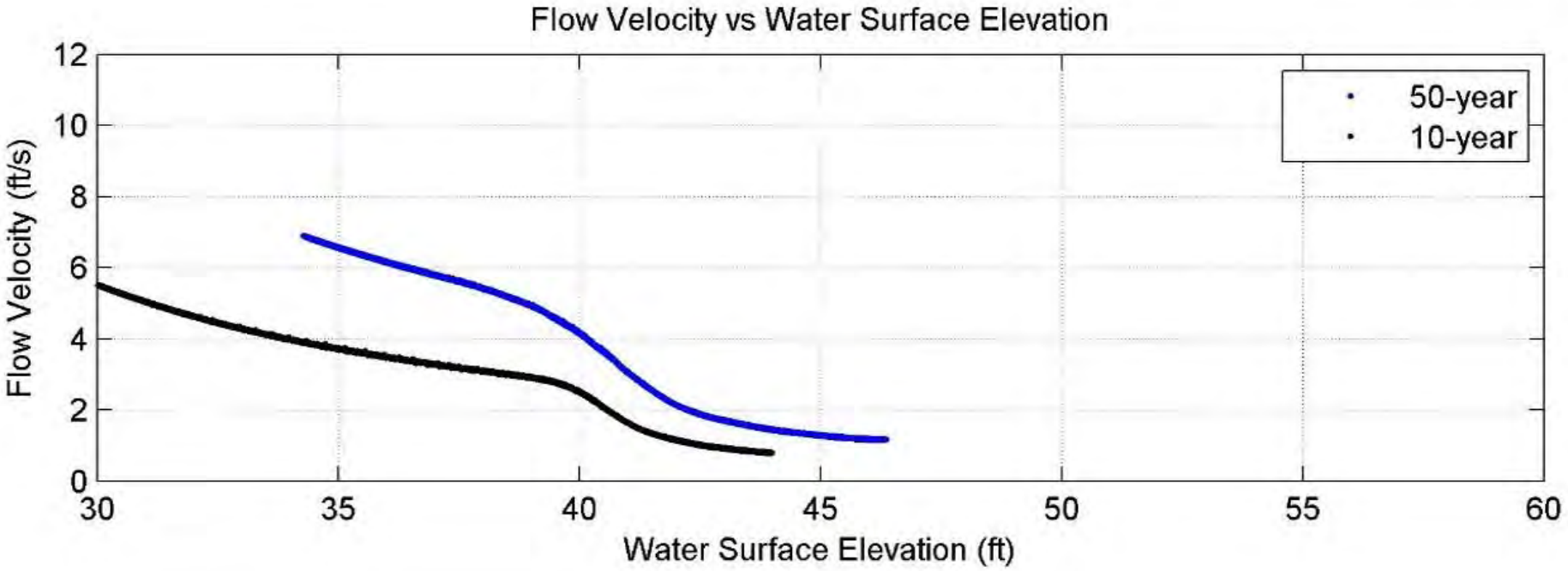
11/30
Date (2003)
WSE 50-year
WSE 10-year
Vel 50-year
Vel 10-year


Flow Velocity vs Water Surface Elevation
Flow Velocity (ft/s)
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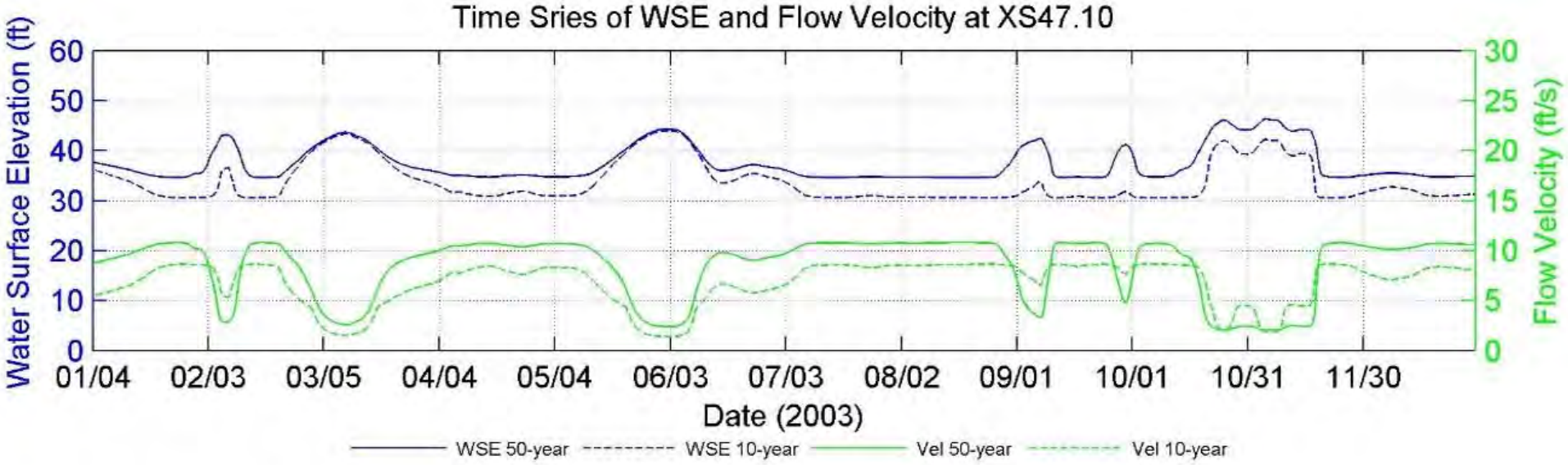
60
Water Surface Elevation (ft)
50-year
10-year


Time Sries of WSE and Flow Velocity at XS47.10
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Flow Velocity (ft/s)
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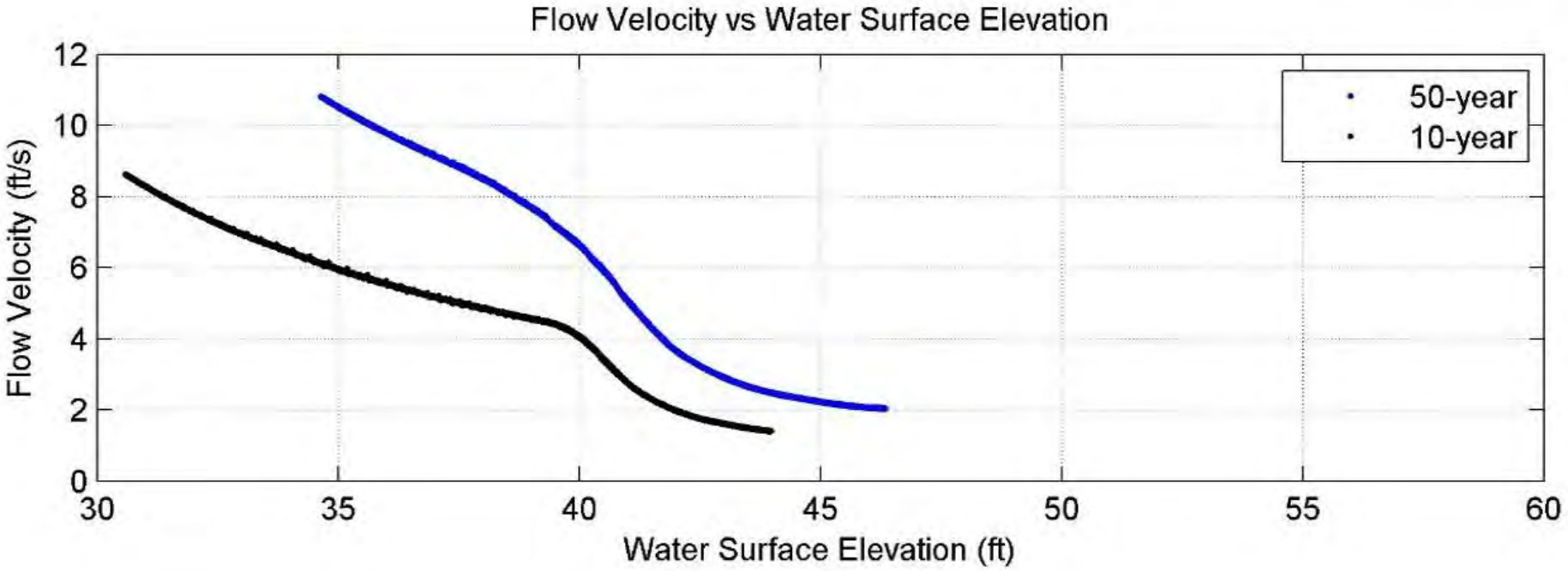
WSE 50-year
WSE 10-year
Vel 50-year
Vel 10-year


Flow Velocity vs Water Surface Elevation
Flow Velocity (ft/s)
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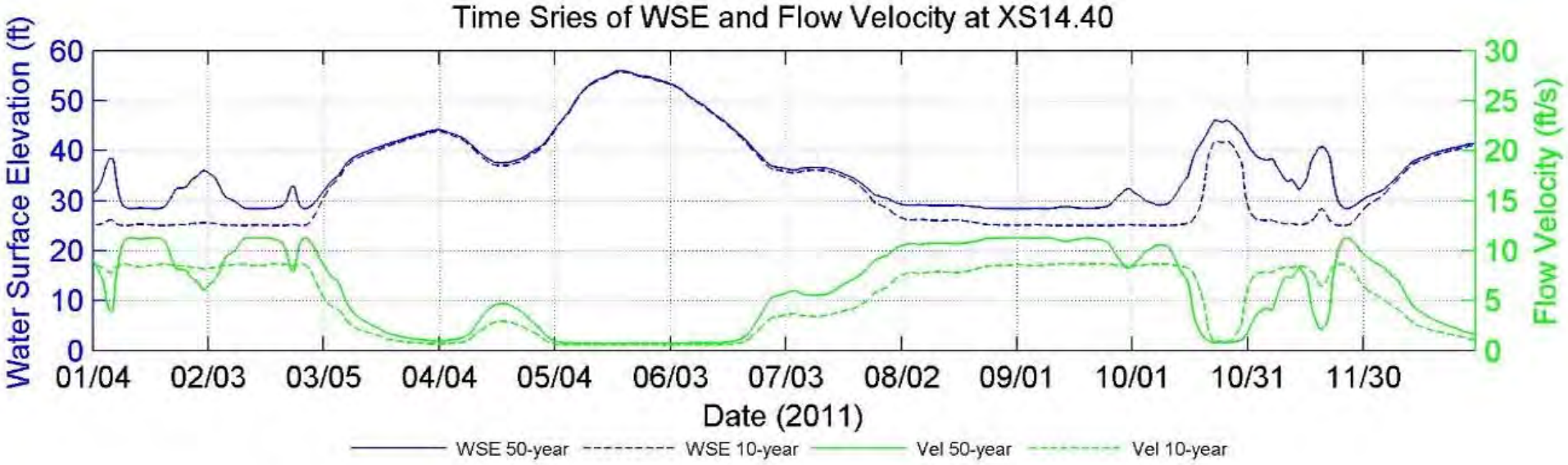
Water Surface Elevation (ft)
50-year
10-year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Date (2011)
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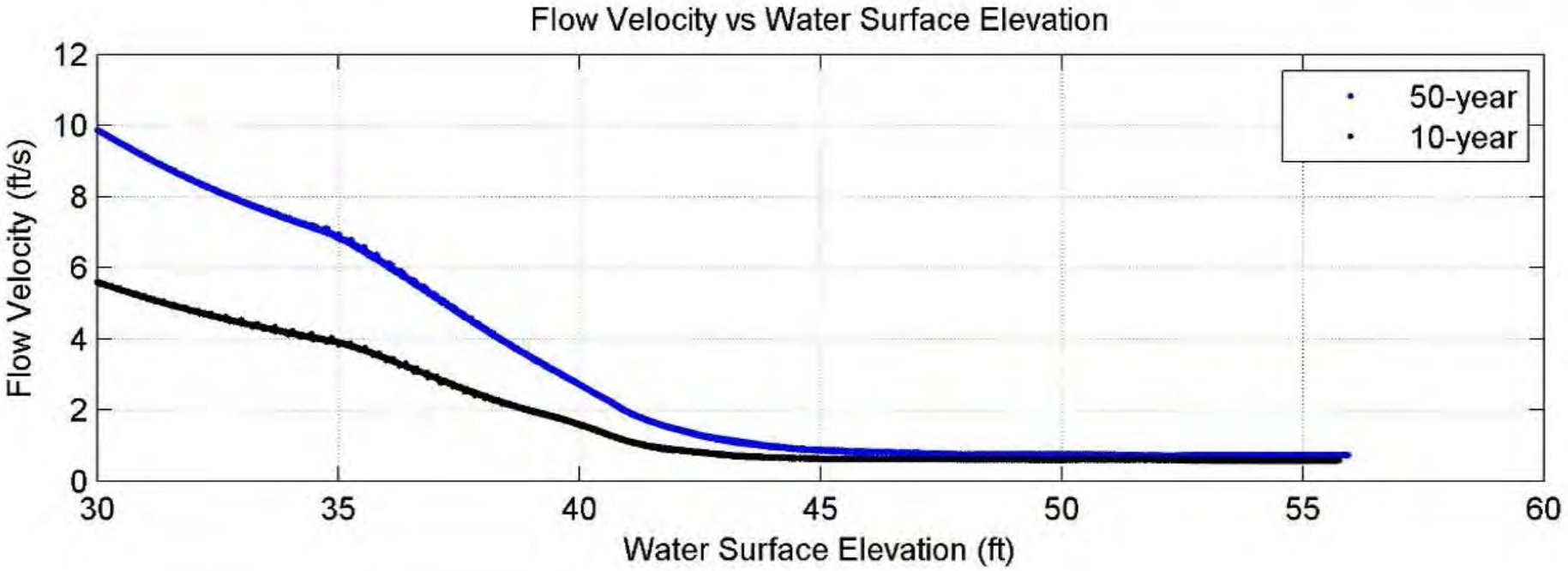
WSE 10-year
Vel 50-year
Vel 10-year


Flow Velocity vs Water Surface Elevation
Flow Velocity (ft/s)
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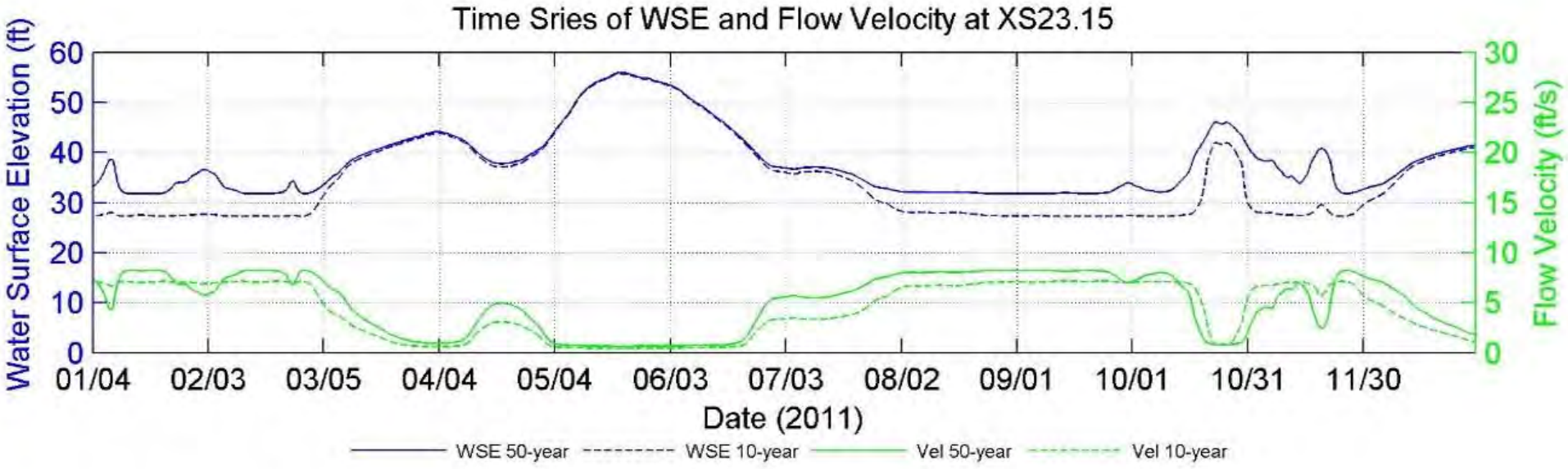
Water Surface Elevation (ft)
50-year
10-year


Time Sries of WSE and Flow Velocity at XS23.15
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Flow Velocity (ft/s)
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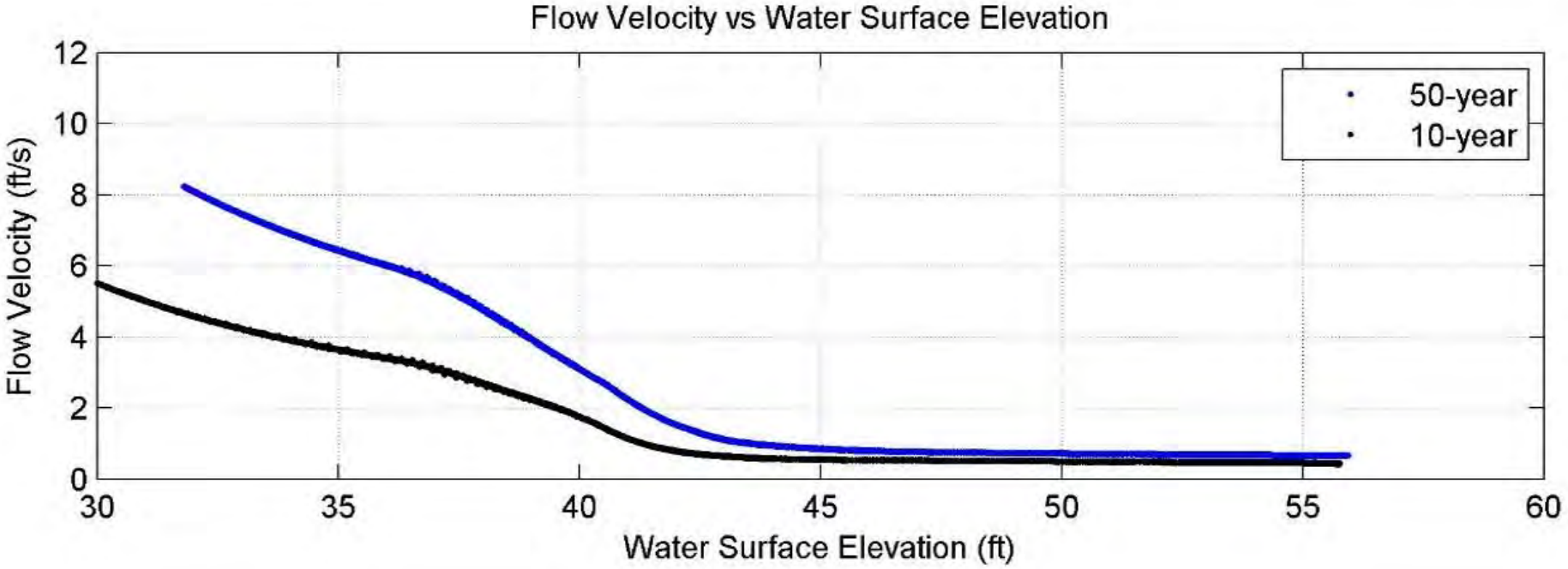
WSE 50-year
WSE 10-year
Vel 50-year
Vel 10-year


Flow Velocity vs Water Surface Elevation
Flow Velocity (ft/s)
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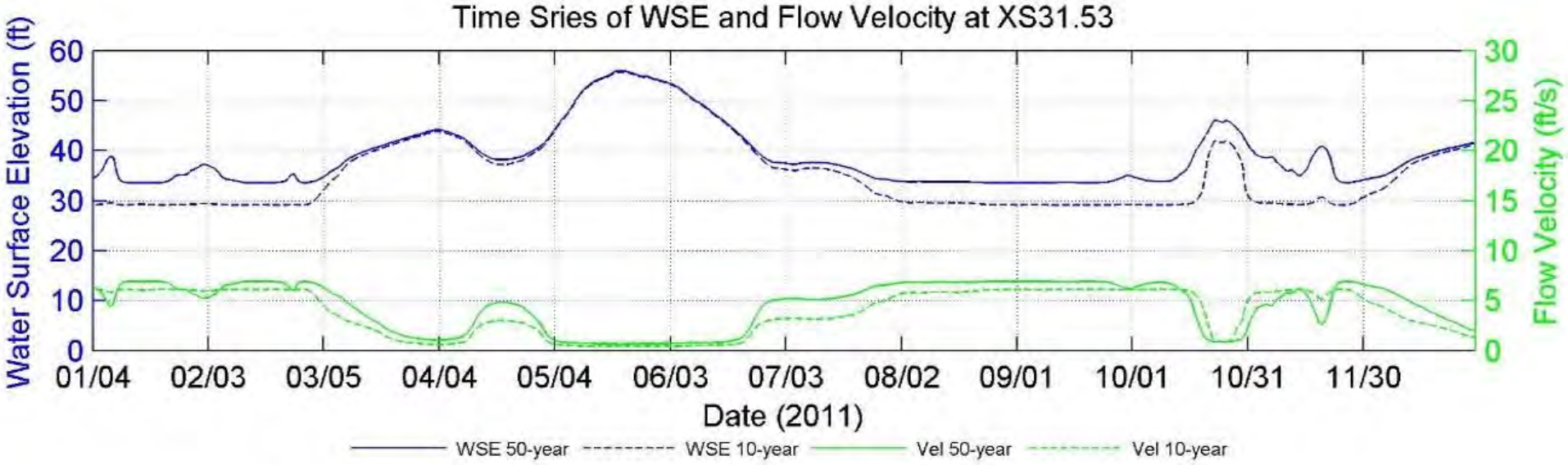
Water Surface Elevation (ft)
50-year
10-year


Time Sries of WSE and Flow Velocity at XS31.53
Water Surface Elevation (ft)
Flow Velocity (ft/s)
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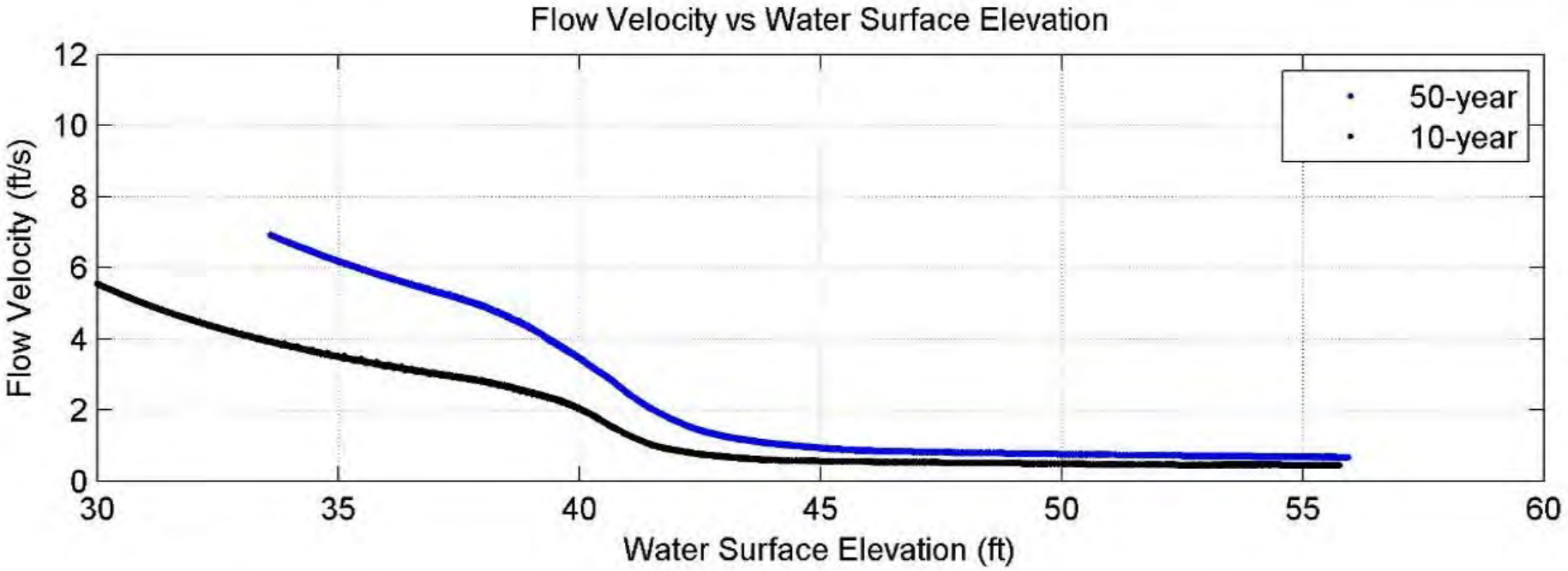
WSE 50-year
WSE 10-year
Vel 50-year
Vel 10-year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Flow Velocity (ft/s)
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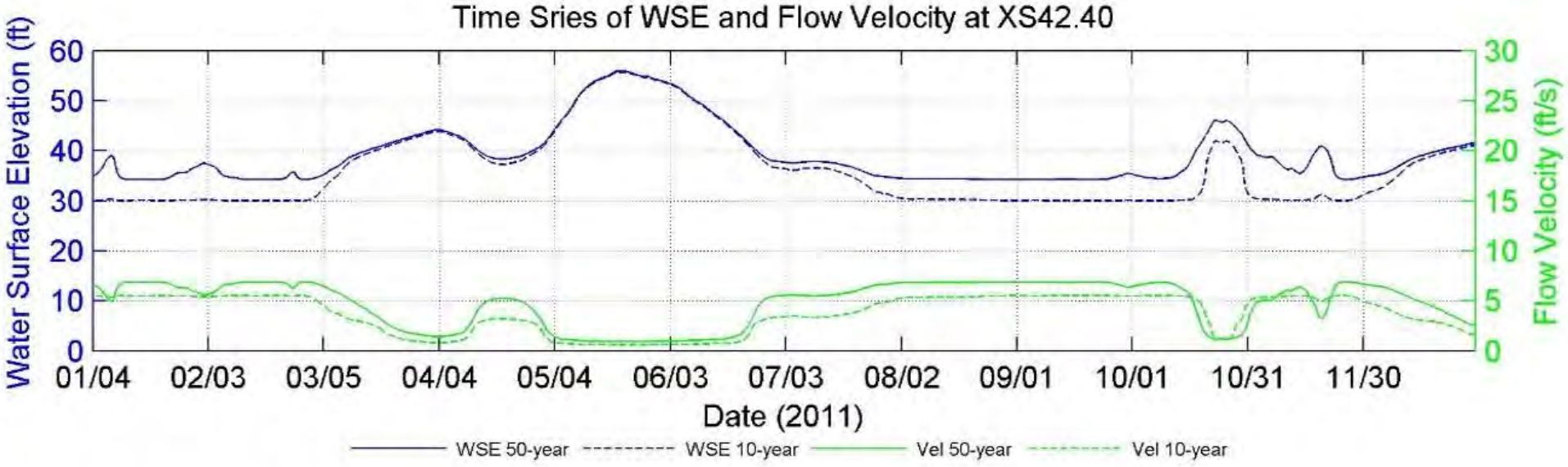
Water Surface Elevation (ft)
50-year
10-year


Time Sries of WSE and Flow Velocity at XS42.40
Water Surface Elevation (ft)
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Date (2011)
WSE 50-year
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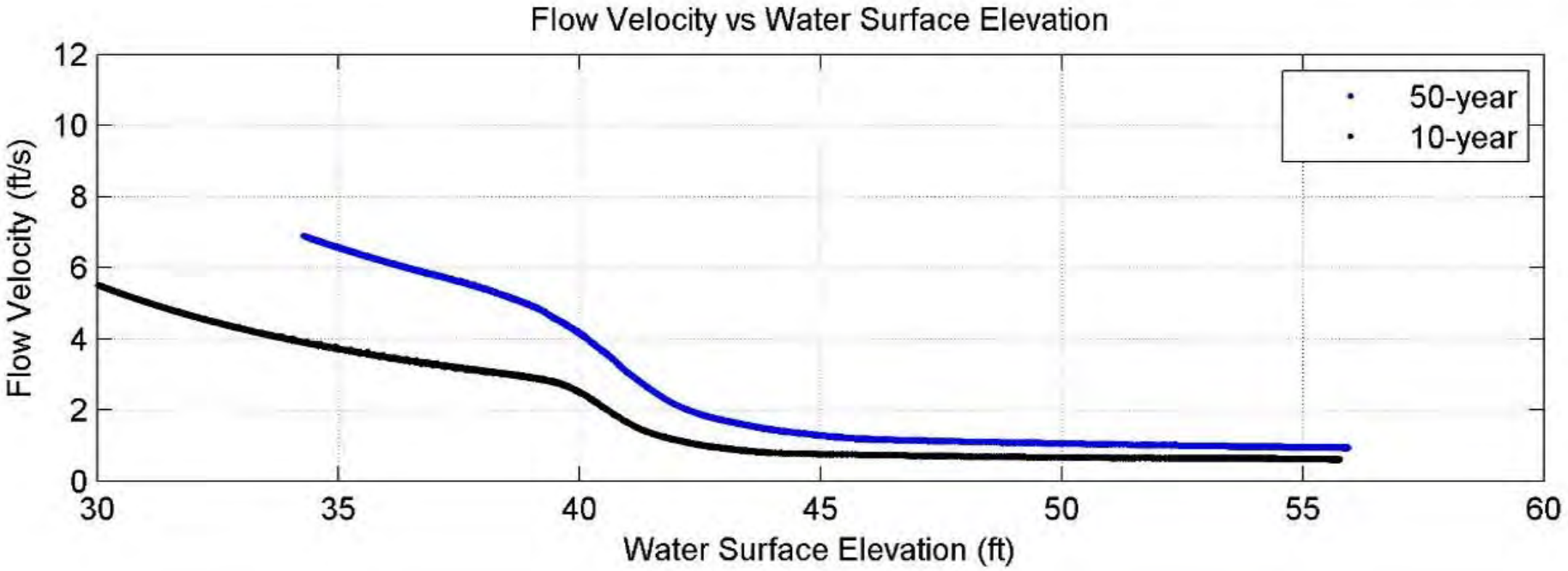
Vel 10-year


Flow Velocity vs Water Surface Elevation
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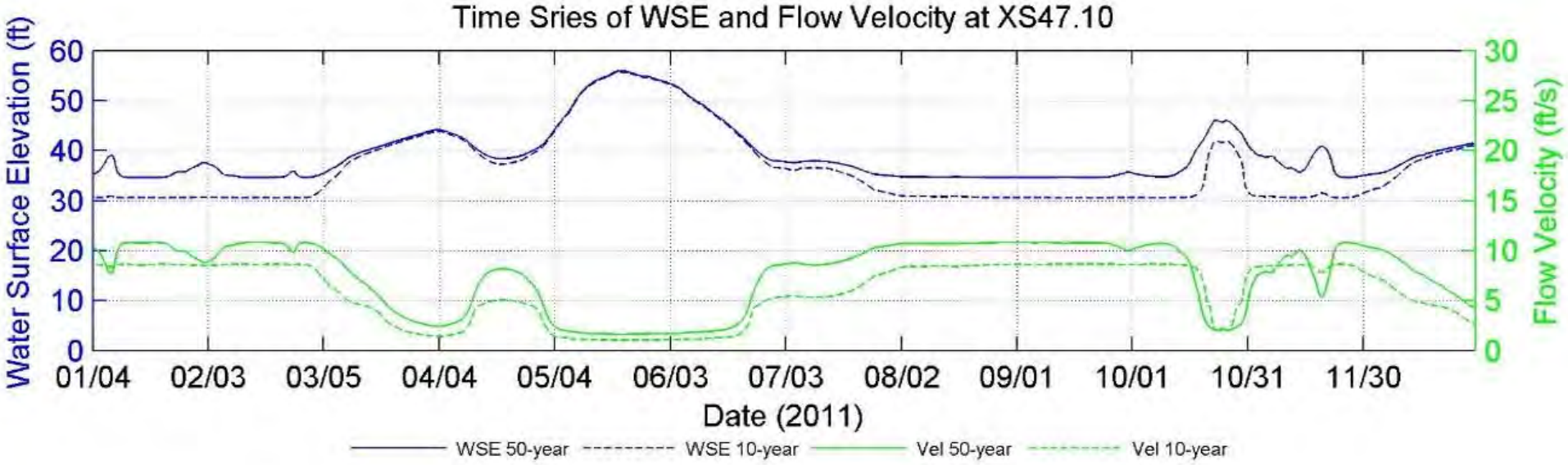
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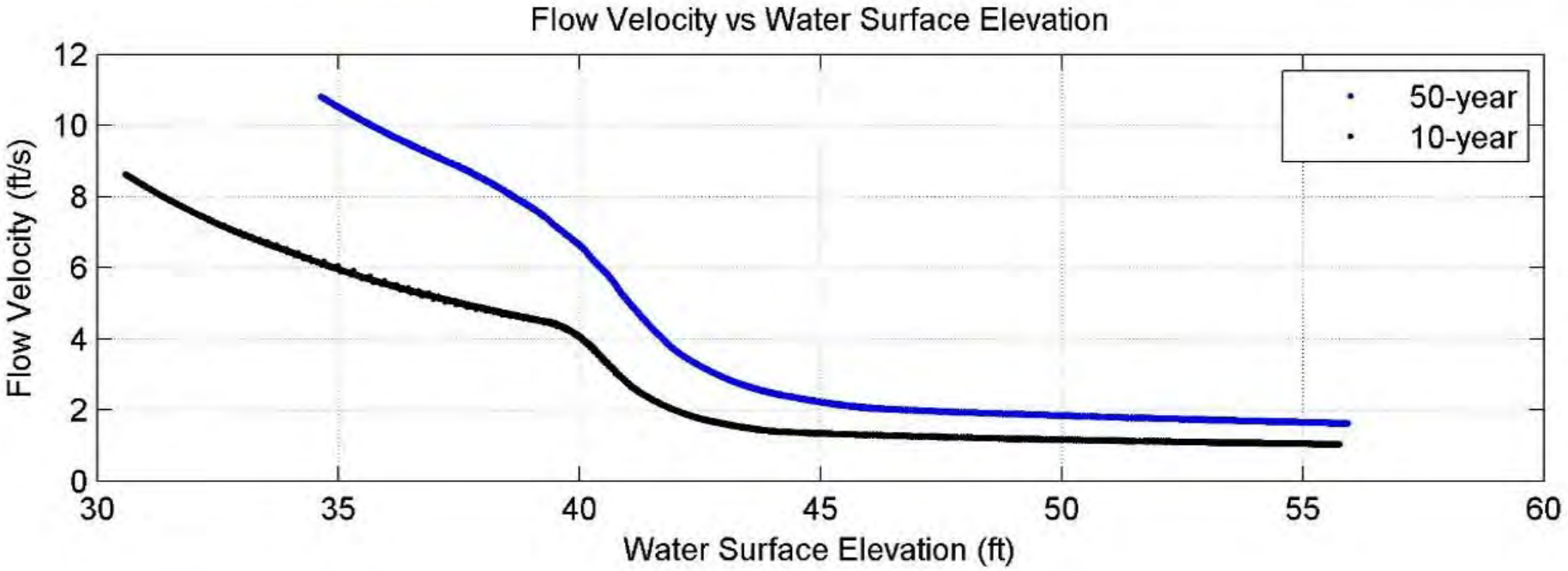
Date (2011)
WSE 50-year
WSE 10-year
Vel 50-year
Vel 10-year


Flow Velocity vs Water Surface Elevation
Flow Velocity (ft/s)
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60
Water Surface Elevation (ft)
50-year
10-year

APPENDIX C

Stone Armor Sizing Calculation

APPENDIX D

Quantity Calculations

Manchac
CONSULTING GROUP, INC.

ARCADIS
Design & Consultancy
for natural and
built assets

WEST FELICIANA PARISH

BAYOU SARA STREAMBANK STABILIZATION

- Hydraulic and Hydrologic (H&H) Analysis
- No Rise Analysis Addendum

May 15, 2017

BAYOU SARA STREAMBANK STABILIZATION

- Hydraulic and Hydrologic (H&H) Analysis
- No Rise Analysis Addendum

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Tel 225 292 1004

Our Ref.:

LA003333.0001.00002

Date:

May 15, 2017

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FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

BFE	Base Flood Elevation
cfs	Cubic Feet per Second
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HEC-RAS	Hydrologic Engineering Center River Analysis System
HUC	Hydrologic Unit Code
H&H	Hydraulic and Hydrologic
MPH	Morris P. Hebert, Inc.
NAVD88	North American Vertical Datum of 1988
NFF Program	National Flood-Frequency Program
RM	River Mile
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WSE	Water Surface Elevation

1 SUMMARY

This technical report addendum identifies the data and methodology that were used to complete the NO-Rise Hydraulic and Hydrologic (H&H) Analysis for the stabilization of Bayou Sara's riverbanks due to rapidly increasing stream bank erosion. The analysis was conducted to demonstrate that the proposed streambank armoring solution would not significantly affect the 100-year floodplain of the project area. Based on the H&H data compiled from the analysis, it was concluded that the maximum increase in water surface elevation caused by the proposed feature is +0.70 feet in elevation. This case is only likely when the discharge in the Mississippi River (the tailwater condition), is very low (approximately 400,000 cfs), such as in the months of August through September. When the Mississippi River stage is higher, there are no significant observable differences in Future With and Without Project conditions.

1.1 Data Collection: Survey

As part of the analysis, recent survey data was incorporated into the U.S. Army Corps of Engineers' (USACE's) Hydrologic Engineering Center River Analysis System (HEC-RAS) model to more accurately capture the bathymetry and topography of Bayou Sara and its overbank areas by adding cross sections as noted in orange below (Figure 1). The site survey consisted of performing a single-beam bathymetry survey in order to gather data to support the hydrographic analysis. Morris P. Hebert, Inc. (MPH) surveyed eight transects spaced approximately every 100 feet within Bayou Sara on March 22, 2016. MPH performed the survey utilizing a 19-foot vessel with a 90-horsepower outboard motor with a draft of 1.5 feet. A Trimble Digital Surface Model 232 Differential Global Positioning System (GPS) receiver and antenna were set up approximately 5 feet from the stern of the vessel. The antenna was approximately 1.5 feet above the roof of the cabin of the vessel while the single-beam echosounder was mounted directly below the GPS receiver. The survey was conducted utilizing GPS-Navigation survey methods and sub-meter accuracies as defined by manufacturers' specifications. MPH utilized a 4-degree beam width Transducer with Odom Echotrac to perform the survey work. All raw data were collected and processed in HYPACK® survey software.

Figure 1. Updated Channel Cross Sections

In order to reference the collected data to North American Vertical Datum of 1988 (NAVD88) elevations, MPH set a control point on site. The control point can be described as "*TO REACH THE MONUMNENT FROM THE INTERSECTION OF HWY 61 AND HWY 3057, TRAVEL SOUTH ON HWY 3057 FOR 1.0 MI TO THE JUNCTION WITH HWY 1258/FERDINARD ST. TURN LEFT ON HWY 1258/FERDINARD STAND TRAVEL SOUTHWEST FOR 1.8 MI TO THE END OF THE ASPHALT ROAD. THE STATION IS ON THE LEFT APPROXIMATELY 20 FT NORTH OF THE END OF THE ASPHALT ROAD, 25 FT WEST OF THE CENTERLINE OF THE ROAD, AND 3 FT EAST OF THE FENCE LINE. IT IS A 3/4" IRON ROD WITH CAP DRIVEN TO GROUND LEVEL.*" A combination Trimble R8 global navigation satellite system (GNSS) (base)/R8 GNSS (rover) GPS Receiver was used to continually monitor water elevations throughout the duration of the survey. A static survey was also performed while the control point was being observed. Trimble Business Center was used to process all GPS survey data collected.

1.2 Data Collection: Modeling

The primary purpose of the one-dimensional modeling analysis was to evaluate flow velocity and water surface elevation near the proposed river bank protection and to determine riprap size. The scope of services included obtaining topographic and bathymetric data; acquiring Mississippi River hydrodynamic data; setting up, modifying, calibrating, and validating the one-dimensional model; developing the design scenarios for model simulations; predicting the flow velocity; and sizing the riprap near the project location.

As discussed previously in the H&H report delivered during the 30% Design Phase, the HEC-RAS model was selected as the ideal tool because the USACE had an existing model from the 2011 high-flow event on the Mississippi River. This model was selected since the stage of the Mississippi River is the major contributor to stage and flow conditions in the lower reaches of Bayou Sara. Therefore, the behavior and conditions of the Mississippi River had to be fully captured and understood to determine flow and velocities within Bayou Sara, which are required for stone armor sizing calculations.

1.3 H&H Analysis

There are no stream gages or recorded data publicly available for the volume of flow in Bayou Sara attributable to precipitation runoff. The watershed of Bayou Sara is located in the Pine Hills Region. The U.S. Geological Survey (USGS) classifies watersheds and sub watersheds into various levels of aggregation. These are characterized by Hydrologic Unit Code (HUC) values. Bayou Sara's watershed corresponds to the HUC-10 level of classification and is depicted on Figure 2. To estimate the peak flow for upstream inflow, regional regression equations (Figure 3) were used to calculate the flow rate for different return periods based on USGS National Flood-Frequency (NFF) Program's "Methods for Estimating Flood Magnitude and Frequency in Rural Areas in Louisiana, 2001" (USGS 2001).

Figure 2. Bayou Sara Watershed

[Q_T, peak discharge for recurrence interval T, 2 to 500 years, in cubic feet per second; A, drainage area, in square miles; SLP, main channel slope, in feet per mile; AP, mean annual precipitation, in inches, during the period 1951-1980]

Regression equations	Standard error of estimate, in percent	Equivalent years of record
Pine Hills region		
$Q_2 = 5.80DA^{0.744}SLP^{0.374}(AP\text{-}35)^{0.796}$	±47	3
$Q_5 = 13.3DA^{0.760}SLP^{0.385}(AP\text{-}35)^{0.694}$	±42	5
$Q_{10} = 19.5DA^{0.768}SLP^{0.392}(AP\text{-}35)^{0.658}$	±41	6
$Q_{25} = 28.0DA^{0.778}SLP^{0.401}(AP\text{-}35)^{0.629}$	±43	8
$Q_{50} = 34.6DA^{0.785}SLP^{0.407}(AP\text{-}35)^{0.616}$	±46	9
$Q_{100} = 41.2DA^{0.791}SLP^{0.412}(AP\text{-}35)^{0.610}$	±49	9
$Q_{500} = 56.0DA^{0.803}SLP^{0.425}(AP\text{-}35)^{0.608}$	±57	10

Figure 3. Regional Regression Equations

The following were measured and/or assumed for the regional regression equations:

Drainage Area (DA) = 448.49 square kilometers = 173.16 square miles

Main Channel Slope (SLP) = 10.08 feet per mile

Mean Annual Precipitation (AP) = 56 inches

Computing the values provides the following flow rates attributable to precipitation runoff in Bayou Sara for various return frequencies as shown in Table 1 where Q_T is the peak discharge for recurrence interval T, 2 to 500.

Table 1. Bayou Sara Flow Rates and Given Return Frequencies

Discharge Recurrence Interval	Discharge (cubic feet per second)
Q_2	7,190
Q_5	13,463
Q_{10}	18,735
Q_{25}	26,476
Q_{50}	33,058
Q_{100}	40,329
Q_{500}	59,727

For the No-Rise analysis, the design team altered the model's upstream and downstream boundary conditions for Bayou Sara. On the downstream end, the Mississippi River was assumed to be under normal flow conditions, which would limit influence of water surface elevations in Bayou Sara. On the upstream end, a 100-year flow of 40,329 cfs was modelled flowing down Bayou Sara towards the Mississippi River.

1.4 Model Validation

As was previously done in the 30% Design H&H analysis, model calibration was performed. As a recap from the previous analysis, the model domain for this study was extracted to only include the part of the USACE model from Baton Rouge, Louisiana, to Tarbert Landing (small domain) with a few cross sections added near the junction of Bayou Sara. The boundary conditions for the Mississippi River portion of the model include upstream inflow and downstream water stage. The daily hydrograph of discharge observed at Tarbert Landing was used for the upstream boundary conditions. The daily water stage observed at Venice was used as the downstream boundary conditions.

The HEC-RAS model was re-validated for the years of 2003 and 2011. Figure 3 and Figure 4 show a comparison between the observed and simulated water surface elevations at Red River Landing (RM 302.8), Bayou Sara (RM 265.38), and Baton Rouge (RM 228.5) for the validation periods. Because of the consistent match between the modeled and observed data, it was concluded that the model with revised cross-sections described in Section 1.1 is still valid to reproduce river hydraulics at the study site.

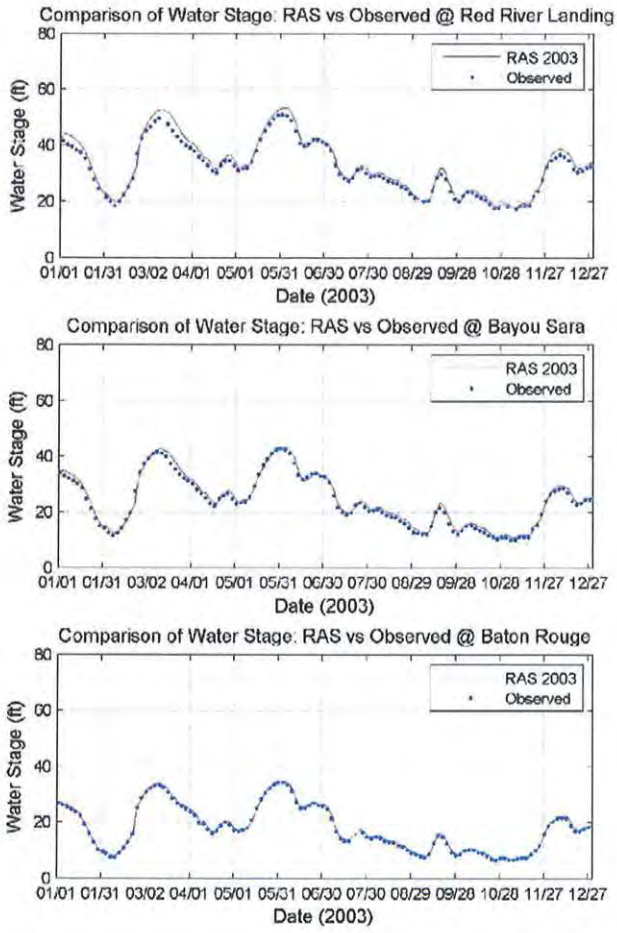

Figure 4. Model Calibration 2003

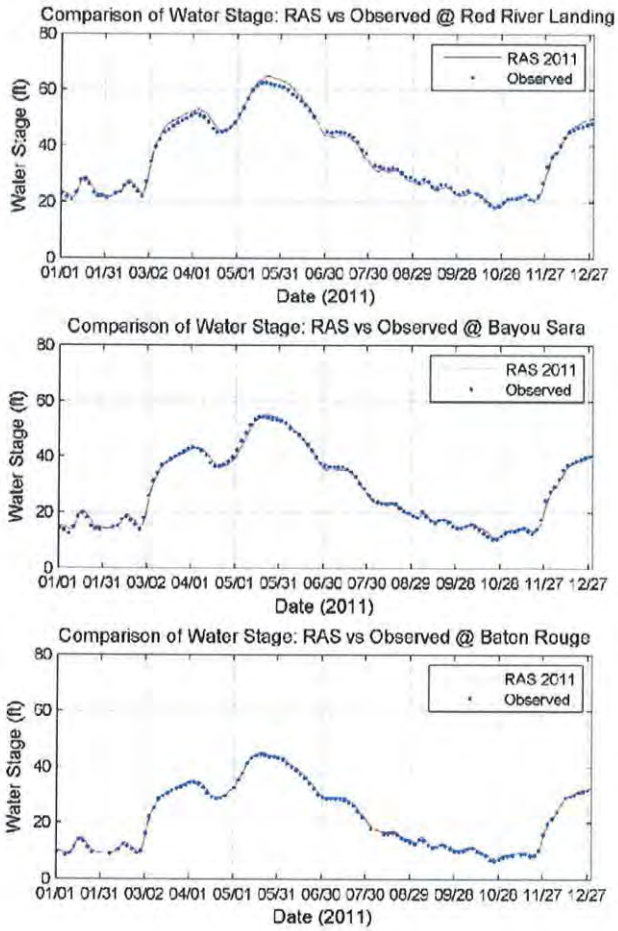

Figure 5. Model Validation 2011

1.5 Assessment of River Flow in Bayou Sara

Using the validated HEC-RAS model, simulations were performed to assess the river flow with and without the proposed project under the 100-year recurrence frequency flow rate. The purpose of this H&H Analysis was to assess what, if any, impacts the proposed features would have on the water surface elevation (WSE) in Bayou Sara floodplain. In summary, with the project implemented, the water levels at cross-sections near the project feature were slightly elevated (< 1.0-foot total change) when the stage was lower than the 100-year Base Flood Elevation (BFE), but showed no changed when stage was at or higher than the 100-year BFE. For downstream cross-sections near the Mississippi River, there was no

noticeable impact on the WSE due to the implementation of the project. Three types of plots were provided in Appendix A for reference:

1) Flow condition plots: time series of flow stage and flow velocity for "Future With Project" and "Future Without Project" conditions at the 100-year recurrence frequency.
2) Difference in flow condition between "Future with Project" and "Future Without Project" conditions at the 100-year recurrence frequency.
3) Flow stage and difference in flow stage.

The WSE and channel velocity time series demonstrated that the water level in lower Bayou Sara does not appreciably change with the project feature in-place when stage in the Mississippi River is at normal or high flow conditions; the maximum WSE change is +0.70 feet (Figures 6 & 7) near where the upstream revetment begins, but this condition is only observed when the Mississippi River is in low flow conditions AND the flows down Bayou Sara are less than the 100-year flow (Figures 8 &9). For comparison, the discharge plots for the Mississippi River for 2003 and 2011 are shown in Figure 10. All model results are provided in Appendix A.

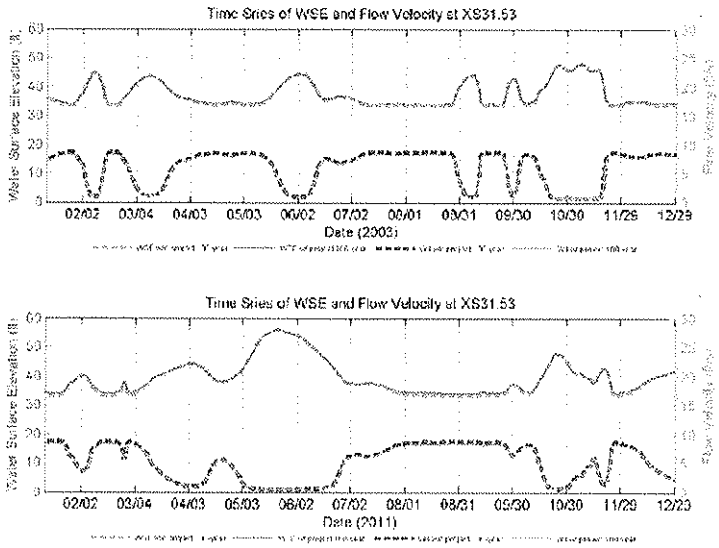

Figure 6. Water Surface Elevation and Channel Flow Velocity along Bayou Sara

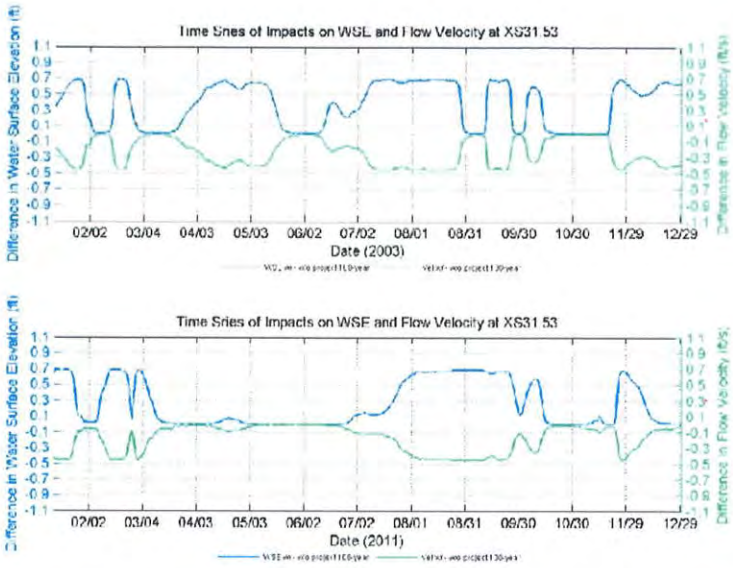

Figure 7. Water Surface Elevation and Channel Flow Velocity along Bayou Sara

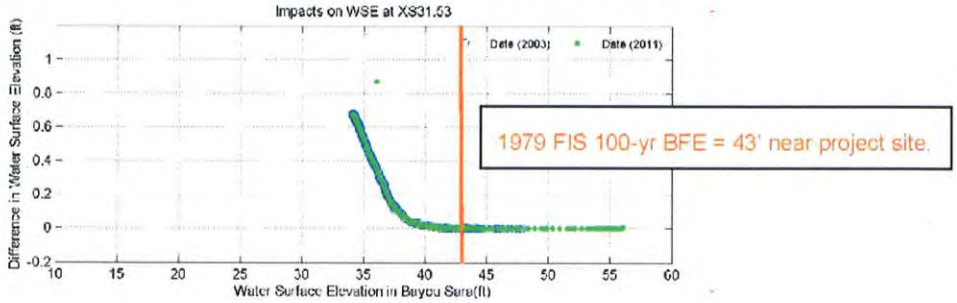

Figure 8. Flow Impacts on WSE in Bayou Sara

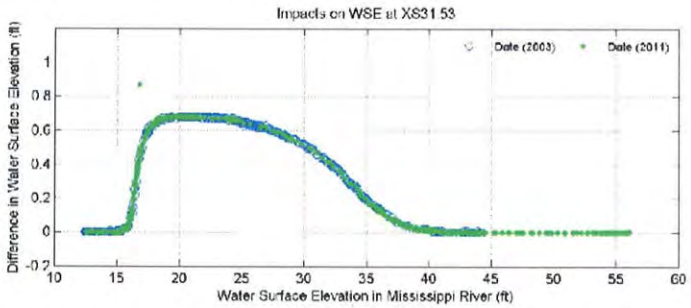

Figure 9. Flow Impacts on WSE in Mississippi River

Figure 10. Mississippi River Discharge

2 REFERENCES

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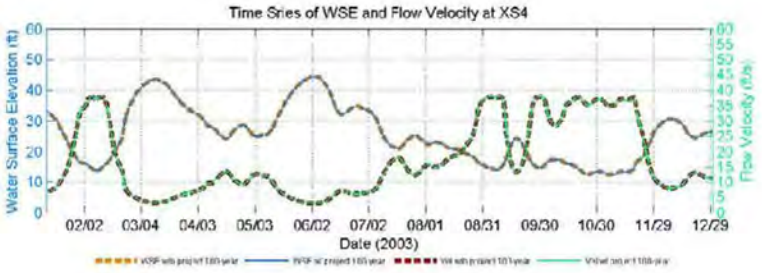
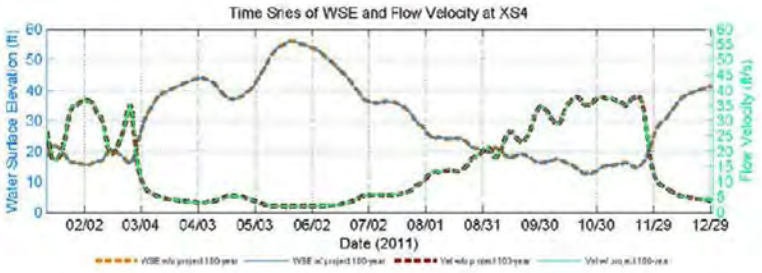
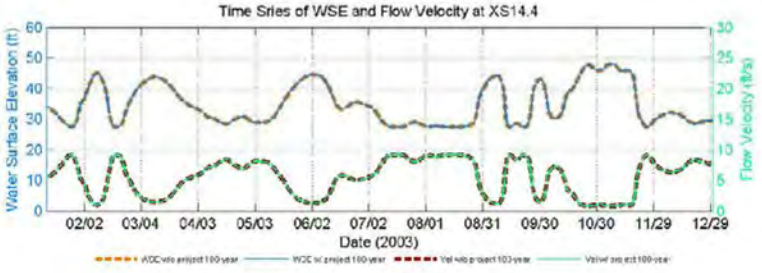
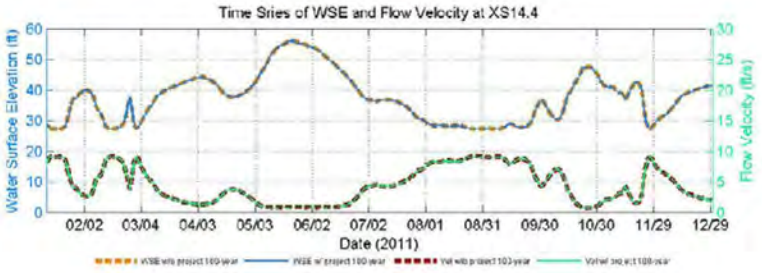
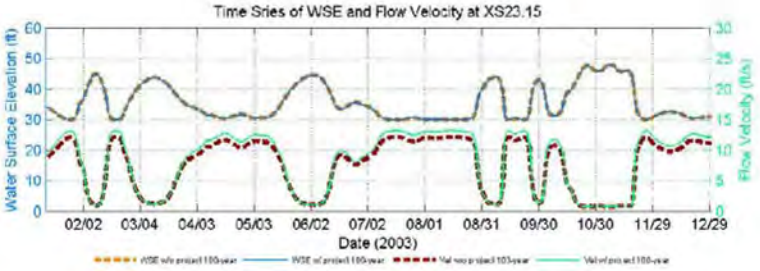
Appendix A: Model HEC–RAS Results







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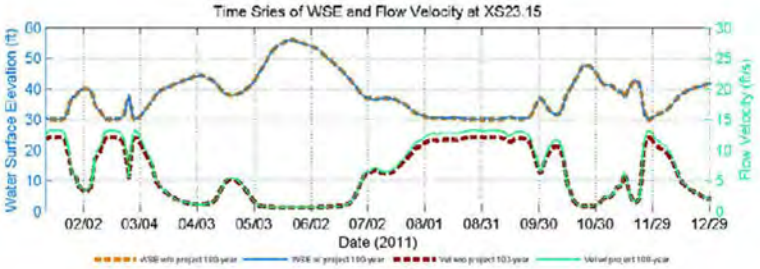
Water Surface Elevation (ft)
Flow Velocity (ft/s)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2003)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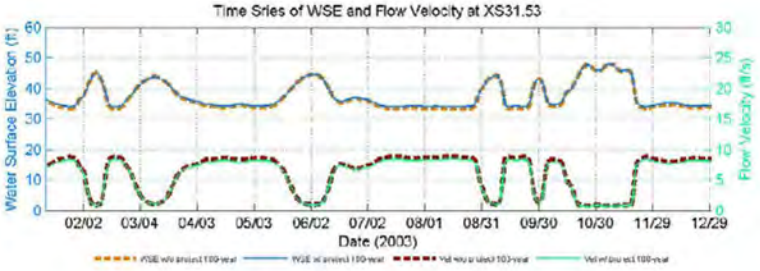
Water Surface Elevation (ft)
Flow Velocity (ft/s)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2011)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Water Surface Elevation (ft)
Flow Velocity (ft/s)
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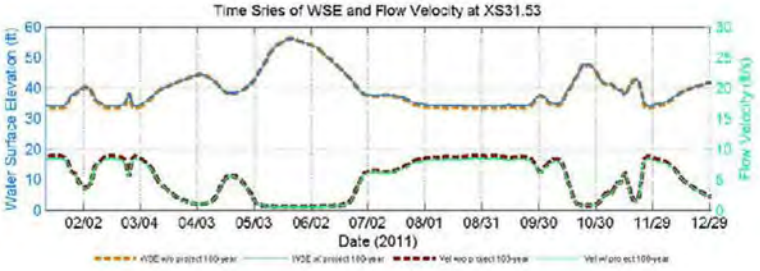
Date (2003)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Water Surface Elevation (ft)
Flow Velocity (ft/s)
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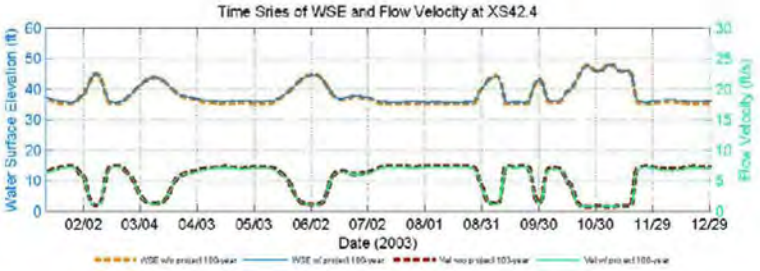
Date (2011)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Water Surface Elevation (ft)
Flow Velocity (ft/s)
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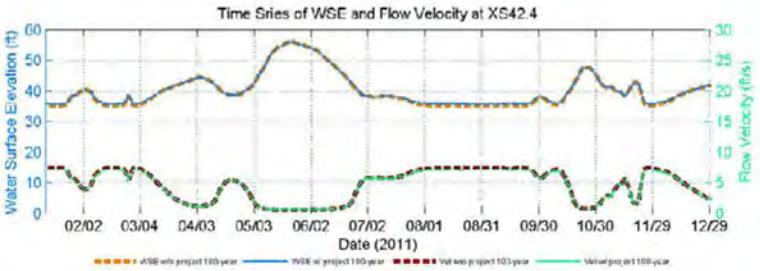
Date (2003)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Water Surface Elevation (ft)
Flow Velocity (ft/s)
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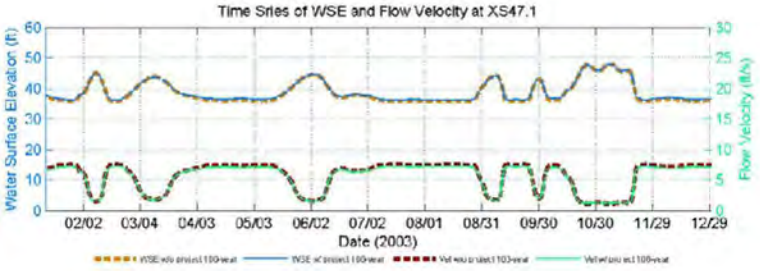
Date (2011)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Flow Velocity (ft/s)
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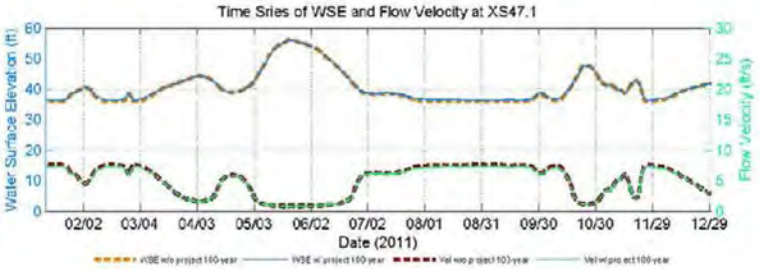
Date (2003)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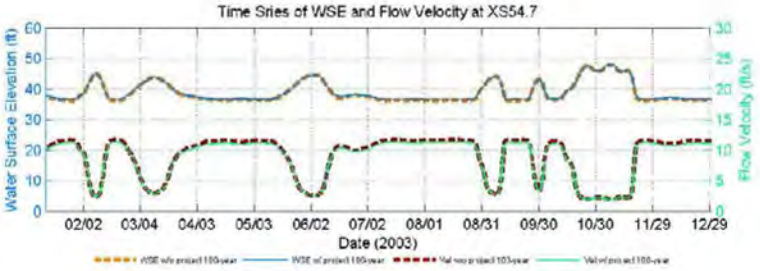
Date (2011)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Flow Velocity (ft/s)
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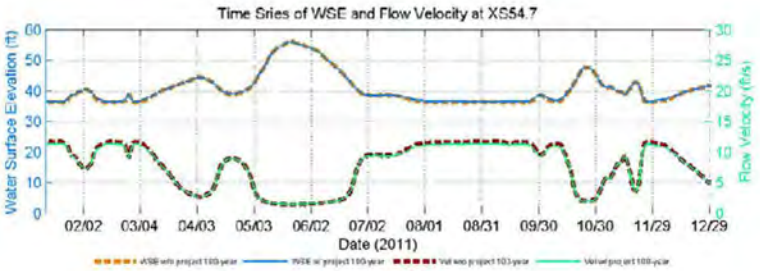
Date (2003)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Flow Velocity (ft/s)
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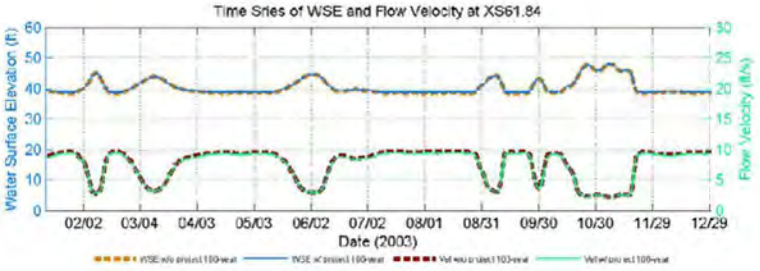
Date (2011)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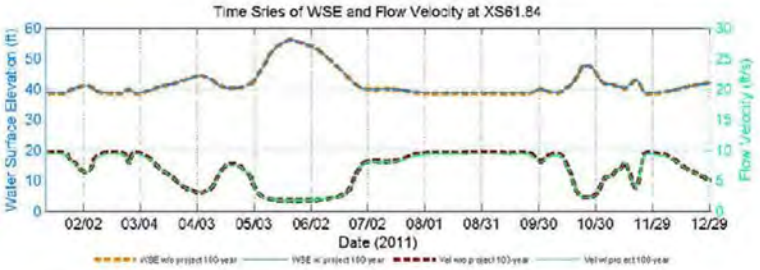
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Flow Velocity (ft/s)
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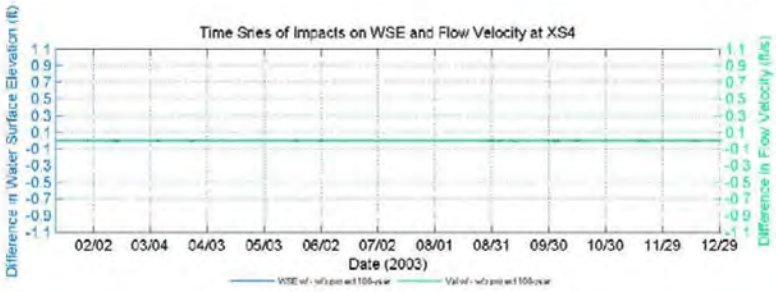
Date (2011)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Difference in Water Surface Elevation (ft)
Difference in Flow Velocity (ft/s)
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0.9
0.7
0.5
0.3
0.1
-0.1
-0.3
-0.5
-0.7
-0.9
-1.1
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
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10/30
11/29
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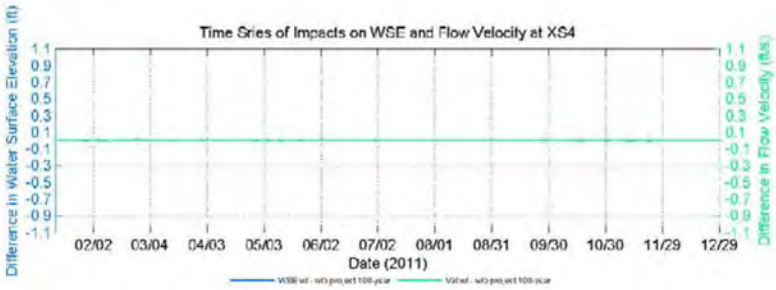
Date (2003)


Time Sries of Impacts on WSE and Flow Velocity at XS4
Difference in Water Surface Elevation (ft)
Difference in Flow Velocity (ft/s)
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0.5
0.3
0.1
-0.1
-0.3
-0.5
-0.7
-0.9
-1.1
02/02
03/04
04/03
05/03
06/02
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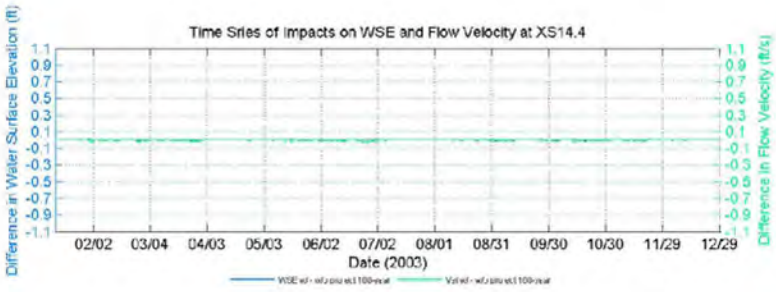
12/29
Date (2011)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-0.3
-0.5
-0.7
-0.9
-1.1
02/02
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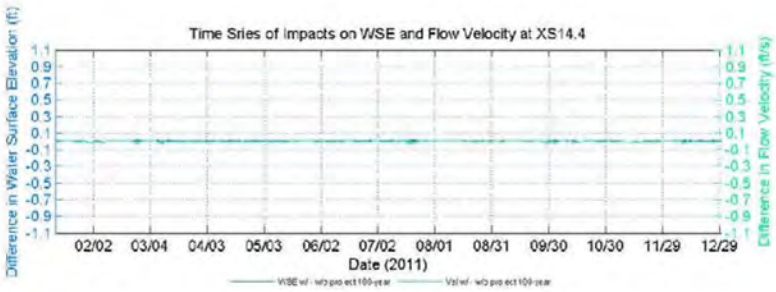
11/29
12/29
Date (2003)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0.1
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-0.3
-0.5
-0.7
-0.9
-1.1
02/02
03/04
04/03
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06/02
07/02
08/01
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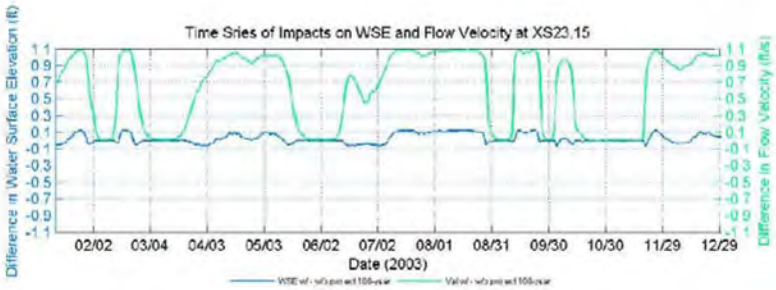
11/29
12/29
Date (2011)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Difference in Water Surface Elevation (ft)
Difference in Flow Velocity (ft/s)
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0.3
0.1
-0.1
-0.3
-0.5
-0.7
-0.9
-1.1
02/02
03/04
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12/29
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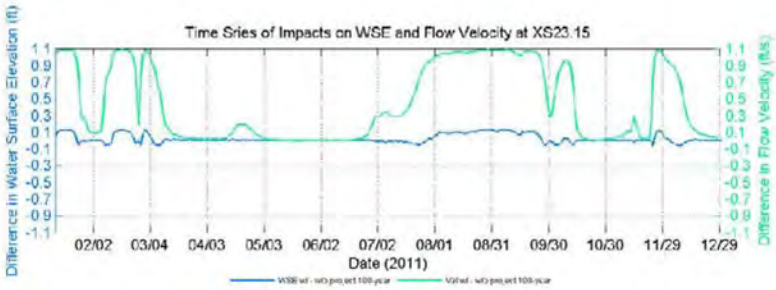
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Difference in Flow Velocity (ft/s)
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0.5
0.3
0.1
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-0.3
-0.5
-0.7
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-1.1
02/02
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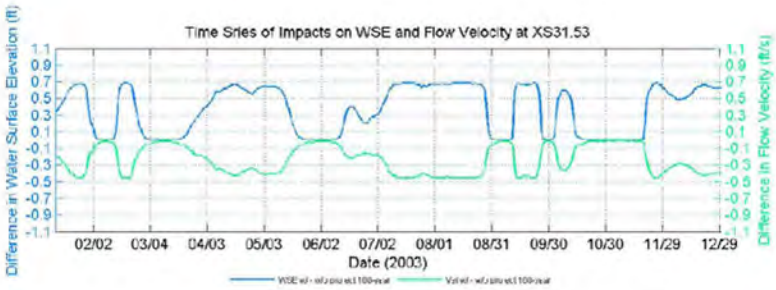
11/29
12/29
Date (2011)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Difference in Flow Velocity (ft/s)
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0.5
0.3
0.1
-0.1
-0.3
-0.5
-0.7
-0.9
-1.1
02/02
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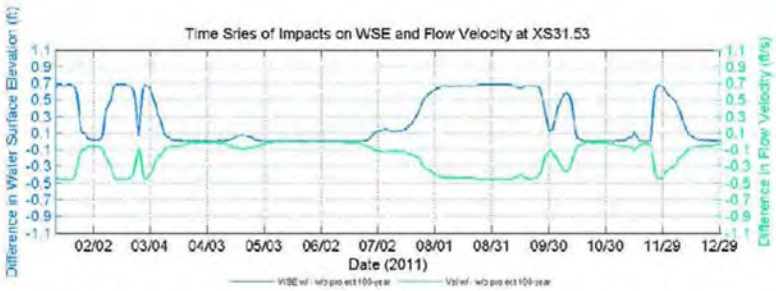
11/29
12/29
Date (2003)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Difference in Water Surface Elevation (ft)
Difference in Flow Velocity (ft/s)
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0.3
0.1
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-0.3
-0.5
-0.7
-0.9
-1.1
02/02
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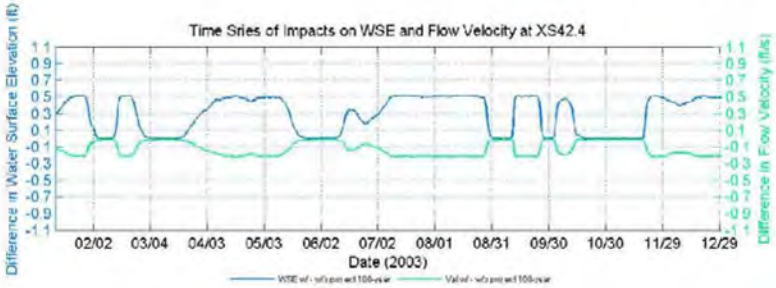
11/29
12/29
Date (2011)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Difference in Flow Velocity (ft/s)
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-0.5
-0.7
-0.9
-1.1
02/02
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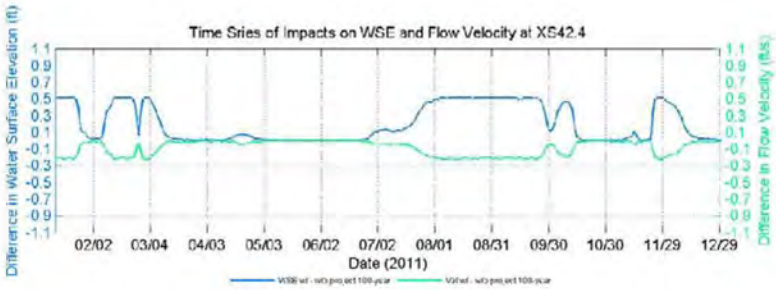
11/29
12/29
Date (2003)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Difference in Flow Velocity (ft/s)
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-0.9
-1.1
02/02
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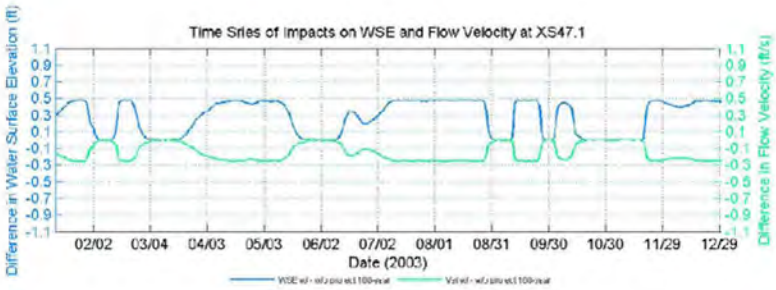
Date (2011)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02/02
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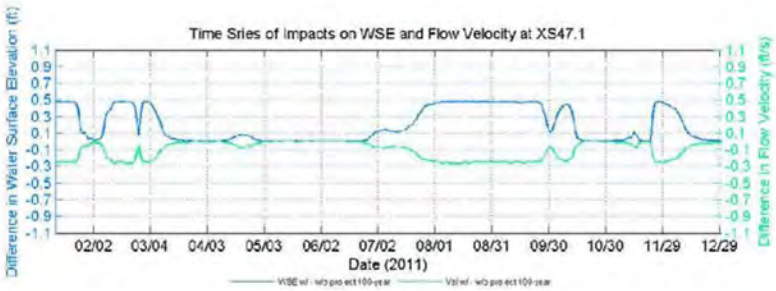
12/29
Date (2003)


Time Sries of Impacts on WSE and Flow Velocity at XS47.1
Difference in Water Surface Elevation (ft)
Difference in Flow Velocity (ft/s)
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0.5
0.3
0.1
-0.1
-0.3
-0.5
-0.7
-0.9
-1.1
02/02
03/04
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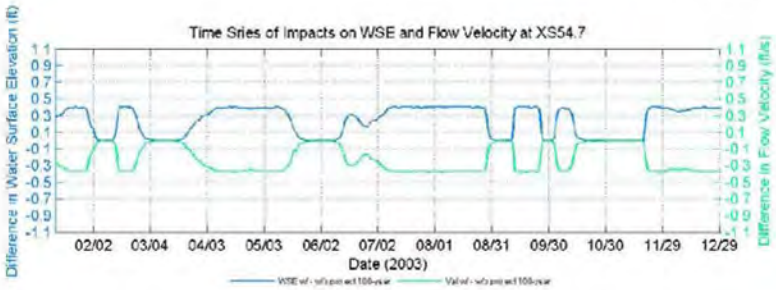
10/30
11/29
12/29
Date (2011)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Difference in Water Surface Elevation (ft)
Difference in Flow Velocity (ft/s)
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0.3
0.1
-0.1
-0.3
-0.5
-0.7
-0.9
-1.1
02/02
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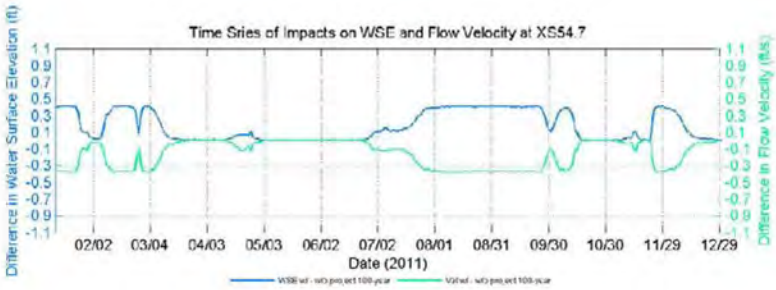
Date (2003)


Time Sries of Impacts on WSE and Flow Velocity at XS54.7
Difference in Water Surface Elevation (ft)
Difference in Flow Velocity (ft/s)
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0.9
0.7
0.5
0.3
0.1
-0.1
-0.3
-0.5
-0.7
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-1.1
02/02
03/04
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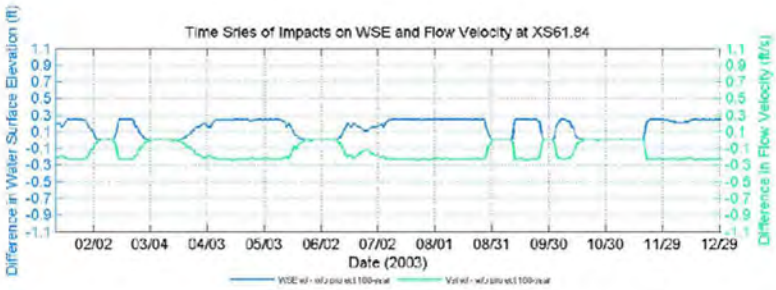
12/29
Date (2011)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Difference in Flow Velocity (ft/s)
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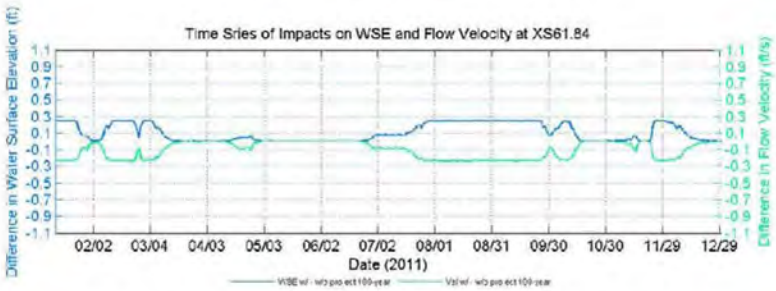
0.5
0.3
0.1
-0.1
-0.3
-0.5
-0.7
-0.9
-1.1
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
09/30
10/30
11/29
12/29
Date (2003)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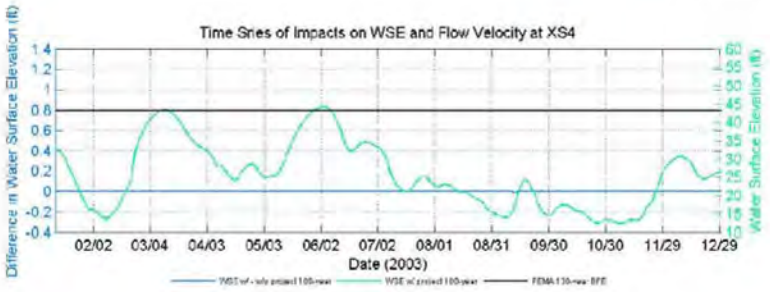
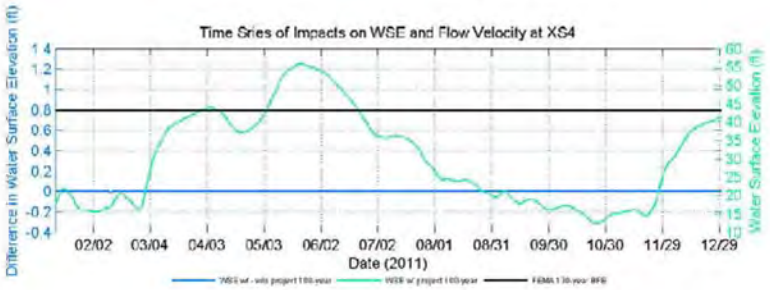
Difference in Water Surface Elevation (ft)
Difference in Flow Velocity (ft/s)
1.1
0.9
0.7
0.5
0.3
0.1
-0.1
-0.3
-0.5
-0.7
-0.9
-1.1
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
09/30
10/30
11/29
12/29
Date (2011)


Time Series of Impacts on WSE and Flow Velocity at XS4
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
09/30
10/30
11/29
12/29
Date (2003)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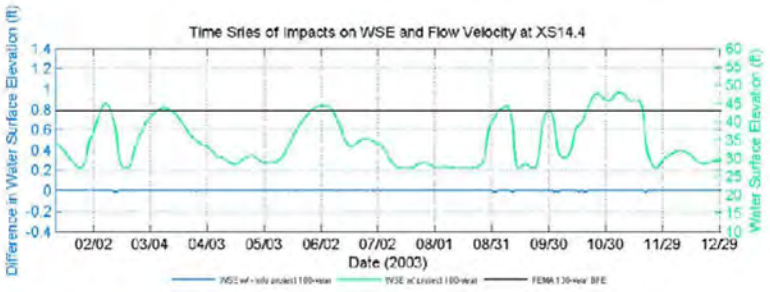
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
09/30
10/30
11/29
12/29
Date (2011)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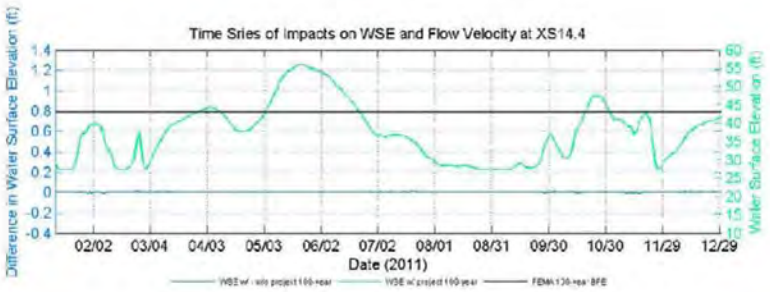
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
09/30
10/30
11/29
12/29
Date (2003)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Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02
03/04
04/03
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06/02
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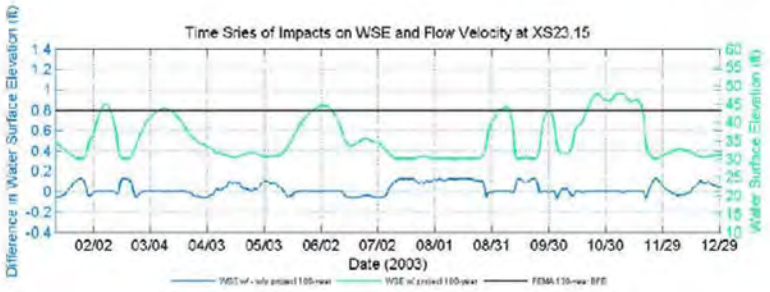
09/30
10/30
11/29
12/29
Date (2011)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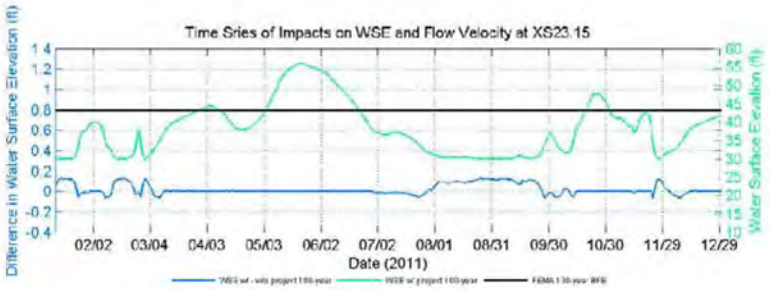
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2003)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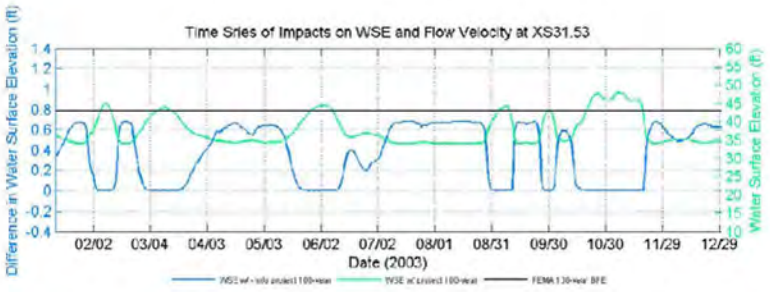
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2011)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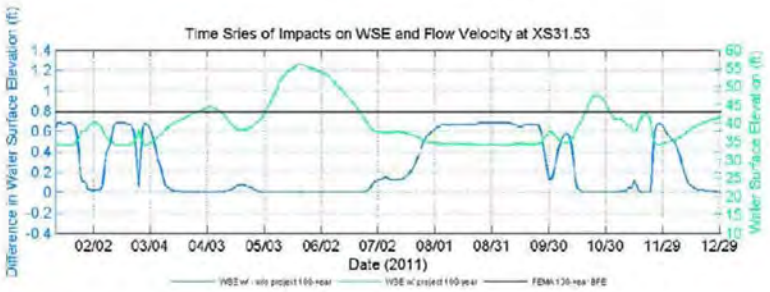
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2003)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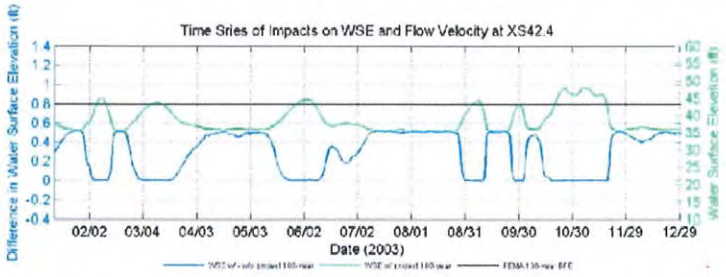
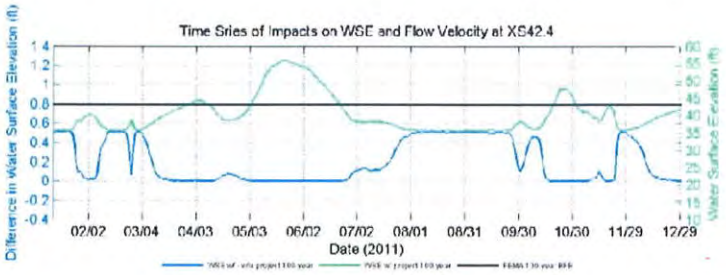
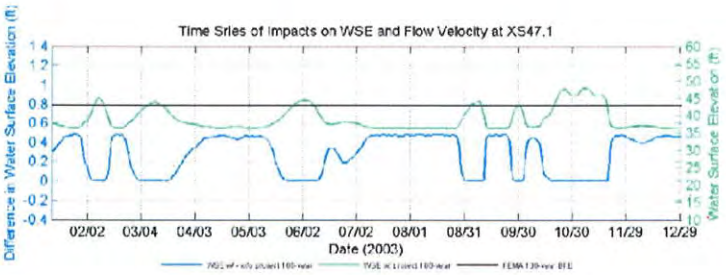
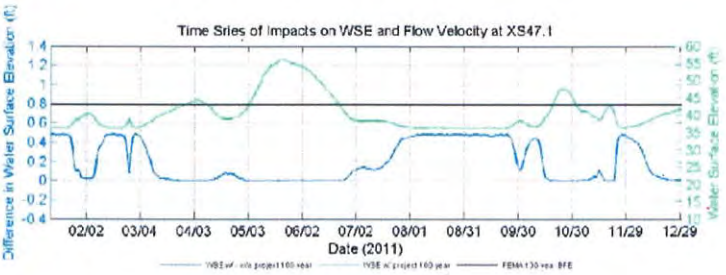
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2011)


Time Sries of Impacts on WSE and Flow Velocity at XS42.4
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
60
55
50
45
40
35
30
25
20
15
10
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
09/30
10/30
11/29
12/29
Date (2003)


Time Sries of Impacts on WSE and Flow Velocity at XS42.4
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
60
55
50
45
40
35
30
25
20
15
10
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
09/30
10/30
11/29
12/29
Date (2011)


Time Sries of Impacts on WSE and Flow Velocity at XS47.1
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
60
55
50
45
40
35
30
25
20
15
10
02/02
03/04
04/03
05/03
06/02
07/02
08/01
08/31
09/30
10/30
11/29
12/29
Date (2003)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Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
60
55
50
45
40
35
30
25
20
15
10
02/02
03/04
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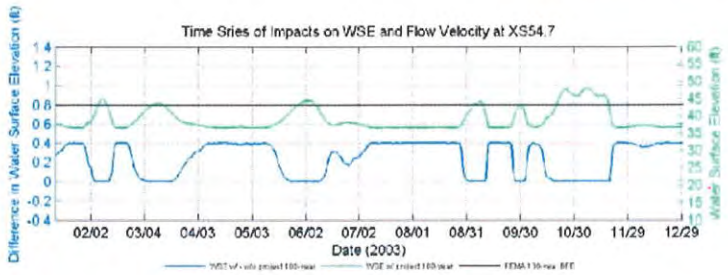
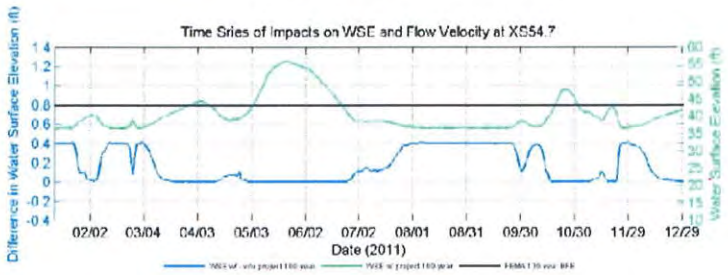
08/31
09/30
10/30
11/29
12/29
Date (2011)


Time Sries of Impacts on WSE and Flow Velocity at XS54.7
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2003)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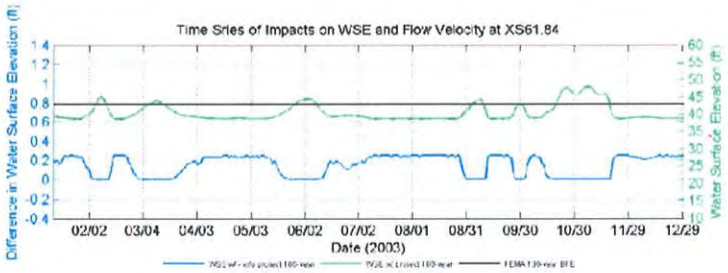
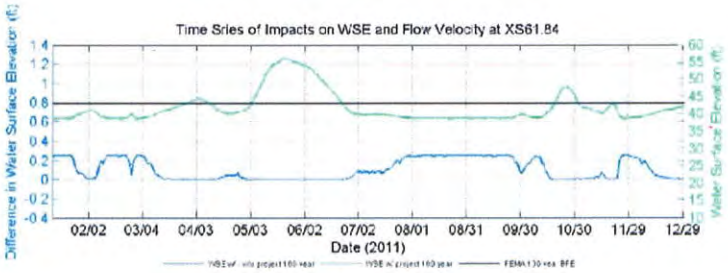
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2011)


Time Sries of Impacts on WSE and Flow Velocity at XS61.84
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2003)


Time Sries of Impacts on WSE and Flow Velocity at XS61.84
Difference in Water Surface Elevation (ft)
Water Surface Elevation (ft)
02/02 03/04 04/03 05/03 06/02 07/02 08/01 08/31 09/30 10/30 11/29 12/29
Date (2011)

Arcadis U.S., Inc.
10352 Plaza Americana Drive
Baton Rouge, Louisiana 70816
Tel 225 292 1004
Fax 225 218 9677

www.arcadis.com

Appendix D

External Agency Correspondence

From: Lunsford, Mark (CTR)
Sent: Tuesday, August 9, 2016 1:11 PM
To: Linda.Hardy@la.gov; gutierrez.raul@epa.gov; cmichon@wlf.la.gov; Amy.E.Powell@usace.army.mil
Cc: Pitts, Melanie; Spann, Tiffany
Subject: Scoping Notification/Solicitation of Views West Feliciana Parish, Bayou Sara Streambank Stabilization, HMGP# 1603-0436, DR-1603-LA
Attachments: 1603 Bayou Sara Rev SOW.pdf; Bayou Sara SOV Ltr Attachment.pdf

Subject: Request for Solicitation of Views (SOV) for HMGP# 1603-0436 Bayou Sara Streambank Stabilization

U.S. Department of Homeland Security

August 9, 2016

Federal Emergency Management Agency

FEMA-DR 1603/1607 LA

Louisiana Recovery Office

1500 Main St., Baton Rouge, LA 70802

FEMA

MEMORANDUM TO: See Distribution

SUBJECT: Scoping Notification/Solicitation of Views

West Feliciana Parish, Bayou Sara Streambank Stabilization, HMGP# 1603-0436, DR-1603-LA

To Whom It May Concern:

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is mandated by the U.S. Congress to administer Federal disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended. Section 404 of the Stafford Act authorizes FEMA's Hazard Mitigation Grant Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. FEMA is considering providing HMGP funding for the attached project in relation to Hurricane Katrina (DR-1603-LA).

Please review the attached project description to determine whether your office has any objections to the proposed project and whether any permits from your office would need to be obtained.

West Feliciana Parish, the applicant, requests funding to stabilize the Bayou Sara streambank along two bends between St. Francisville and the Mississippi River. The two bends would be armored with a stone riprap revetment and riprap toes placed at the base of the embankment. The proposed project would prevent streambank encroachment of the St. Francisville sewage treatment lagoon, which serves more than 700 customers, and also provide erosion protection for Ferdinand Street, which provides St. Francisville's sole access for Mississippi River riverboat tourism.

To ensure compliance with the National Environmental Policy Act (NEPA), Executive Orders (EOs), and other applicable Federal regulations, FEMA-EHP will be preparing an Environmental Assessment (EA). To assist us in preparation of the EA, FEMA-EHP requests that your office review the attached documents for a determination as to the requirements of any formal consultations, regulatory permits, determinations, or authorizations.

We would appreciate your comments on this project within thirty (30) days. If we do not receive comments from you within this time period, we will assume that you have no concerns or issues with the proposed project. If appropriate, FEMA will add the condition that the applicant will be required to obtain applicable permits from your office.

Comments may be emailed to mark.lunsford@associates.fema.dhs.gov or mailed to the attention of Mark Lunsford, Environmental Department, at the address above. For questions regarding this matter, please contact Mark Lunsford, Environmental Protection Specialist at (504) 875-1173.

Sincerely,

Tiffany Spann-Winfield,

Deputy Environmental Liaison Officer, FEMA LRO

FEMA 1603/1607-DR-LA

Distribution: LDEQ, USEPA, LDWF, USACE

Attachment: Scope of Work, Project Plans

Mark Lunsford
Environmental & Historic Preservation (EHP)
Environmental Protection Specialist
1603/1607-DR-LA
BB (504) 875-1173

Porter, Bonnie

From: Gutierrez, Raul <Gutierrez.Raul@epa.gov>
Sent: Tuesday, August 9, 2016 3:16 PM
To: Lunsford, Mark (CTR)
Subject: RE: Scoping Notification/Solicitation of Views West Feliciana Parish, Bayou Sara Streambank Stabilization, HMGP# 1603-0436, DR-1603-LA

The U.S. Environmental Protection Agency (EPA) has completed your request for a solicitation of views concerning the Bayou Sara Streambank Stabilization project in West Feliciana Parish, Louisiana. The scope of the work for the project includes stabilizing the Bayou Sara streambank along two bends between St. Francisville and the Mississippi River. The two bends would be armored with a stone riprap revetment and riprap toes placed at the base of the embankment. The proposed project would prevent streambank encroachment of the St. Francisville sewage treatment lagoon, which serves more than 700 customers, and also provide erosion protection for Ferdinand Street, which provides St. Francisville's sole access for Mississippi River riverboat tourism. The comments that follow are being provided relative to the EPA's *404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR Part 230)* and *Executive Order 11990.*

Our preliminary review revealed jurisdictional waters of the U.S. occur on the proposed site. At this time, the EPA does not object to the project as proposed and recommends coordination with the U.S. Army Corps of Engineers at the New Orleans District Office to verify which permits are needed. Thanks for the opportunity to review the proposed project. If you have any questions or would like to discuss the issue further, please do not hesitate to contact me.

Raul Gutierrez, Ph.D.
Wetlands Section (6WQ-EM)
US EPA Region 6
(504) 862-2371

Office:
US Army Corps of Engineers
New Orleans District
CEMVN-OD-SC
Post Office Box 60267
New Orleans, Louisiana 70160-0267

From: Linda (Brown) Hardy
To: Lunsford, Mark (CTR)
Cc: Yasoob Zia
Subject: 160810/0895 West Feliciana Bayou Sara Streambank Stabilization
Date: Monday, September 12, 2016 11:30:21 AM

September 12, 2016

Tiffany Spann-Winfield
Deputy Environmental Liaison Officer, FEMA LRO
1500 Main St
Baton Rouge, LA 70802
mark.lunsford@associates.fema.dhs.gov

RE: 160810/0895 West Feliciana Bayou Sara Streambank Stabilization
HMGP Funding
West Feliciana Parish

Dear Ms. Spann-Winfield:

The Department of Environmental Quality (LDEQ), Business and Community Outreach Division has received your request for comments on the above referenced project.

After reviewing your request, the Department has no objections based on the information provided in your submittal. However, for your information, the following general comments have been included. Please be advised that if you should encounter a problem during the implementation of this project, you should immediately notify LDEQ's Single-Point-of-contact (SPOC) at (225) 219-3640.

- Please take any necessary steps to obtain and/or update all necessary approvals and environmental permits regarding this proposed project.
- If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.
- All precautions should be observed to control nonpoint source pollution from construction activities. LDEQ has stormwater general permits for construction areas equal to or greater than one acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-9371 to determine if your proposed project requires a permit.
- If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit is required. An application or Notice of Intent will be required if the sludge management practice includes preparing biosolids for land application or preparing sewage sludge to be hauled to a landfill. Additional information may be obtained on the LDEQ website at http://www.deq.louisiana.gov/portal/tabid/2296/Default.aspx or by contacting the LDEQ Water Permits Division at (225) 219- 9371.
- If any of the proposed work is located in wetlands or other areas subject to the jurisdiction of the U.S. Army Corps of Engineers, you should contact the Corps directly regarding permitting issues. If a Corps permit is required, part of the application process may involve a water quality certification from LDEQ.
- All precautions should be observed to protect the groundwater of the region.
- Please be advised that water softeners generate wastewaters that may require special limitations

depending on local water quality considerations. Therefore if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.

- Any renovation or remodeling must comply with LAC 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.
- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.

Currently, West Feliciana Parish is classified as attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations.

Please send all future requests to my attention. If you have any questions, please feel free to contact me at (225) 219-3954 or by email at linda.hardy@la.gov.

Sincerely,

Linda M. Hardy

Louisiana Dept. of Environmental Quality
Office of the Secretary
P.O. Box 4301
Baton Rouge, LA 70821-4301
Phone: (225) 219-3954
Fax: (225) 219-3971
Email: linda.hardy@la.gov

JOHN BEL EDWARDS
GOVERNOR

State of Louisiana
DEPARTMENT OF WILDLIFE AND FISHERIES
OFFICE OF WILDLIFE

CHARLIE MELANCON
SECRETARY

Date	August 26, 2016
Name	Mark Lundsford
Company	FEMA
Street Address	1500 Main Street
City, State, Zip	Baton Rouge, LA 70802
Project	West Feliciana Parish Bayou Sara Streambank Stabilization
Project ID	1852016
Invoice Number	16082619

Personnel of the Coastal & Nongame Resources Division have reviewed the preliminary data for the captioned project. After careful review of our database, no impacts to rare, threatened, or endangered species or critical habitats within Louisiana's boundary are anticipated for the proposed project. No state or federal parks, wildlife refuges or scenic streams are known at the specified site within Louisiana's boundaries.

The Louisiana Natural Heritage Program (LNHP) has compiled data on rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features throughout the state of Louisiana. Heritage reports summarize the existing information known at the time of the request regarding the location in question. The quantity and quality of data collected by the LNHP are dependent on the research and observations of many individuals. In most cases, this information is not the result of comprehensive or site-specific field surveys; many natural areas in Louisiana have not been surveyed. This report does not address the occurrence of wetlands at the site in question. Heritage reports should not be considered final statements on the biological elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. LNHP requires that this office be acknowledged in all reports as the source of all data provided here. If at any time Heritage tracked species are encountered within the project area, please contact the LNHP Data Manager at 225-765-2643. If you have any questions, or need additional information, please call 225-765-2357.

Sincerely,

for Amity Bass, Coordinator
Natural Heritage Program

From: Lunsford, Mark (CTR)
Sent: Friday, October 21, 2016 12:34 PM
To: 'Martinez.Omar@epa.gov'
Cc: Pitts, Melanie; Spann, Tiffany
Subject: FW: Scoping Notification/Solicitation of Views West Feliciana Parish, Bayou Sara Streambank Stabilization, HMGP# 1603-0436, DR-1603-LA
Attachments: Bayou Sara SOV Ltr Attachment.pdf; 1603 Bayou Sara Rev2 SOW.pdf

Subject: Request for Solicitation of Views (SOV) for HMGP# 1603-0436 Bayou Sara Streambank Stabilization

U.S. Department of Homeland Security

October 21, 2016

Federal Emergency Management Agency

FEMA-DR 1603/1607 LA

Louisiana Recovery Office

1500 Main St., Baton Rouge, LA 70802

FEMA

MEMORANDUM TO: Sole Source Aquifer Program, U.S. EPA Region 6

SUBJECT: Scoping Notification/Solicitation of Views

West Feliciana Parish, Bayou Sara Streambank Stabilization, HMGP# 1603-0436, DR-1603-LA

To Omar T. Martinez:

The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is mandated by the U.S. Congress to administer Federal disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended. Section 404 of the Stafford Act authorizes FEMA's Hazard Mitigation Grant Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. FEMA is considering providing HMGP funding for the attached project in relation to Hurricane Katrina (DR-1603-LA).

Please review the attached project description to determine whether your office has any objections to the proposed project and whether any permits from your office would need to be obtained.

West Feliciana Parish, the applicant, requests funding to stabilize the Bayou Sara streambank along two bends between St. Francisville and the Mississippi River. The two bends would be armored with a stone riprap revetment and riprap toes placed at the base of the embankment. The proposed project would prevent streambank encroachment of the St. Francisville sewage treatment lagoon, which serves more than 700 customers, and also provide erosion protection for Ferdinand Street, which provides St. Francisville's sole access for Mississippi River riverboat tourism.

To ensure compliance with the National Environmental Policy Act (NEPA), Executive Orders (EOs), and other applicable Federal regulations, FEMA-EHP will be preparing an Environmental Assessment (EA). To assist us in preparation of the EA, FEMA-EHP requests that your office review the attached documents for a determination as to the requirements of any formal consultations, regulatory permits, determinations, or authorizations.

We would appreciate your comments on this project within thirty (30) days. If we do not receive comments from you within this time period, we will assume that you have no concerns or issues with the proposed project. If appropriate, FEMA will add the condition that the applicant will be required to obtain applicable permits from your office.

Comments may be emailed to mark.lunsford@associates.fema.dhs.gov or mailed to the attention of Mark Lunsford, Environmental Department, at the address above. For questions regarding this matter, please contact Mark Lunsford, Environmental Protection Specialist at (504) 875-1173.

Sincerely,

Tiffany Spann-Winfield,

Deputy Environmental Liaison Officer, FEMA LRO

FEMA 1603/1607-DR-LA

Attachment: Scope of Work, Project Plans

Mark Lunsford
Environmental & Historic Preservation (EHP)
Environmental Protection Specialist
1603/1607-DR-LA
BB (504) 875-1173

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS TX 75202-2733

December 14, 2016

Ms. Tiffany Spann-Winfield, Deputy Environmental Liaison Officer
Federal Emergency Management Agency
FEMA-DR 1603/1607 DR-LA
Louisiana Recovery Office
1500 Main Street, Baton Rouge, LA 70802

Dear Ms. Spann-Winfield:

We have received your October 21, 2016, letter requesting our evaluation of the potential environmental impacts which might result from the following project:

The Bayou Sara Streambank Stabilization Project to Provide Erosion Protection for Sewage Treatment Pond
The Bayou Sara Streambank along two bends between St. Francisville & the Mississippi River
HMGP 1603-0436, DR-1603-LA
West Feliciana Parish, St. Francisville, Louisiana

The project, proposed for financial assistance through the Federal Emergency Management Agency-Hazard Mitigation Grant Program (FEMA-HMGP) funds, is located on the Southern Hills aquifer system which has been designated a sole source aquifer (SSA) by the EPA. Based on the information provided for the project, we have determined that the project, as proposed, should not have an adverse effect on the quality of the ground water underlying the project site.

This approval of the proposed project does not relieve the applicant from adhering to other State and Federal requirements, which may apply. This approval is based solely upon the potential impact to the quality of ground water as it relates to the EPA's authority pursuant to Section 1424(e) of the Safe Drinking Water Act.

If you did not include the parish, project description, project location, area map, plat or the federal funding agency, please do so in future SSA correspondence.

If you have any questions on this letter or the SSA program please contact me at (214) 665-8485.

Sincerely yours,

Omar T. Martinez, Coordinator
Sole Source Aquifer Program
Ground Water/UIC Section

cc: Mr. Mark Lunsford, Environmental Protection Specialist
Jesse Means, LDEQ

From:	Pitts, Melanie
To:	"Daivd_oster@fws.gov"
Cc:	Spann, Tiffany
Subject:	West Feliciana Parish, Bayou Sara Streambank Stabilization, HMGP# 1603-0436, DR-1603-LA
Date:	Tuesday, April 10, 2018 2:22:00 PM
Attachments:	LA ESA project development report - Feb 2018 - Bayou Sara - AMENDED.PDF image001.png 1603 Bayou Sara Rev SOW.PDF 1603-0436 Biological Assessment -Pallid sturgeon.pdf Bayou Sara SOV Ltr Attachment (003).pdf Bayou Sara 90%_Submittal_2017.03.23.pdf
Importance:	High

U.S. Department of Homeland Security

April 10, 2018

Federal Emergency Management Agency

FEMA-DR 1603/1607 LA

Louisiana Recovery Office

1500 Main St., Baton Rouge, LA 70802

MEMORANDUM TO: U.S. Fish and Wildlife Service Louisiana Ecological Services Office

SUBJECT: RE: West Feliciana Parish, Bayou Sara Streambank Stabilization, HMGP# 1603-0436, DR-1603-LA

Mr. David Oster:

Per our conversation, The Department of Homeland Security's Federal Emergency Management Agency (FEMA) is mandated by the U.S. Congress to administer Federal disaster assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), PL 93-288, as amended. Section 404 of the Stafford Act authorizes FEMA's Hazard Mitigation Grant Program (HMGP) to provide funds to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. FEMA has received an application from The Parish of West Feliciana. The Parish has requested, through the State of Louisiana Governor's Office of Homeland Security and Emergency Preparedness (LA GOHSEP), that FEMA provide disaster assistance consisting of federal grant funds in accordance with the provisions of the Stafford Act. The proposed project includes the stabilization of the Bayou Sara bank located in St. Francisville, West Feliciana Parish, Louisiana. Specifically, the project is located on the bank of Bayou Sara, beginning approximately 1,835 feet (ft) upstream from the mouth of the Mississippi River. The center of the project area is located at Latitude 30.768413, Longitude -91.394385.

FEMA has determined that the proposed project may affect, but is not likely to adversely affect, ESA-listed Pallid Sturgeon (*Scaphirhynchus albus)* as described below, and is therefore requesting concurrence with our determinations pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1536), and the consultation procedures at 50 C.F.R. Part 402.

Pursuant to our request for informal consultation, FEMA is providing, enclosing, or otherwise identifying the following information:

- A description of the action to be considered;
- Construction Plans;
- A Biological Assessment;
- Endangered Species Act (ESA) Project Review and Guidance for Other Federal Trust Resources Report

If you have questions, please contact Tiffany Spann-Winfield of our Environmental Historic Preservation Division at 504-218-6800 or tiffany.spann@fema.dhs.gov. Please reference file number HMGP 1603-0346 in all correspondence related to this consultation

Sincerely,

Tiffany Spann-Winfield,

Deputy Environmental Liaison Officer, FEMA LRO

FEMA 1603/1607-DR-LA

MELANIE PITTS (O'KEEFE)
SUPERVISORY ENVIROMENTAL PROTECTION SPECIALIST
DHS-FEMA
504-427-8000
MELANIE.PITTS@FEMA.DHS.GOV

Endangered Species Act (ESA) Project Review and Guidance for Other Federal Trust Resources Report

Instructions

Please submit a copy of this report to the Louisiana Ecological Services Office for review at lafayette@fws.gov. Contact our office at (337) 291-3100 for further assistance.

Project Description: West Feliciana Parish proposes to armor two bends of Bayou Sara to provide erosion protection for the St. Francisville sewage treatment plant (STP) pond and a portion of Ferdinand Street, which is the sole access to the Mississippi River for St. Francisville. Preliminary site plans would armor approximately 1,300 feet along the large bend along the STP pond and approximately 900 feet further south by the Oyster Bar adjacent to Ferdinand Street. Each revetment would include a base of riprap fill extending from a revetment toe at a 2:1 slope up to or above the Ordinary High Water Mark (OHWM). The upper portion of the streambank would consist of concrete block mats with a 3:1 slope.
Prior to installing the revetment, the existing streambank slopes would be cut and filled with compacted fill to achieve 2: 1 slopes on the embankment. Streambanks would then be covered with a geotextile filter fabric and armored with 130-pound class stone riprap revetment with riprap toes placed at the base of the slopes. The excavated streambank materials would be deposited within the 0.87 acre Excess Cut Placement Area located between the STP lagoons and the loop access road around the STP.
If there are sufficient funds available, West Feliciana Parish may also armor the east bank of Bayou Sara between the two large bends.
This project development report is to amend the one previously submitted, which erroneously stated that dredging would be involved in the project. All streambank work would be completed above the high water line.

Requesting Agency: Federal Emergency Management Agency (FEMA)

Project Coordinates: Latitude: 30.765819 Longitude: -91.396711

Point of Contact: Bonnie Porter

Address: 1500 Main St.

City: Baton Rouge **State:** Louisiana **Zip Code:** 70122

Phone Number 1: 504-210-7263 **Phone Number 2:** _____

Email Address: bonnie.porter@fema.dhs.gov

Does the proposed action only involve telecommunication structure(s)?

No

Would the proposed action occur entirely within an existing footprint or rights-of-way (ROW)?

No

Would any portion of the proposed action occur within one of these areas of interest?

Yes

Pallid Sturgeon

Would the proposed action result in riverine pathway obstruction (such as construction of dams, hydropower plants, etc.)?

No

Would the proposed action involve addition of or modifications to water intake structures?

No

Would the proposed action involve modifications to existing or construction of new diversion structure or turbines?

No

Would the proposed action involve dredging activities?

No

Conclusion:
We have determined that the proposed action is not likely to adversely affect the Pallid Sturgeon.

TIFFANY R SPANN WINFIELD Digitally signed by TIFFANY R SPANN WINFIELD Date: 2018.04.04 08:29:49 -05'00'

Project Representative *Date*

Based on the information provided in this report, as well as any pertinent correspondence and documentation saved to the project file at our office (if applicable), the Service concurs with your "not likely to adversely affect" determination for the following species:

Pallid Sturgeon

27 Jun 18

Louisiana Ecological Services Office *Date*
U.S. Fish and Wildlife Service

Section 7 consultation for the proposed action is concluded when you receive signature from this office. To ensure continued compliance with the ESA, reinitiate consultation when:

- new information reveals that the action may affect listed species or designated critical habitat in a manner or to an extent not considered in this consultation
- the action is modified in a manner that causes effects to listed species or designated

critical habitat not considered in this consultation

- a new species is listed or critical habitat designated that the action may affect.

Migratory Bird Conservation Recommendations

Bald Eagle

The proposed project area may provide nesting habitat for the bald eagle (*Haliaeetus leucocephalus*), which was officially removed from the List of Endangered and Threatened Species as of August 8, 2007. However, the bald eagle remains protected under the Bald and Golden Eagle Protection Act (BGEPA) (54 Stat. 250, as amended, 16 U.S.C. 668a-d) and theMigratory Bird Treaty Act (MBTA) (40 Stat. 755, as amended; 16 U.S.C. 703 et seq.) The Louisiana Department of Wildlife and Fisheries (LDWF) has not collected comprehensive bald eagle survey data since 2008, and new active, inactive, or alternate nests may have been constructed within the proposed project area since that time.

The Service developed the National Bald Eagle Management (NBEM) Guidelines to provide landowners, land managers, and others with information and recommendations to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the BGEPA. A copy of the NBEM Guidelines is available at:

http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf

In southern Louisiana parishes, eagles typically nest in mature trees (e.g., baldcypress, sycamore, willow, etc.) near fresh to intermediate marshes or open water. Bald eagles may also nest in mature pine trees near large lakes in central and northern Louisiana. If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then an evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles. That evaluation may be conducted on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary.

Colonial Waterbirds

In accordance with the Migratory Bird Treaty Act of 1918 (as amended), please be advised should the project area be located in or near wetland habitats which may be inhabited by colonial nesting waterbirds and/or seabirds, additional restrictions may be necessary.

Colonies may be present that are not currently listed in the database maintained by the Louisiana Department of Wildlife and Fisheries. That database is updated primarily by (1) monitoring previously known colony sites and (2) augmenting point-to-point surveys with flyovers of adjacent suitable habitat. Although several comprehensive coast-wide surveys have been recently conducted to determine the location of newly-established nesting colonies, we recommend that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to our colonial nesting waterbird guidance on the LESO Webpage https://www.fws.gov/lafayette/Migratory_Birds/MigBird.html.

Additional Migratory Bird Conservation Recommendations

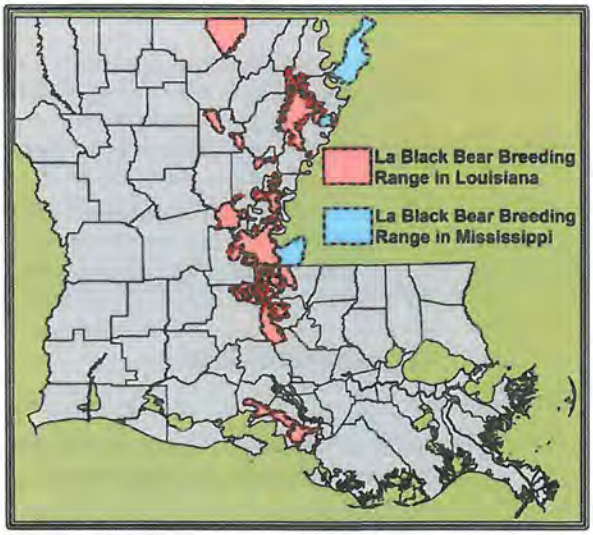
During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the LESO webpage https://www.fws.gov/lafayette/Migratory_Birds/MigBird.html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php).

The Louisiana Black Bear

Recovered and Delisted

Post-Delisting Conservation Considerations

The Louisiana black bear (*Ursus americanus luteolus*) was listed as a threatened subspecies in 1992. Due to recovery, it was officially removed from the List of Endangered and Threatened Species on March 11, 2016 (effective April 11, 2016); critical habitat designation for this subspecies has also been withdrawn. Because the Louisiana black bear is no longer protected under the Endangered Species Act (ESA), *consultation with the U.S. Fish and Wildlife Service (Service) is not required for this subspecies.* The Louisiana black bear remains protected under Louisiana state law, and the Louisiana Department of Wildlife and Fisheries (LDWF) will continue to actively manage this subspecies. The Service and LDWF have developed a plan to extensively monitor the status of the Louisiana black bear for 7 years following its delisting (until year 2022). That monitoring will be undertaken to detect any potential population decreases or threat increases that may warrant the implementation of measures to ensure that the Louisiana black bear remains secure from risk of extinction.



The Louisiana black bear is primarily associated with forested wetlands, but will utilize a variety of other habitat types, including scrub-shrub, marsh, spoil banks, and upland forests. They normally den from December through April and preferred den sites include large, hollow trees (36 inches or more in diameter at breast height) with sufficiently sized openings that allow access to interior cavities. Although ESA consultation is no longer required regarding project impacts on this subspecies, in the interest of conserving the Louisiana black bear, projects proposed in areas of the state that are inhabited by bears should be designed to avoid adversely affecting this subspecies or its habitat. (A current Louisiana black bear breeding area map is located at: https://www.fws.gov/Lafayette/pdf/LA_Black_Bear_Breeding_Habitat_Map.pdf)

Conservation measures for the Louisiana black bear include:

- reducing the footprint of proposed actions to the maximum extent feasible
- avoiding impacts to potential den trees that are 36 inches or more in diameter at breast height
- implementing programs to prevent the habituation of bears to human-associated food sources (e.g., use of "bear-proof" waste disposal containers or daily removal of food and garbage)
- avoiding vegetative clearing during the black bear denning season (i.e., December 1 through April 30).

For additional information regarding the Louisiana black bear and project-specific conservation measures that may be required by the LDWF, please contact Maria Davidson (Large Carnivore Program Manager) at (337) 262-2080 or mdavidson@wlf.la.gov.

DEPARTMENT OF THE ARMY
NEW ORLEANS DISTRICT, CORPS OF ENGINEERS
7400 LEAKE AVENUE
NEW ORLEANS, LOUISIANA 70118

REPLY TO
ATTENTION OF:
Operations Division
Central Evaluation Section

March 9, 2018

SUBJECT: MVN-2017-0368-CQ
Nationwide Permit-13

West Feliciana Parish
5934 Commerce Street / Post Office Box 1921
Saint Francisville, Louisiana 70775

Gentlemen:

This is in regard to your permit application dated March 22, 2017 requesting Department of the Army approval to install and maintain concrete block mats, rip rap material, and compacted fill for bank stabilization measures along the Bayou Sara streambank, near St. Francisville, in West Feliciana Parish, Louisiana.

This office has determined that your project, as shown in the attached drawings, is authorized by **Nationwide Permit Number 13**, as found in the January 6, 2017, Federal Register, Reissuance of Nationwide Permits (82 FR 1983). Enclosed is a copy of the nationwide permit and the general conditions with which you must comply.

Based on the project description, qualifying criteria for this permit are that the activity will not exceed the placement of an average of one cubic yard per running foot along the bank below the plane of ordinary high water mark, the total linear length of the bank stabilization measure cannot exceed 500 feet in total length along the bank, and the permit does not involve discharges of dredged or fill material into special aquatic sites. In consideration of the need to re-stabilize the site to prevent further damage, it is anticipated that the proposed activity will result in minimal adverse impacts to Bayou Sara. As such, a waiver to the above mentioned criteria of NWP-13 is granted.

You are reminded that Nationwide Permit General Condition 30 requires you to provide a signed certification stating that the authorized work was conducted in accordance with the permit, including any special conditions, and that mitigation (if required) was completed in accordance with the permit. We have attached this form. The permittee must sign the attached form and a copy of this nationwide permit authorization letter must be attached. Send this to: U.S. Army Corps of Engineers, New Orleans District, ATTN: CEMVN-OD-SC, 7400 Leake Avenue, New Orleans, Louisiana 70118.

In addition, the following special conditions are made part of this authorization:

1. The permittee is aware that all necessary local, state and parish approvals must be obtained prior to the commencement of work at the project site.

2. The permittee shall assure that all material used during construction shall be pollutant free in accordance with the EPA Guidelines for Discharge of Dredged or Fill Material, found in 40 CFR 230. The material may be obtained offsite or from site preparation. Offsite material shall not be obtained from wetlands or from areas that may adversely affect adjacent wetlands. Any excess material shall be placed in an upland area and properly contained or stabilized to prevent entry into adjacent wetlands of other waters.

3. The permittee is aware that future site visits and inspections of the project site may be conducted by personnel of the New Orleans District Corps of Engineers, Regulatory Branch (CEMVN) and/or other resource agencies in order to assess project compliance with the requirements of this authorization.

4. Construction activities shall not cause more than minimal and temporal water quality degradation of any adjacent wetland, stream, or water body. Appropriate erosion and siltation controls must be utilized during construction to prevent sediment runoff into adjacent wetlands and waterways. Sediment control techniques could include but are not limited to the use of secured hay bales, sediment/silt fencing, wooden or vinyl barriers, and/or seeding or sodding of exposed or disturbed areas. These structures should be maintained in effective operating condition until sediments are stabilized by vegetation and other impervious surfaces.

5. The project area has been identified as an area of interest for federally recognized Native American Tribes. If during the course of work at the site, prehistoric and/or historic aboriginal cultural materials are discovered, the permittee will contact CEMVN. CEMVN will initiate the required federal, state, and Tribal coordination to determine the significance of the cultural materials and the need, if applicable, for additional cultural resource investigations.

6. The permittee shall limit clearing, excavation and the placement of fill material to areas essential to the project. The remainder of the property shall be left in its natural state. If the authorized project requires any additional work not expressly permitted herein, or impacts any wetlands (or “other waters of the US”) other than the areas indicated on the attached drawings, the permittee must apply for an amendment to this authorization prior to commencement of work.

7. To minimize potential impacts to adjacent wetlands from construction activities, the permittee shall mark the boundaries of wetlands with clearly recognizable markers to avoid encroachment. All contractors, foremen, and/or on-site workers involved in construction activities shall be briefed as to location of the markers and the avoidance of wetlands.

8. Issuance of this permit confirms that CEMVN has been provided with written notification from the Cypress Plantation Farm, LLC that the permittee has contracted for 0.1 acre of bottomland hardwoods restoration mitigation credit at Cypress Plantation II Mitigation Bank. The Cypress Plantation Farm, LLC has assumed responsibility for completing the mitigation in accordance with the Cypress Plantation II Mitigation Bank Mitigation Banking Instrument and has recorded the allocation of the mitigation required by this permit in the Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS).

The authorized work would neither affect any species listed as endangered by the U. S. Departments of Interior or Commerce, nor affect any habitat designated as critical to the survival and recovery of any endangered species.

This determination is only applicable to the permit program administered by the U. S. Army Corps of Engineers. It does not eliminate the need to obtain other applicable federal, state, or local approvals before beginning work.

Permittee is aware that this office may reevaluate its decision on this permit at any time the circumstances warrant.

This determination relative to the nationwide permit expires on March 18, 2022.

Should you have any further questions concerning this matter, please contact Kenny Blanke of this office at (504) 862-1217.

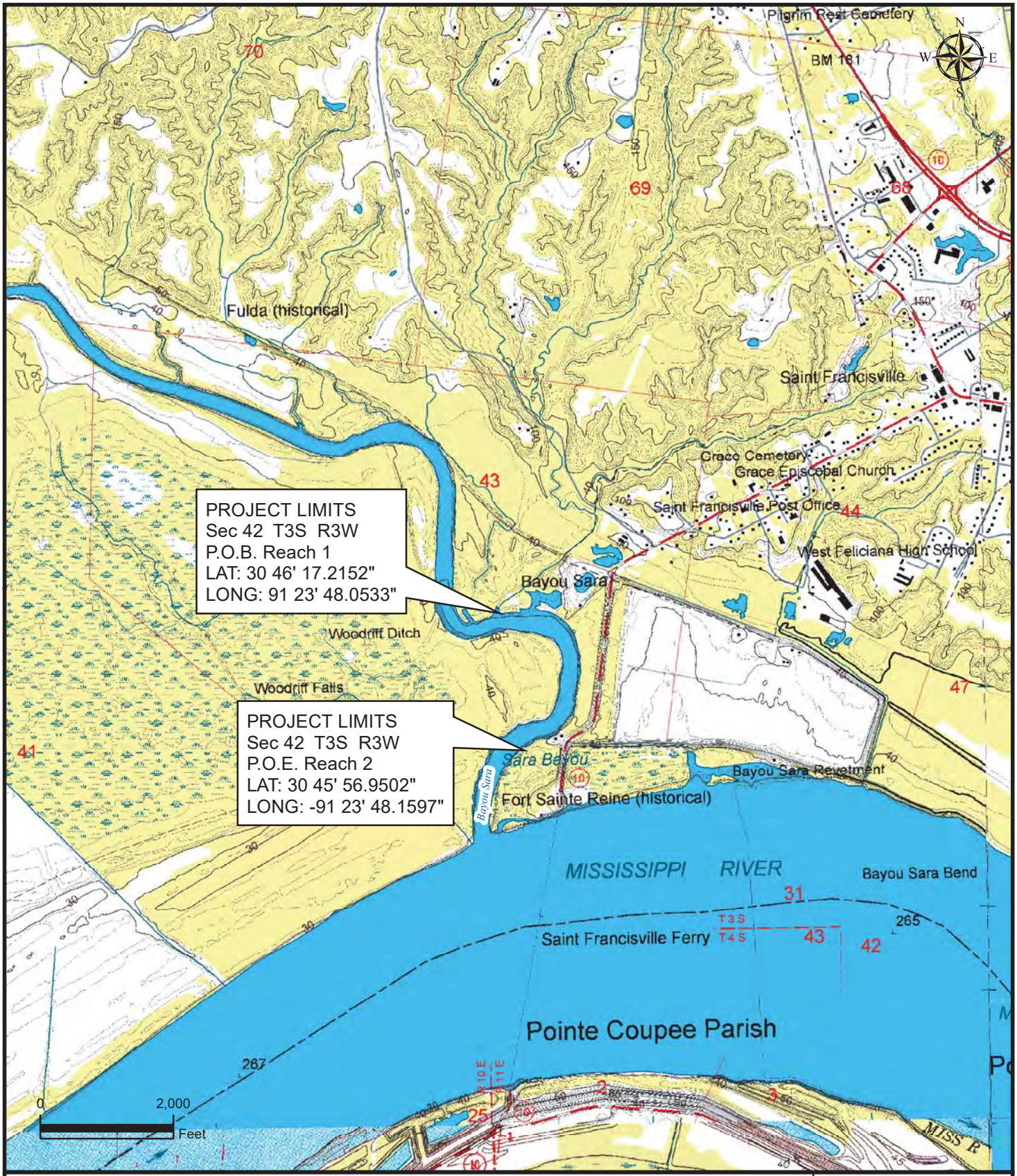
Sincerely,

HERMAN.JOHN.MATTHEW.1119334280

Digitally signed by HERMAN.JOHN.MATTHEW.1119334280
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=HERMAN.JOHN.MATTHEW.1119334280
Date: 2018.03.09 13:01:59 -06'00'

for Martin S. Mayer
Chief, Regulatory Branch

Enclosures



PROJECT LOCATION MAP

Bayou Sara
West Feliciana Parish, Louisiana

ARCADIS
10352 Plaza Americana Drive
Baton Rouge, Louisiana 70816
Tel: 225.292.1004
Fax: 225.218.9677
www.arcadis.com

Project Manager:	KJ
Task Manager:	MS
Project No.:	LA003333.0001
Figure No.	1

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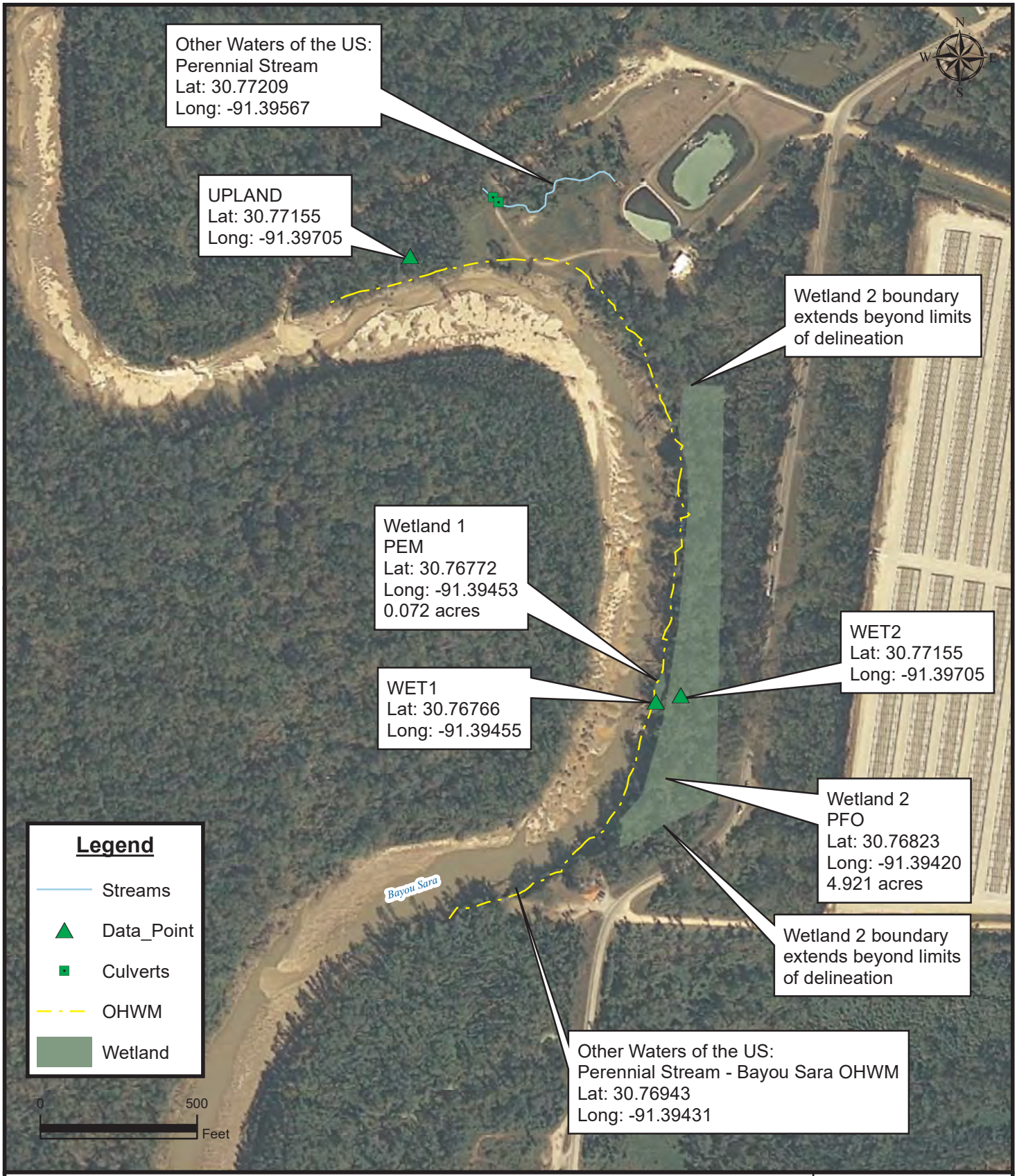


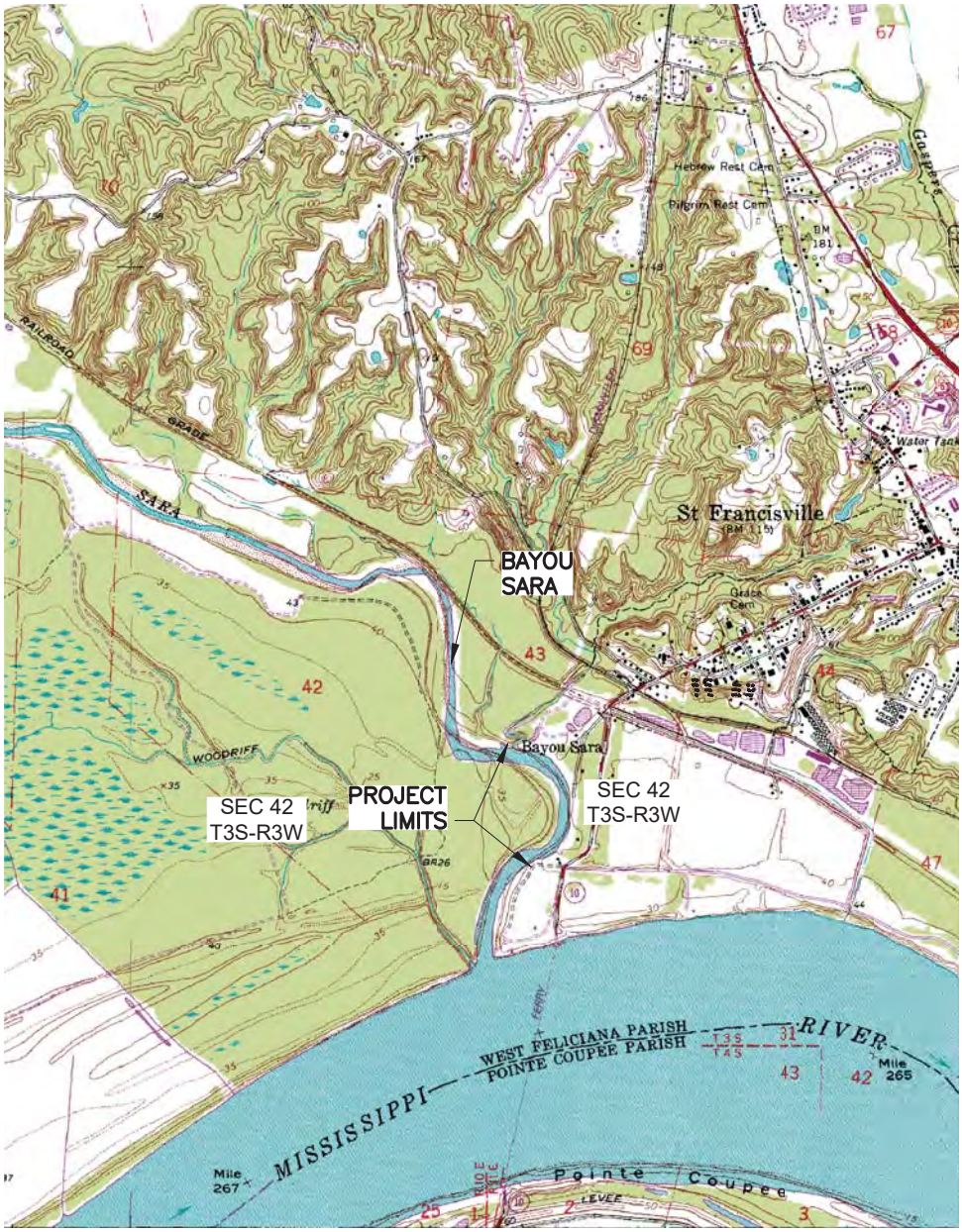
WETLAND AND SOIL SAMPLE LOCATIONS

Bayou Sara
West Feliciana Parish, Louisiana

ARCADIS
10352 Plaza Americana Drive
Baton Rouge, Louisiana 70816
Tel: 225.292.1004
Fax: 225.218.9677
www.arcadis.com

Project Manager:	KJ
Task Manager:	MS
Project No.:	LA003333.0001
Figure No.	2

Document Path: G:\APROJECT\Recovery and Mitigation\West Feliciana\Bayou Sara\Z_For Kyle\GIS\Figure 2.mxd User Name: mschulze Date Saved: 3/17/2017 10:06:41 AM



SCALE 1"=3,000'

0 1,500 3,000 6,000

SCALE IN FEET

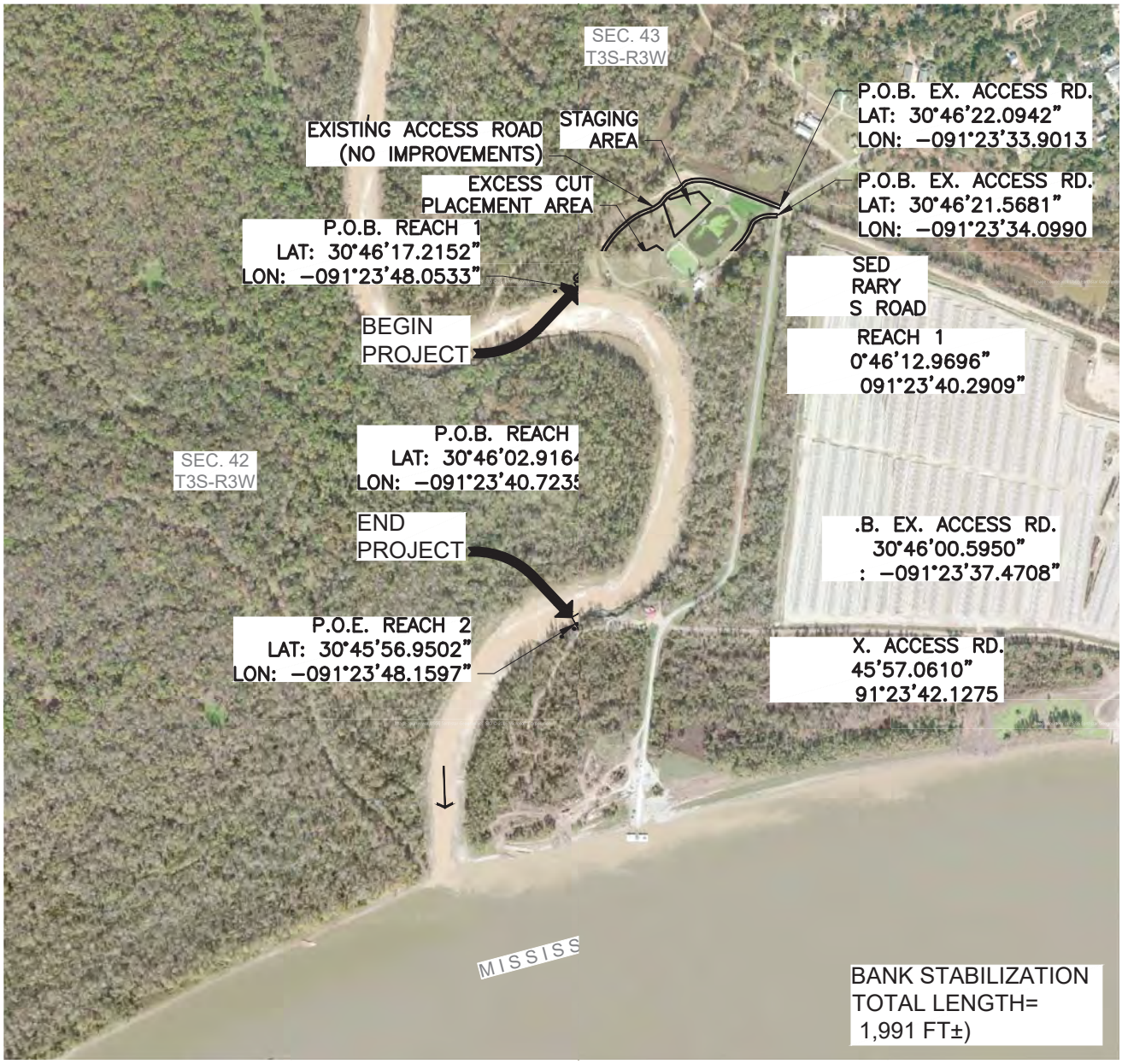
THESE PLATS ARE TO BE USED EXCLUSIVELY FOR THE ACQUISITION OF REGULATORY PERMITS.

ARCADIS
Manchac CONSULTING GROUP, INC.
3850 N CAUSEWAY BLVD
SUITE 1600
METAIRIE, LOUISIANA
T. (504) 832-4174
F. (504) 832-2145
www.arcadis-us.com
WEST FELICIANA PARISH

SHEET TITLE

BAYOU SARA BANK STABILIZATION PROJECT
W. FELECIANA PARISH, LA
PERMIT DRAWINGS

VICINITY MAP



SCALE 1"=1,000'

0 500 1,000 2,000

SCALE IN FEET

NOTE:
ALL LOCATIONS REFERENCED TO NAD83 (2011)

THESE PLATS ARE TO BE USED EXCLUSIVELY FOR THE ACQUISITION OF REGULATORY PERMITS.

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WEST FELICIANA PARISH

SHEET TITLE

BAYOU SARA BANK STABILIZATION PROJECT
W. FELECIANA PARISH, LA
PERMIT DRAWINGS

PROJECT LOCATION

SCALE 1"=1,000'

0 500 1,000 2,000

SCALE IN FEET

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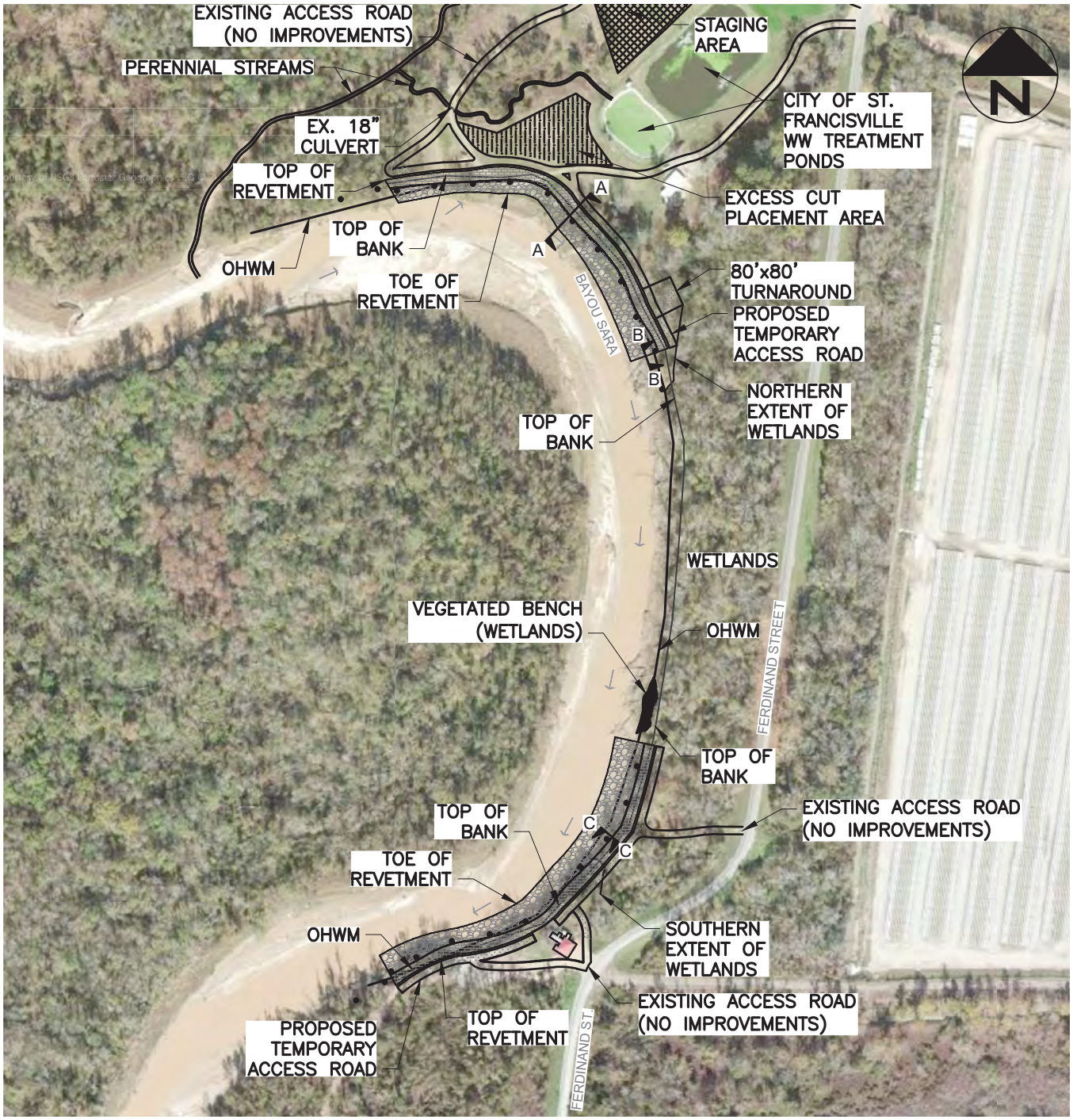
WEST FELICIANA PARISH

SHEET TITLE

BAYOU SARA BANK STABILIZATION PROJECT
W. FELECIANA PARISH, LA
PERMIT DRAWINGS

WORK LIMITS

REV. 04 SHEET P-03



SCALE 1"=400'

0 200 400 800

SCALE IN FEET

THESE PLATS ARE TO BE USED EXCLUSIVELY FOR THE ACQUISITION OF REGULATORY PERMITS.

ARCADIS
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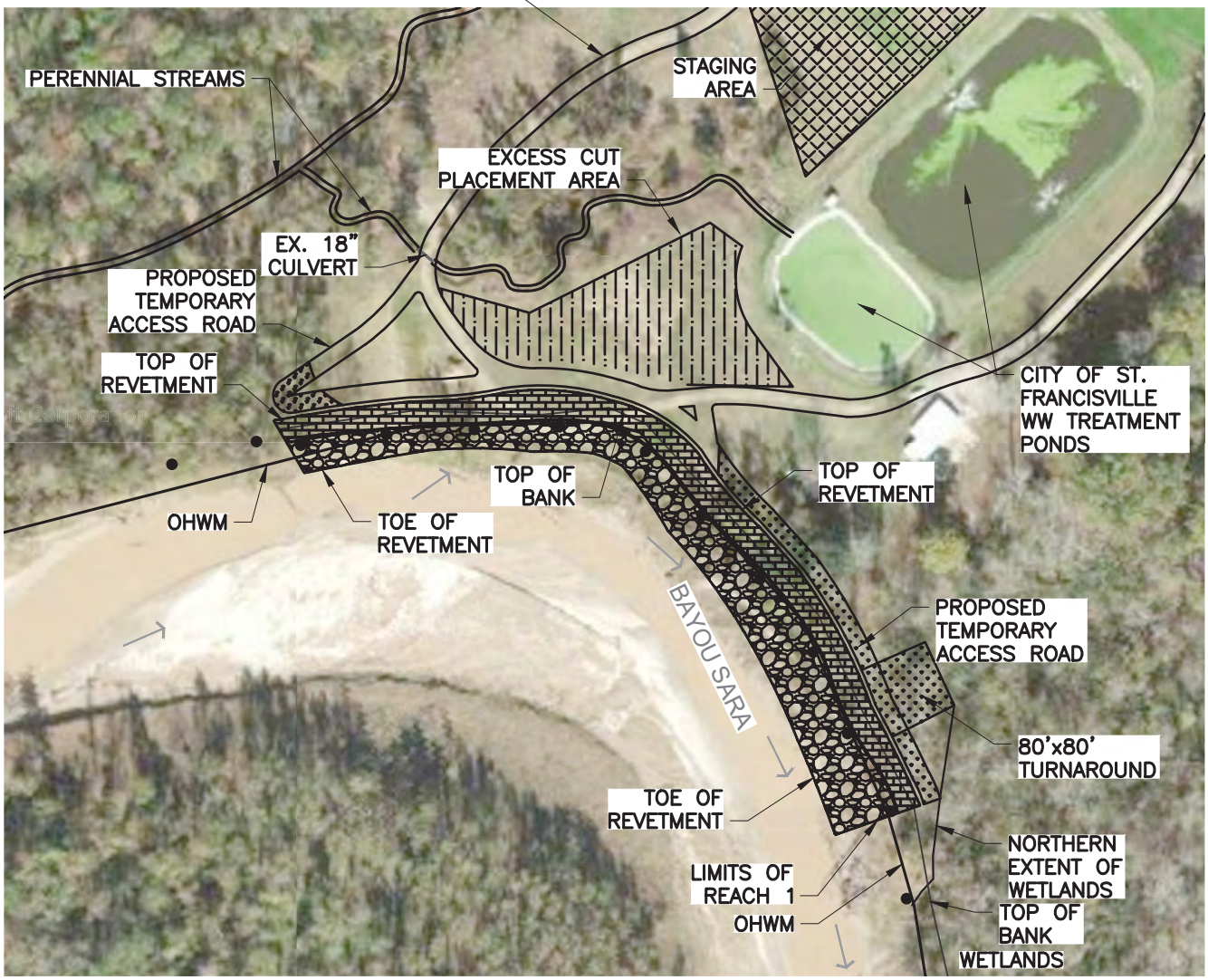
WEST FELICIANA PARISH

SHEET TITLE

BAYOU SARA BANK STABILIZATION PROJECT
W. FELECIANA PARISH, LA
PERMIT DRAWINGS

OVERALL PLAN VIEW

REV. 04 SHEET P-04



SCALE 1"=200'

0 100 200 400

SCALE IN FEET

LEGEND:

= BLOCK MAT

= RIPRAP FILL

= ACCESS TO BE CLEARED

= STAGING AREA

= EXCESS FILL PLACEMENT AREA

THESE PLATS ARE TO BE USED EXCLUSIVELY FOR THE ACQUISITION OF REGULATORY PERMITS.

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www.arcadis-us.com

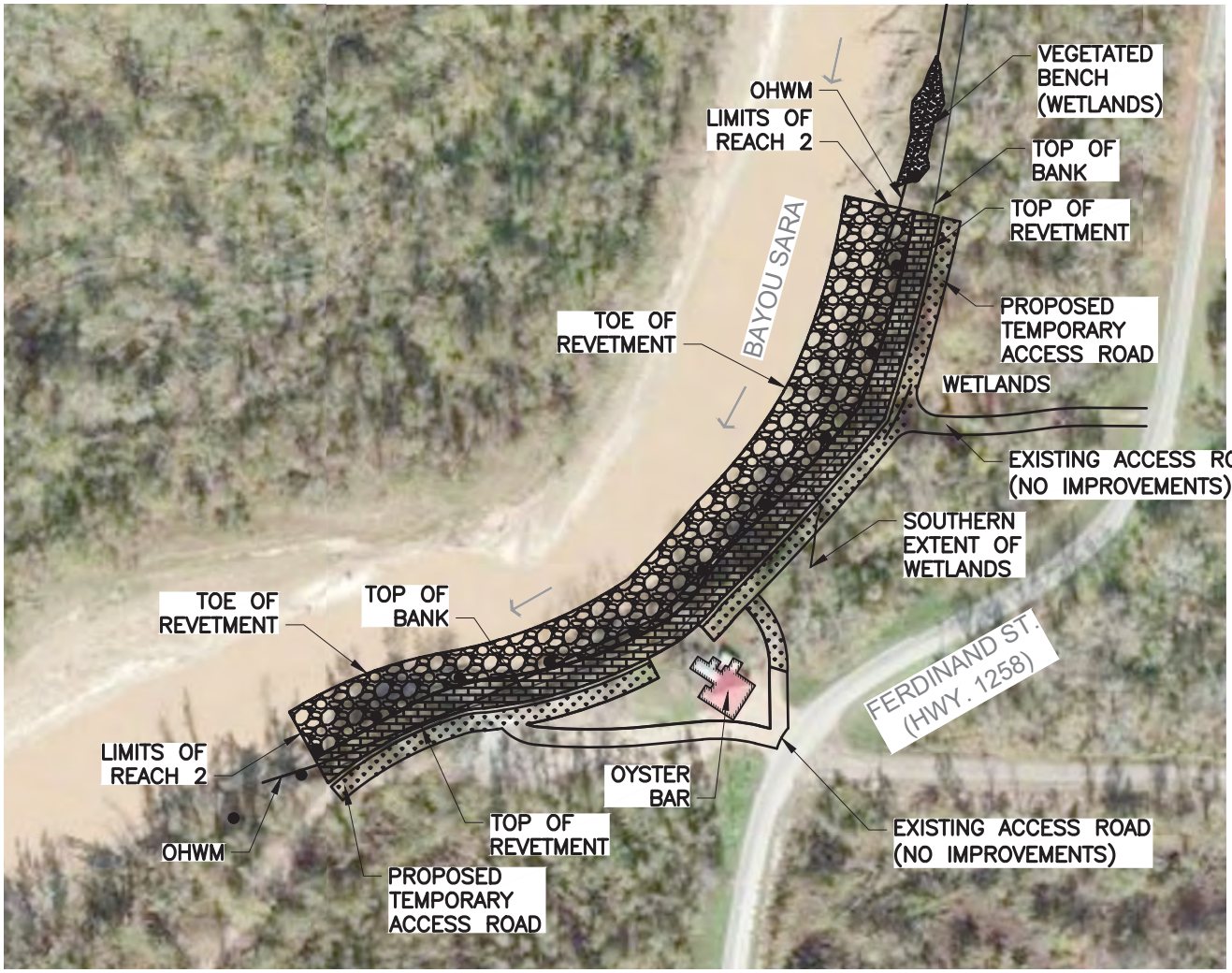
WEST FELICIANA PARISH

SHEET TITLE

BAYOU SARA BANK STABILIZATION PROJECT
W. FELECIANA PARISH, LA
PERMIT DRAWINGS

REACH 1 - PLAN VIEW

REV. 04 SHEET P-05



SCALE 1"=200'

0 100 200 400

SCALE IN FEET

LEGEND:

= BLOCK MAT

= RIPRAP FILL

= ACCESS TO BE CLEARED

= VEGETATED BENCH (WETLANDS)

THESE PLATS ARE TO BE USED EXCLUSIVELY FOR THE ACQUISITION OF REGULATORY PERMITS.

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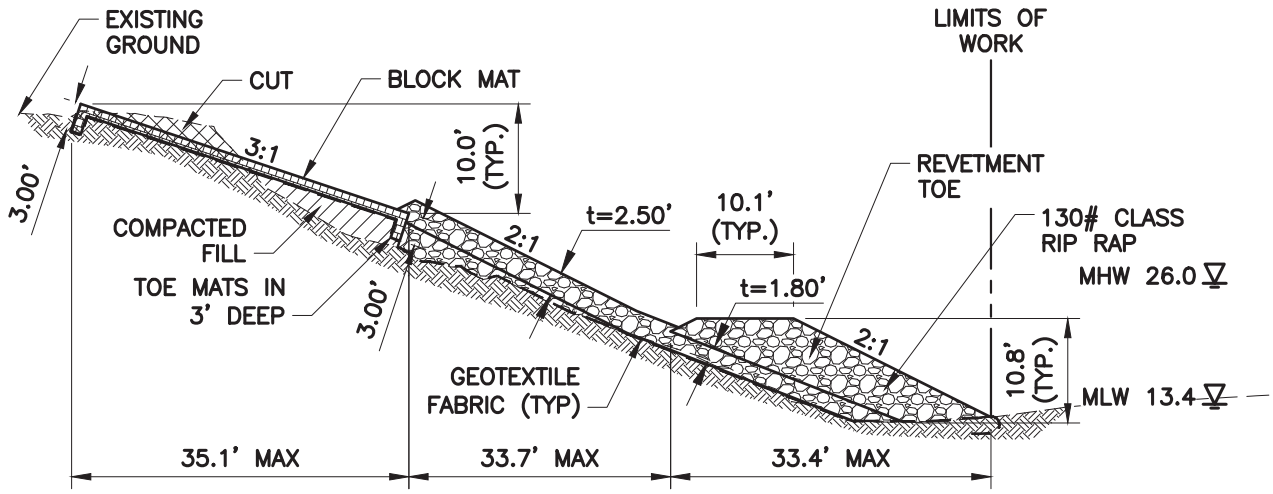
SHEET TITLE

BAYOU SARA BANK STABILIZATION PROJECT
W. FELECIANA PARISH, LA
PERMIT DRAWINGS

REACH 3 - PLAN VIEW

REV. 04 SHEET P-06



LEGEND:

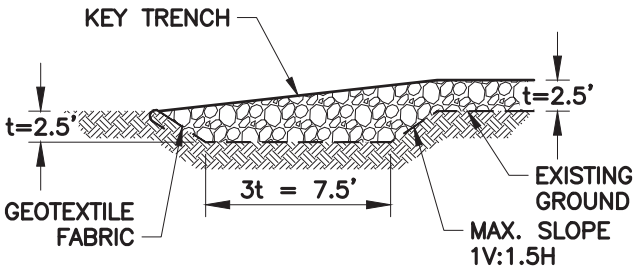
= BLOCK MAT

= 130# CLASS RIP RAP

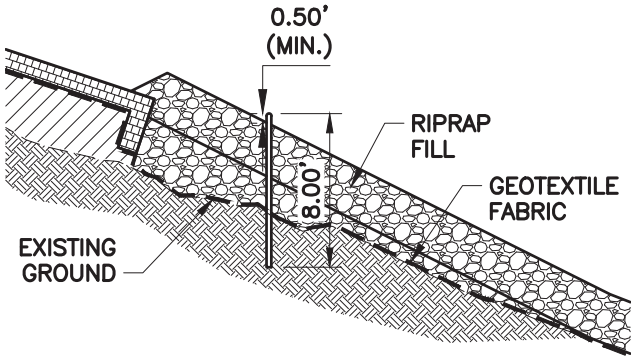
= COMPACTED FILL

= CUT

TYPICAL SECTION A
N.T.S.



TYPICAL SECTION B
N.T.S.



TYPICAL SECTION C
RIPRAP POLE GAUGE
N.T.S.

THESE PLATS ARE TO BE USED EXCLUSIVELY FOR THE ACQUISITION OF REGULATORY PERMITS.

ARCADIS
Manchac CONSULTING GROUP, INC.
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WEST FELICIANA PARISH

SHEET TITLE

BAYOU SARA BANK STABILIZATION PROJECT
W. FELECIANA PARISH, LA
PERMIT DRAWINGS

TYPICAL SECTIONS

REV. 04 SHEET P-07

ITEM	REACH 1	REACH 2	TOTAL
BLOCK MAT (SF)	36,526	38,963	72,440
BLOCK MAT ABOVE OHWM (CY)	653	567	1,220
BLOCK MAT BELOW OHWM (CY)	23	98	121
BLOCK MAT IN WETLAND (CY)	N/A	79.5	79.5
RIPRAP (INCLUDES 20% LOSSES) (CY)	8,347	11,702	20,050
RIPRAP ABOVE OHWM (INCLUDES 20% LOSSES) (CY)	1,204	2,065	3,269
RIPRAP BELOW OHWM (INCLUDES 20% LOSSES) (CY)	7,144	9,637	16,781
COMPACTED FILL (INCLUDES 20% LOSSES) (CY)	289	960	1,249
COMPACTED FILL ABOVE OHWM (INCLUDES 20% LOSSES) (CY)	253	629	882
COMPACTED FILL BELOW OHWM (INCLUDES 20% LOSSES) (CY)	36	331	367
CUT (CY)	2,860	1,530	4,390
GEOTEXTILE (SF)	86,608	103,067	189,675
POLE GAUGES (UNIT)	13	13	26
4" GRAVEL FILL FOR ACCESS ROADS (CY)*	_	_	1337

ACCESS ROADS	LENGTH (LF)	AREA (SF)	ACREAGE
EXISTING	3,331	66,628	1.53
NOT WOODED	490	9,808	0.23
WOODED	1,971	39,412	0.90
UPLAND	5,416	108,321	2.49
WETLAND	376	7,527	0.17
TOTAL	5,492	115,848	2.66

REVETMENT FOOTPRINT	
ITEM	ACREAGE
OTHER WATERS OF THE U.S. BELOW OHWM	2.06
NON-WETLAND	1.49
WETLAND	0.09
TOTAL	3.64

AREA	ACREAGE
STAGING AREA	0.95
EXCESS CUT PLACEMENT AREA	0.87
WORK LIMITS	9.04

NOTE:
*** NO FILL FOR ACCESS WILL BE PLACED IN THE IDENTIFIED WETLAND AREAS.**

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W. FELECIANA PARISH, LA
PERMIT DRAWINGS

QUANTITIES

US Army Corps of Engineers®
New Orleans District

Nationwide Permit Summary

33 CFR Part 330; Issuance of Nationwide Permits – March 19, 2017
and Regional Conditions for Louisiana

Nationwide Permit 13 – Bank Stabilization. Bank stabilization activities necessary for erosion control or prevention, such as vegetative stabilization, bioengineering, sills, rip rap, revetment, gabion baskets, stream barbs, and bulkheads, or combinations of bank stabilization techniques, provided the activity meets all of the following criteria:

(a) No material is placed in excess of the minimum needed for erosion protection;

(b) The activity is no more than 500 feet in length along the bank, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects (an exception is for bulkheads—the district engineer cannot issue a waiver for a bulkhead that is greater than 1,000 feet in length along the bank);

(c) The activity will not exceed an average of one cubic yard per running foot, as measured along the length of the treated bank, below the plane of the ordinary high water mark or the high tide line, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects;

(d) The activity does not involve discharges of dredged or fill material into special aquatic sites, unless the district engineer waives this criterion by making a written determination concluding that the discharge will result in no more than minimal adverse environmental effects;

(e) No material is of a type, or is placed in any location, or in any manner, that will impair surface water flow into or out of any waters of the United States;

(f) No material is placed in a manner that will be eroded by normal or expected high flows (properly anchored native trees and treetops may be used in low energy areas);

(g) Native plants appropriate for current site conditions, including salinity, must be used for bioengineering or vegetative bank stabilization;

(h) The activity is not a stream channelization activity; and

(i) The activity must be properly maintained, which may require repairing it after severe storms or erosion events. This NWP authorizes those maintenance and repair activities if they require authorization.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to construct the bank stabilization activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are

necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to preconstruction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if the bank stabilization activity: (1) Involves discharges into special aquatic sites; or (2) is in excess of 500 feet in length; or (3) will involve the discharge of greater than an average of one cubic yard per running foot as measured along the length of the treated bank, below the plane of the ordinary high water mark or the high tide line. (See general condition 32.)

(**Authorities:** Section 10 of the Rivers and Harbors Act of 1899 and section 404 of the Clean Water Act)

A. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/ or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. **Navigation.** (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. **Aquatic Life Movements.** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. **Spawning Areas.** Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. **Migratory Bird Breeding Areas.** Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. **Shellfish Beds.** No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. **Suitable Material.** No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. **Water Supply Intakes.** No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. **Adverse Effects From Impoundments.** If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. **Management of Water Flows.** To the maximum extent practicable, the preconstruction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. **Fills Within 100-Year Floodplains.** The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. **Equipment.** Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. **Soil Erosion and Sediment Controls.** Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. **Removal of Temporary Fills.** Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. **Proper Maintenance.** Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. **Single and Complete Project.** The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. **Wild and Scenic Rivers.** (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ‘‘study river’’ for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a ‘‘study river’’ for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. **Tribal Rights.** No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. **Endangered Species.** (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which ‘‘may affect’’ a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If preconstruction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity ‘‘may affect’’ or will have ‘‘no effect’’ to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps’ determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the

proposed activity will have ‘‘no effect’’ on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

(e) Authorization of an activity by an NWP does not authorize the ‘‘take’’ of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with ‘‘incidental take’’ provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where ‘‘take’’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word ‘‘harm’’ in the definition of ‘‘take’’ means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide Web pages at http://www.fws.gov/ or http:// www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. **Migratory Birds and Bald and Golden Eagles.** The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S.

Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory birds or eagles, including whether ‘‘incidental take’’ permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. **Historic Properties.** (a) In cases where the district engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the preconstruction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic

properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

(d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/ THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. **Discovery of Previously Unknown Remains and Artifacts.** If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. **Designated Critical Resource Waters.** Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological

significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. **Mitigation.** The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require preconstruction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require preconstruction notification, the district engineer may determine on a case-by case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)).

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14)

must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2- acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. **Safety of Impoundment Structures.** To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified

persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. **Water Quality.** Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. **Coastal Zone Management.** In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. **Regional and Case-By-Case Conditions.** The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. **Use of Multiple Nationwide Permits.** Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. **Transfer of Nationwide Permit Verifications.** If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To

validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee)

(Date)

30. **Compliance Certification.** Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a USACE project), the prospective permittee must submit a preconstruction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office

issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. **Pre-Construction Notification.** (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer s receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is no effect on listed species or no potential to cause effects on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee s right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) A description of the proposed activity; the activity s purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more

than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a study river for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the study river (see general condition 16); and

(10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity s compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity s adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) All NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via email, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or email that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the preconstruction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity s compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of preconstruction notifications to expedite agency coordination.

B. Regional Conditions for all Nationwide Permits in Louisiana

Regional Condition 1. No regulated activity may cause the permanent loss or the conversion of greater than 1/2 acre of cypress swamp and/or cypress-tupelo swamp.

Regional Condition 2. No regulated activity may cause the permanent loss or the conversion of greater than ½ acre of coastal prairie, pine savanna, and/or pitcher plant bogs.

Regional Condition 3. No regulated activity is authorized under any NWP permit which has been determined to have an adverse impact upon a federal or state designated rookery and/or bird sanctuary.

Regional Condition 4. Although ESA Section 7 consultation is no longer required for the Louisiana black bear (which has been delisted due to recovery), permittees are advised that the Louisiana black bear is still protected under State of Louisiana law, and the Louisiana Department of Wildlife and Fisheries (LDWF) will continue to actively manage this subspecies. To learn more about State law requirements for Louisiana black bear protection and habitat conservation, permittees shall contact Maria Davidson (Louisiana Department of Wildlife and Fisheries - Large Carnivore Program Manager) at (337) 948-0255.

Regional Condition 5. Due to the occurrence of threatened or endangered species, **Pre-Construction Notification** shall be required for **ALL** regulated instream activities in the following waterways: Abita River and tributaries; Amite River (LA Highway 37 at Grangeville to Port Vincent); Bayou Bartholomew in Morehouse Parish; Bayou Boeuf and Bayou Rapides Tributaries in Rapides Parish: (Bayou Clear, Brown Creek, Burney Branch, Castor Creek, Clear Creek, Haikey s Creek, Little Bayou Clear, Little Brushy Creek, Loving Creek, Little Loving Creek, Long Branch, Mack Branch, Patterson Branch, Valentine Creek, and Williamson Branch), Bayou Rigolette tributaries in Grant Parish (Beaver Creek, Black Creek, Chandler Creek, Clear Branch, Coleman Branch, Cress Creek, Cypress Creek, Glady Hollow, Gray Creek, Hudson Creek, James Branch, Jordon Creek, Moccasin Branch, and Swafford Creek); Bogue Falaya River and Tributaries, Bogue Chitto River and Tributaries, Lake Borgne, Lake Pontchartrain and its tributaries, Lake Saint Catherine, Little Lake, Tchefuncta River, Little Tchefuncta River, the Rigolets and West Pearl River.

Regional Condition 6. Dredged and/or fill material placed within wetlands and other waters must be free of contaminants, to the best of the applicant s knowledge.

Regional Condition 7. For work within the Louisiana Coastal Zone and/or the Outer Continental Shelf off Louisiana;

a. The New Orleans District s Programmatic General Permit (PGP) generally supersedes the Nationwide Permit authorization for regulated activities located within the Louisiana Coastal Zone as incorporated within the New Orleans Corps District boundaries. Projects typically will not qualify for a Nationwide Permit if they qualify for the Programmatic General Permit.

b. A joint permit application for work must first be submitted to the Louisiana Department of Natural Resources, Office of Coastal Management (OCM). OCM will then forward the request to the Corps of Engineers-New Orleans District.

c. NWP requests that have not received a Coastal Use Permit or other consistency determination from the OCM would be processed by the Corps. However any granted authorization may be conditioned to require the applicant to obtain appropriate authorization from OCM before the NWP is valid.

Regional Condition 8. A pre-construction notification, as defined under nationwide general condition 32, will be provided for all regulated activities, excluding Nationwide 20, that meet one or both of the following criteria;

a. Adversely affects greater than 1/10 acre of wetlands, and/or;

b. Adversely impacts a Louisiana designated Natural and Scenic River or a state or federal wetland/wildlife management area and/or refuge.

Regional Condition 9, Supplement to General Condition 2 – Aquatic Life Movement. To support compliance with General Condition 2 of the NWPs, culverts must be sufficiently sized to maintain expected high water flows and be installed at a sufficient depth to maintain low flows to sustain the movement of aquatic species.

C. Regional Conditions Specific to Nationwide Permit 13 in Louisiana

Rip-rap material shall be free of protruding reinforcement material (i.e., rebar). Such material may pose a hazard to navigation and recreational uses.

This NWP, via disavowal of Coastal Zone certification by the Louisiana Department of Natural Resources, is considered **denied** without prejudice within the Louisiana Coastal Zone. Individual requests for approval under this NWP will ***be conditioned to require the applicant to obtain a Louisiana Department of Natural Resources determination/certification before the NWP is valid.***

D. Water Quality Nationwide Permit Regional Conditions for "Indian Country" Lands

The Environmental Protection Agency (EPA) is the agency required to address water quality certification of the 2012 nationwide permits (NWPs) in Indian country[1] where a tribe has not received treatment in the same manner as a state for the Clean Water Act (CWA) Section 401 program. Tribes which have received treatment in the same manner as a state (TAS) for the water quality standards and §401 certification programs and which have EPA-approved water quality standards will be contacted by the Corps of Engineers for the water quality certification process. EPA is the agency required to address water quality certification for tribes that have not received TAS for the water quality standards and 401 certification programs. At this time, no Indian tribes in Louisiana have CWA Section 401 authority.

1. The permittee shall conduct all work in such a manner to comply with all U.S. Army Corps of Engineers §404 permit conditions.

2. The permittee shall keep a copy of this certification with conditions at the project site during all phases of construction. All contractors or subcontractors involved in the project must be provided a copy of this certification prior to commencement of activities.

3. All heavy equipment used in the project areas shall be steam cleaned before the start of the project and inspected daily for leaks. Leaking equipment must not be used in or near surface water or in a wetland area. Equipment shall be parked outside the waterbody when not in use.

4. All fuels, oil, hydraulic fluid, or other substances of this nature must not be stored, temporarily or otherwise, within the normal floodplain or the wetland. A secondary containment system for these items shall be used in the event the primary containment system leaks. Refueling or servicing of equipment must not take place within 100 feet of any watercourse or within the wetland area.

5. The construction area shall be protected such that a runoff event will not move soil or contaminants to surface water or away from the construction site. These measures shall be in place prior to the commencement of activities and inspected daily.

6. Temporary mats must be placed on stream banks, riparian areas, and wetlands, to minimize impacts to soil and vegetation from heavy equipment. Temporary access roads must be restored to pre-project conditions.

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[1] "Indian Country", as defined in 18 U.S.C. 1151, means: (1) all land within the limits of any Indian reservation under the jurisdiction of the United States government, not withstanding the issuance of any patent, and including rights-of-way running through the reservation; (2) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a State; and (3) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same.

7. All asphalt, concrete, and other construction materials must be properly handled and contained to prevent releases to the stream channels. All concrete that is to be poured must be fully contained in mortar-tight forms to prevent accidental releases to surface water or ground water. No discharge of any concrete to surface water or ground water may occur. Dumping of waste materials near watercourses is strictly prohibited.

8. Work in a stream channel should be limited to periods of no flow when practicable, and must be limited to periods of low flow. Avoid working within the channel during spring runoff or summer thunderstorm season.

9. When working in a stream channel, flowing water must be temporarily diverted around the work area to minimize sedimentation and turbidity problems. Acceptable diversion structures are non-erosive and include (but are not limited to) sand bags, water bladders, concrete barriers lined with plastic, and flumes.

10. The permittee shall restore all areas disturbed by construction activities to pre-project conditions. This shall include restoration of surface contours, stabilization of the soil, and restoration of appropriate native vegetation to establish permanent cover.

E. District Engineer's Decision.

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2- acre.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and include any activity specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide

a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) That the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized by NWPs 21, 49, and 50), with activity specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

F. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

G. Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term ‘‘discharge’’ means any discharge of dredged or fill material into waters of the United States.

Ecological reference: A model used to plan and design an aquatic habitat and riparian area restoration, enhancement, or establishment activity under NWP 27. An ecological reference may be based on the structure, functions, and dynamics of an aquatic habitat type or a riparian area type that currently exists in the region where the proposed NWP 27 activity is located. Alternatively, an ecological reference may be based on a conceptual model for the aquatic habitat type or riparian area type to be restored, enhanced, or established as a result of the proposed NWP 27 activity. An ecological reference takes into account the range of variation of the aquatic habitat type or riparian area type in the region.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is

not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the acres or linear feet of stream bed that are filled or excavated as a result of the regulated activity. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the United States.

Navigable waters: Waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR part 329.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of flowing or standing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of ‘‘open waters’’ include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas.

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Preconstruction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where preconstruction notification is not

required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Protected tribal resources: Those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by, or reserved by or for, Indian tribes through treaties, statutes, judicial decisions, or executive orders, including tribal trust resources.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Reestablishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: Reestablishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands next to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a

variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term ''single and complete project'' is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term ''single and complete project'' is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of ''independent utility''). Single and complete non-linear projects may not be ''piecemealed'' to avoid the limits in an NWP authorization. Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line.

Tribal lands: Any lands title to which is either: (1) Held in trust by the United States for the benefit of any Indian tribe or individual; or (2) held by any Indian tribe or individual subject to restrictions by the United States against alienation.

Tribal rights: Those rights legally accruing to a tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, and that give rise to legally enforceable remedies.

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States. If a wetland is adjacent to a waterbody determined to be a water of the United States, that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of ‘‘waterbodies’’ include streams, rivers, lakes, ponds, and wetlands.

West Feliciana Parish

Department of Public Works, Planning and Zoning

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4/5/17

EHP Alternative Analysis
Bayou Sara Bank Stabilization Project
West Feliciana Parish
HMGP #1603-0436

FEMA Environmental and Historic Preservation Project and Alternative Project Narrative

The streambank of Bayou Sara, located in St. Francisville, LA near the confluence of the Mississippi River, is severely eroding and encroaching upon the Town of St. Francisville's sewer treatment pond as well as the United States Army Corps of Engineers (USACE)'s casting fields which are used for creating and exporting concrete mats for Mississippi River levee bank stabilization. The streambank erosion is a significant hazard that will handicap West Feliciana soon if mitigation efforts are not initiated through the completion of this project.

This project will mitigate future erosion that has been increasingly evolving over the past 20 years, which can be seen utilizing historical aerial photography. The streambank erosion at the project site requires immediate attention. The threat of losing the Town of St. Francisville's sewage treatment ponds and the ingress and egress on Ferdinand Street has become imminent. The streambank has eroded within approximately 160 feet of Ferdinand Street and is even closer to the pond levees that protect the sewage treatment facility. The downstream limits of the project are approximately 1,200 feet from the confluence with the Mississippi River, which frequently floods the area and is likely a contributing factor to the streambank erosion. Historical aerial photography shows the erosion has significantly accelerated over the years and it is anticipated to impact the sewage treatment pond levee and river access road in the very near future without mitigation. The proposed project is to install approximately 3,600 linear feet of limestone rip rap revetment along the most vulnerable section of the bank, thereby halting the accelerating erosion that has been occurring at an accelerated rated over the last few years.

Three proposed avoidance/mitigation measures were determined to avoid and/or minimize effects to cultural resources in the area:

Alternate 1: Mitigate the entire length of the affected river bend
Alternate 2 (Preferred Action): Mitigate only the most vulnerable sections of the bank with reduced footprint to minimize impacts to cultural and wetland resources. Timber mat placement on roads within wetland boundaries, excavation from within perviously disturbed streambed, work will take not place in heavily saturated soils outside of stream bed.
Alternate 3: No action - imminent failure of facilities and continued destrcution of acrchaeological site through erosion

U.S. Department of Homeland Security
Federal Emergency Management Agency
FEMA-1603/1607-DR-LA
FEMA Louisiana Recovery Office
Environmental/Historic Preservation
1500 Main Street
Baton Rouge, LA 70802

04/10/2017

Casey Tingle
Assistant Deputy Director, Hazard Mitigation
Governor's Office of Homeland Security & Emergency Preparedness
1500 Main Street
Baton Rouge, LA 70802

RE: Section 106 Review Consultation, Hurricane Katrina, FEMA-DR-1603--LA
Applicant: **West Feliciana Parish**
Undertaking: Bayou Sara Bank Stabilization Project, West Feliciana Parish, Louisiana (HMGP# 1603-0436)
Determination: **Adverse Effect to Historic Properties**

Dear Mr. Tingle:

The Federal Emergency Management Agency (FEMA) will be providing funds authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, P.L. 93-288, as amended, in response to the following major Disaster Declaration:

FEMA-1603-DR-LA, dated August 29, 2005, as amended.

FEMA, through its through its 404 Hazard Mitigation Grant Program (HMGP), proposes to fund the Bayou Sara Bank Stabilization Project, West Feliciana Parish, Louisiana (undertaking) as requested by West Feliciana Parish (Applicant). Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations, 36 CFR 800.5(c), FEMA is providing the Tunica-Biloxi Tribe of Louisiana with the opportunity to consult on the proposed undertaking. Documentation in this letter is consistent with the requirements in 36 CFR §800.11(d).

Description of the Undertaking
FEMA, through its Hazard Mitigation Grants Program (HMGP), proposes to provide funding for bank stabilization along Bayou Sara near its confluence with the Mississippi River, located in West Feliciana Parish, Louisiana (30.769185,-91.394268). The project area for the planned undertaking is located in Section 42, Township 3S, Range 3W. A 7.5 USGS map of the location is presented in Figure 1.

The undertaking proposes to stabilize two (2) sections of streambank along Bayou Sara where severe erosion threatens to impact the Town of St. Francisville's Wastewater Treatment facility, pond levees, and the Parish's only access road (Ferdinand Street) to the Mississippi River. Ferdinand Street is vital to the Parish economy for its riverboat revenue, tourism, and the U.S. Army Corps of Engineers (USACE) access to the 210-acre St. Francisville Casting field. The streambank has eroded to within 160 feet (48.7 m) of the roadway and in close proximity to the pond levees that protect the Parish's wastewater treatment facility. If left unchecked, the road and treatment ponds will become more vulnerable to washout and loss of function. Loss of these facilities would result in significant economic damages and any damage to the sewerage treatment ponds would have additional environmental consequences.

West Feliciana Parish proposes to stabilize the streambanks of Bayou Sara by constructing two (2) revetment areas along the most vulnerable sections of the bank (Revetment-1 and Revetment-2; Figure 2), utilizing

approximately 22,640 cubic yards (17309.5 m²) of block mats, limestone riprap, and compacted fill. During staging, no improvements to existing access roads are proposed; only clearing vegetation with hand tools. Timber mats will be used for existing access roads within the archaeological site to avoid unforeseen effects to cultural resources. Additionally, the Parish's contractor will not work in overly saturated soils outside the streambed to minimize damage to the adjacent bank line. Temporary roads will be constructed along the top bank of Bayou Sara for the length of both revetment areas and will be accessed by means of the existing roads. In-filling and excavation will occur from within the previously disturbed streambed of Bayou Sarah and from the new temporary access roads along the top bank using excavators, bulldozers, and dump trucks. Design plans for the Bayou Sara Bank Stabilization Project are attached (Attachment 2).

The plans call for the construction of a sheetpile or geotube cofferdam during low water conditions within the streambed (Figure 3). A combination of grading and in-filling will then be used to create a 2:1 slope ratio extending eastwards beyond the present high water mark as shown on Attachment 2. Fill material from existing approved borrow sources will be placed directly on the bank and compacted within the existing channel to match the proposed grade of the top bank (Figure 3). Following in-filling and grading, geo-textile fabric will be placed over the 2:1 sloped area. The portion of the slope below the ordinary high water mark will be armored with riprap, and concrete block mats will be installed above the ordinary high water mark.

Area of Potential Effects (APE)
Based on the design plans submitted by the Applicant, (Attachment 2), FEMA has identified a discontinuous Area of Potential Effects (APE) for both standing structures and archaeology which encompasses a total of 9.09 acres (3.67 ha) as shown in Figure 2. This APE incorporates both direct effects (access, staging, and construction areas) and indirect effects (visual). FEMA requests the Louisiana State Historic Preservation Office (SHPO) and Tribes' review and comment on the APE in accordance with II.C(2) of the 2016 LA Statewide PA.

Identification and Evaluation
Historic Properties within the APE were identified based on FEMA's review of the National Register of Historic Places (NRHP) database, the *Louisiana Cultural Resources Map* provided by SHPO, historic map research, a preliminary archaeological site visit conducted by FEMA Historic Preservation (HP) staff on July 28, 2016, and a Phase I archaeological survey conducted at the request of FEMA in November of 2016 by Coastal Environments, Inc. (CEI; Carpenter and Kelly 2017). This data was evaluated by FEMA using the NRHP Criteria.

Standing Structures
There are no standing structures located within the APE: The APE is not located within a listed or eligible National Register Historic District, nor is the APE located within the view-shed of a property individually listed in the NRHP.

Archaeology
On June 07, 2016, FEMA plotted the latitudes and longitudes of the Bayou Sara Bank Stabilization Project location against the NRHP database, *the Louisiana Cultural Resources Map* provided by SHPO, and historic maps. Based on the results of FEMA's desktop review, FEMA determined that the Bayou Sara Bank Stabilization Project, as proposed, would affect portions of the former village of Bayou Sara. Bayou Sara was first identified through archival research in 1983 by National Park Service (NPS) archaeologists conducting a cultural resources study for the USACE. NPS conducted a site visit and performed limited surface collection. This investigation resulted in the recordation of Archaeological Site 16WF37 (Bayou Sara; Greene et al., 1984). At that time the presumed function of the site was classified as a trading post and town site and no determination regarding the eligibility of Site 16WF37 for inclusion in the NRHP was made.

The village of Bayou Sara was founded by John Mills in 1790 as a trading post and cotton port. In its prime (ca. 1860), it was one of the largest shipping ports between Natchez and New Orleans. Bayou Sara remained an important center of shipping and commerce until it was devastated by a series of floods from 1912-1937 that eventually lead to the abandonment of the town. The 1909 U.S. Geological Survey, *St. Francisville, LA* Quadrangle Map provides a reference to the size of the town of Bayou Sara prior to the series of aforementioned floods. Since abandonment, notable changes to the project site include the construction of a major access road (Ferdinand Street) and the construction of a 210 acre (84.9 ha) casting facility by USACE in the 1960's that now encompasses the majority of the village's former footprint (Figure 4). Currently, a small area of forested land remains between Ferdinand Street and the banks of Bayou Sara that includes the present project area. Bayou Sarah has continued to shift eastwards and has now penetrated beyond the confines of the former ring levee that once protected the town, and an area larger than the size of an entire city block has already been claimed to erosion (also see: Carpenter and Kelly 2017).

A site visit was conducted by FEMA HP staff on July 28, 2016. At the time of this visit no visible intact cultural remains were observed on the surface due to heavy vegetation. However, water levels were extremely low and a thick layer of modern trash, mostly consisting of plastic, was observed in the cut bank profile within the proposed Revetment-1 area (Figure 5). This layer appeared to have been recently exposed and ranged in depth from approximately 25-100 centimeters below surface (cmbs; 9.8-39.3 in) and was observed throughout a major portion of the northern river bend. Severe erosion was also evident in the Revetment-2 area (Figure 6) where the sharply cut bank line could be observed collapsing under its own weight.

During a follow-up site visit on March 15, 2017, FEMA HP staff observed that the cut bank line within the Revetment-2 footprint shown Figure 6 had further retroceded and exposed additional deposits of historic artifacts – see Figures 7 and 8. The modern debris/trash deposits within the Revetment-1 footprint shown in Figure 5 had continued to erode – see Figure 9, and there was severe erosion in the northeastern portion of the Revetment-1 area - see Figure 10.

FEMA's background research indicates that only a portion of the former village of Bayou Sara was included within the recorded boundary of Site 16WF37, and FEMA's July 28, 2016, site visit did not provide enough information to determine the extent and the NRHP eligibility of Site 16WP37. In November of 2016, FEMA contracted Coastal Environments, Inc. (CEI) to conduct a Phase I archaeological survey of the Bayou Sara Bank Stabilization project area. The surveyed area encompassed approximately 8 acres (3.2 ha) and was focused along the entirety of the eastern river bend where the proposed revetment areas will be constructed and three (3) additional staging areas. It also included an area which had been proposed for marine construction staging activities at the riverboat landing located at the end of Ferdinand Street, but is no longer being considered.

The Phase I archaeological survey of the Bayou Sara Bank Stabilization Project consisted of both pedestrian survey and sub-surface testing (Carpenter and Kelly 2017). Pedestrian survey identified historic features and artifacts associated with the former village both at the ground level and within the exposed cut-banks of Bayou Sara throughout the majority of the project area. Feature types identified included historic ceramic and glass concentrations, brick piers, paving, cistern bases, asphalt paving, and remnant portions of the former ring levee that protected the town. Shovel testing also revealed potentially intact sub-surface deposits in both revetment areas (Figure 2). Artifact types recovered dated from the late-eighteenth century through the twentieth century and included historic glass, ceramics, and metal objects. Based on the results of the aforementioned survey, CEI submitted an LA SHPO Site Form Update proposing to increase the boundary of 16WF37 to encompass the entire former extent of the village of Bayou Sarah as is indicated in historic map overlays (Carpenter and Kelly 2017); albeit noting that it is probable a significant portion of the site was destroyed during the construction of the St. Francisville Casting field and portions lost due to continued river erosion. On March 7, 2017, SHPO adopted the proposed site boundary change increasing the total size of the site from 0.98 Acres (0.39 ha) to 122.73 Acres (49.66 ha), encompassing the majority of the Bayou Sara Bank Stabilization APE as

is seen in Figure 2. CEI further advised that the construction of the rock revetments may adversely affect some of these remains and recommended that the site be evaluated for its eligibility for inclusion in the NRHP.

Based on the aforementioned Identification and Evaluation, FEMA has determined that Site 16WF37 (Bayou Sara) is eligible for NRHP under Criterion D for purposes of this Section 106 review.

Copies or Summaries of Views by Consulting Parties and the Public
FEMA is forwarding this letter and the attached documentation to the Governor's Office Of Homeland Security and Emergency Preparedness, West Feliciana Parish Government, and West Feliciana Parish Historical Society and Museum for their review and comments as required by 36 CFR §800.4(d)(1), and we request that these potential consulting parties provide comments within the 30 days provided by the 2016 LA Statewide PA.

FEMA will also post a notice on the Louisiana Department of Culture, Recreation & Tourism website: (http://www.crt.state.la.us/dataprojects/culturalassets/fema106/) describing this undertaking, its effects on historic properties, and FEMA's proposed treatment to mitigate adverse effects for a 15 day comment period.

Assessment of Effects to Historic Properties
The proposed Bayou Sara Bank Stabilization Project includes ground disturbing activities that will affect the historic property in a way that will directly affect the characteristics that make the property eligible for the NRHP and per 36 CFR 800.6, FEMA has determined a finding of **Historic Properties Adversely Affected** for this undertaking and is submitting it to you for your review and comment. As rapid erosion continues to impact significant portions of the project area, including a portion of Site 16WF37, FEMA proposes to expedite the resolution of adverse effects through application of Treatment Measures (TMs) set out in Appendix C of the 2016 LA Statewide PA as described in Attachment 1 of this letter.

Resolution of Adverse Effects
Following Stipulation II.C.5(b) of the 2016 LA Statewide PA, FEMA has requested that West Feliciana Parish Government consider ways to revise the Scope of Work (SOW) to substantially conform to the standards, and/or avoid or minimize adverse effects for National Register listed or eligible traditional cultural properties and/or archaeological properties. A written description of feasible alternatives considered by West Feliciana Government is attached to this letter (Attachment 3). As a result, the proposed Scope of Work for this project was re-examined, and based on hydraulic studies, it was determined that the overall project footprint could be reduced to minimize potential impacts to cultural and wetland resources while also decreasing total project costs. Now only two (2) revetment areas along the most vulnerable sections of the bank are planned rather than the continuous revetment that was originally proposed. Additionally, in an effort to further minimize the construction footprint and potential effects to Site 16WF37, the Applicant has committed to using existing access roads to the maximum extent possible and staging construction activities from within the previously disturbed stream channel as is feasible. However, even with the proposed SOW changes it will still be impossible to avoid adversely effecting those portions of Site 16WF37 contained within the eroding bank.

In accordance with II.C.6(a) of the 2016 LA Statewide PA, Abbreviated Consultation Process, FEMA may propose in writing to the consulting parties to resolve the adverse effects of the undertaking through the application of one or more TMs in Appendix C after taking into consideration the significance of the historic properties affected, the severity of the adverse effect(s) and avoidance or minimization of the adverse effect(s). FEMA has determined that the significance of Site 16WP37 can be documented through archaeological data recovery and agrees with the Applicant's efforts to minimize effects to the site, and FEMA recommends that the adverse effects of the undertaking will be adequately mitigated through implementation of the Treatment Measures IX: Archaeological Research Design and Data Recovery Plan and III: Public Interpretation, in Appendix C as described below:

IX. Archaeological Research Design and Data Recovery Plan

FEMA has developed a draft Research Design for the Bayou Sara Bank Stabilization Project Phase III Archaeological Mitigation (Data Recovery Plan), intended to mitigate the adverse effects to archaeological Site 16WF37. The data recovery plan was developed in accordance with the ACHP's "Recommended Approach for Consultation on Recovery of Significant Information for Archaeological Sites" (http://www.achp.gov/archguide.html) and the Louisiana Division of Archaeology (LDOA) Phase III (data recovery) Investigations Field Standards.

FEMA has attached the proposed Data Recovery Plan to this letter (Attachment 1) and is submitting it to SHPO and Tribes for a 30 day comment period. FEMA will review SHPO and Tribal comments and revise the plan to reflect the comments received. Once comments have been incorporated into the Data Recovery Plan, FEMA will ensure the plan is implemented in accordance with LDOA Phase III (data recovery) Investigations Field Standards and the Secretary of Interior Standards for Archaeological Documentation (www.nps.gov/history/local-law/arch_stnds_7.htm).

Following the successful implementation of the Data Recovery Plan, FEMA's selected archaeological contractor will notify FEMA with an "End of Fieldwork" letter and/or email that demonstrates completion of the collection of data from the field. FEMA will forward the "End of Fieldwork" to consulting parties. Following FEMA's written acknowledgement, the Applicant may proceed with construction.

A. FEMA will implement the Research Design for Archaeological Site 16WF37 (Bayou Sara) Archaeological Mitigation set out in Attachment 1.

B. Building on the previous Phase I results (Carpenter and Kelly 2017), the Research Design is intended to collect data from the archaeological site through the sampling of cultural deposits and the identification and excavation of additional historic features; analyze artifacts; describe the requirements for technical reporting and curation; and include a public education component.

C. The archaeological investigations must be performed by, or under the supervision of, an individual who meets the Professional Standards, as defined below.

   "*Standards*"—shall mean the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (Federal Register 48(190) 1983:44716-44737) and SHPO Division of Archaeology Phase III data recovery and report standards (http://www.crt.state.la.us/cultural-development/archaeology/ section-106/index).

   "*Professional Standards*"—shall mean the Secretary of the Interior's Professional Qualification Standards set out at 48 FR 44716, September 29, 1983, for Archaeology.

D. Following completion of the archaeological fieldwork and analysis, FEMA will consult with West Feliciana Parish to determine what artifacts property owners will donate to the State of Louisiana Department of Culture, Recreation and Tourism – Division of Archaeology.

III. Public Interpretation

Following the completion of fieldwork, FEMA, the GOHSEP, and West Feliciana Parish will consult with SHPO, participating Tribes, and others, as appropriate, to design an educational or public interpretive plan.

Conclusion

FEMA is submitting the data recovery plan and its proposal to address the Adverse Effects of this undertaking through TMs and for your review and comment. FEMA requests your comments within 30 days on:

- FEMA's determination that Site 16WF37 is eligible for inclusion in the NRHP for the purpose of this undertaking;
- FEMA's determination that the Bayou Sara Bank Stabilization Project will result in an Adverse Effect to Historic Properties; and
- FEMA's proposal to address the effects to Site 16WF37 through the TMs IX and III set out in Appendix C of the 2016 LA Statewide PA.

We look forward to your concurrence with FEMA's determinations and the proposed Treatment Measures. Should you have any questions or need additional information, please contact me at (504) 247-7771 or jerame.cramer@fema.dhs.gov, or, Jeremiah Kaplan, Historic Preservation Specialist, at (504) 598-5397 or Jeremiah.Kaplan@fema.dhs.gov.

Sincerely,

JERAME J CRAMER

Digitally signed by JERAME J CRAMER
DN: c=US, o=U.S. Government, ou=Department of Homeland Security, ou=FEMA, ou=People, cn=JERAME J CRAMER, 0.9.2342.19200300.100.1.1=0972893910.FEMA
Date: 2017.04.10 11:10:27 -05'00'

Jeramé J. Cramer
Environmental Liaison Officer
FEMA-DR-1603-LA, FEMA-DR-1607-LA

CC: File
Harry St. Pierre - GOHSEP
Ellen Ibert - GOHSEP

Enclosures

References:

Carpenter, Michael P., and David B. Kelly
2017 Draft Phase I Archaeological Survey of the Bayou Sara Bank Stabilization Project, West Feliciana Parish, Louisiana. Report prepared by Coastal Environments, Inc. for the Federal Emergency Management Agency (FEMA), U.S. Department of Homeland Security, Louisiana Recovery Office, 1500 Main Street, Baton Rouge, Louisiana 70802 (LA DOA Report No. 22-5503).

Greene, Jerome A., A. Berle Clemensen, John C. Paige, David R. Stuart, Lawrence F. Van Horn
1984 Mississippi River Cultural Resources Survey: A Comprehensive Study: Phase I. Report prepared by the Southeast/Southwest Team of the National Park Service for the U.S. Army Corps of Engineers, New Orleans District. New Orleans, Louisiana (LA DOA Report No. 22-5503).

U.S. Geological Survey
1909 *St. Francisville, LA* [Contours]. 1:65,000. 15 Minute Series (Topographic). Reston, VA: USGS. Copy on file, FEMA Historic Preservation, 1500 Main Street, Baton Rouge, LA 70802.

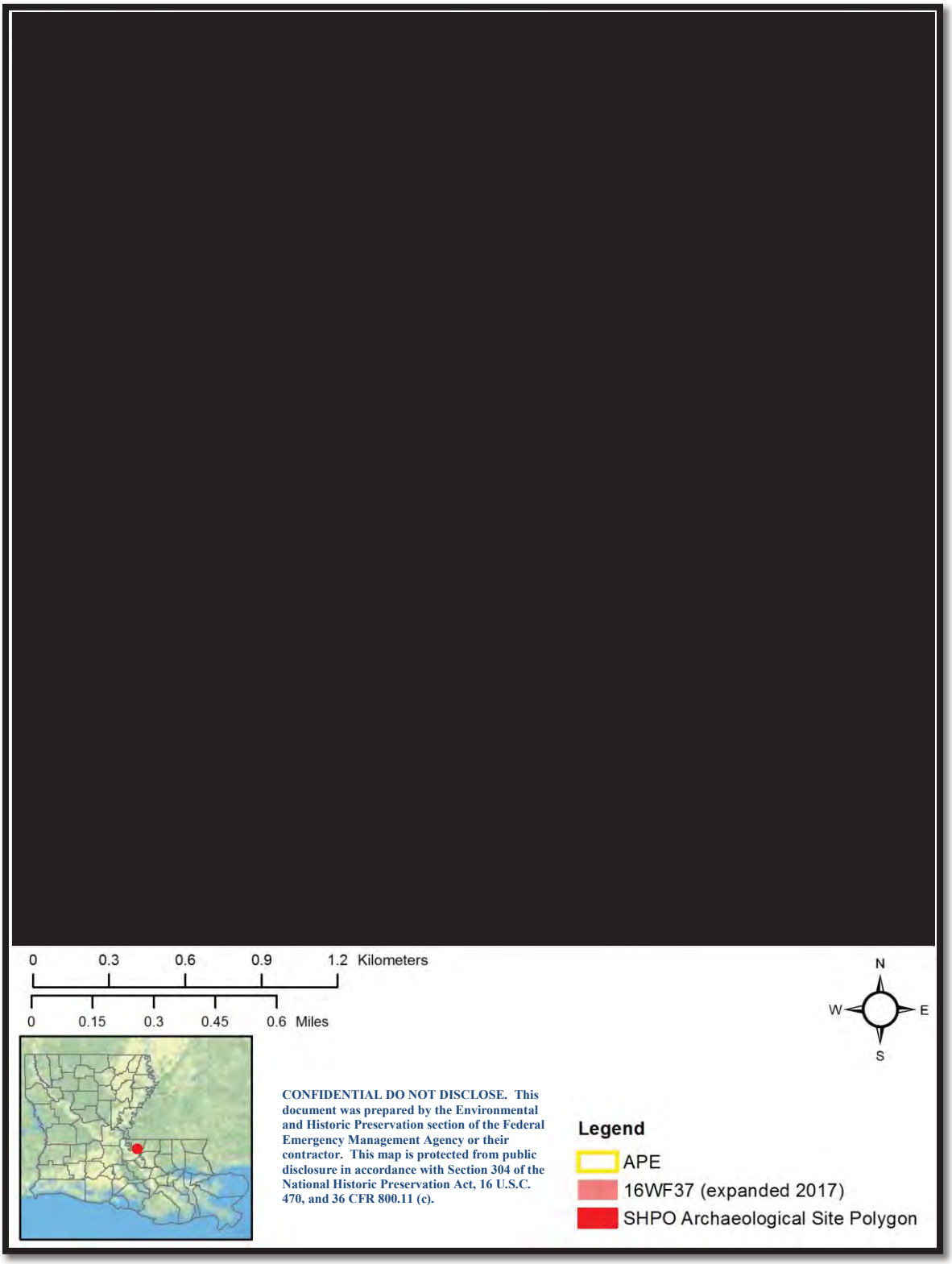

Figure 1. USGS 7.5 Quad map displaying Bayou Sara Bank Stabilization APE with former 16WF37 (1984) and revised (2017) 16WF37 LA SHPO Site Polygon boundaries.

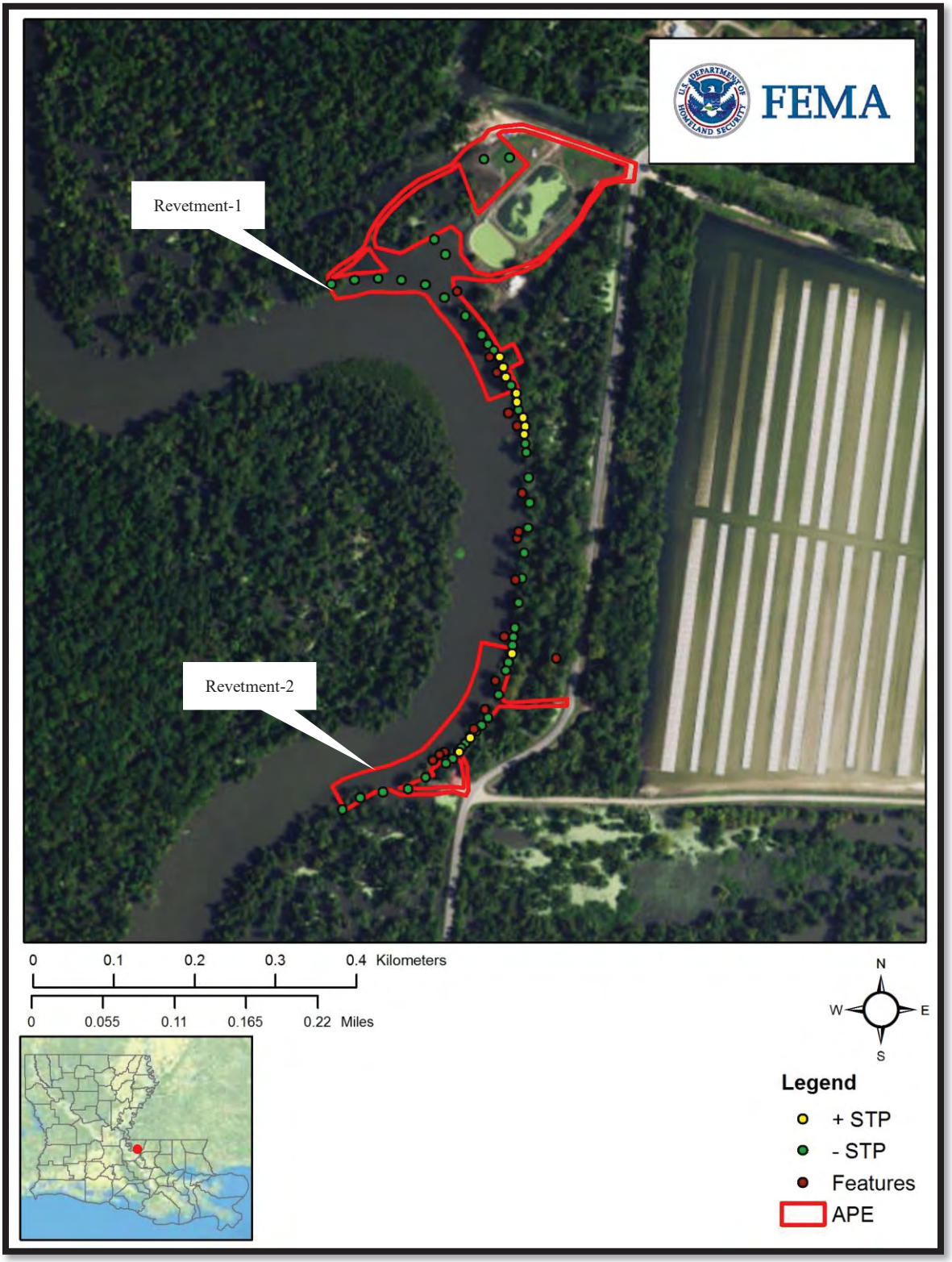

Figure 2. Aerial imagery displaying Bayou Sara Bank Stabilization APE with 2017 CEI testing locations.

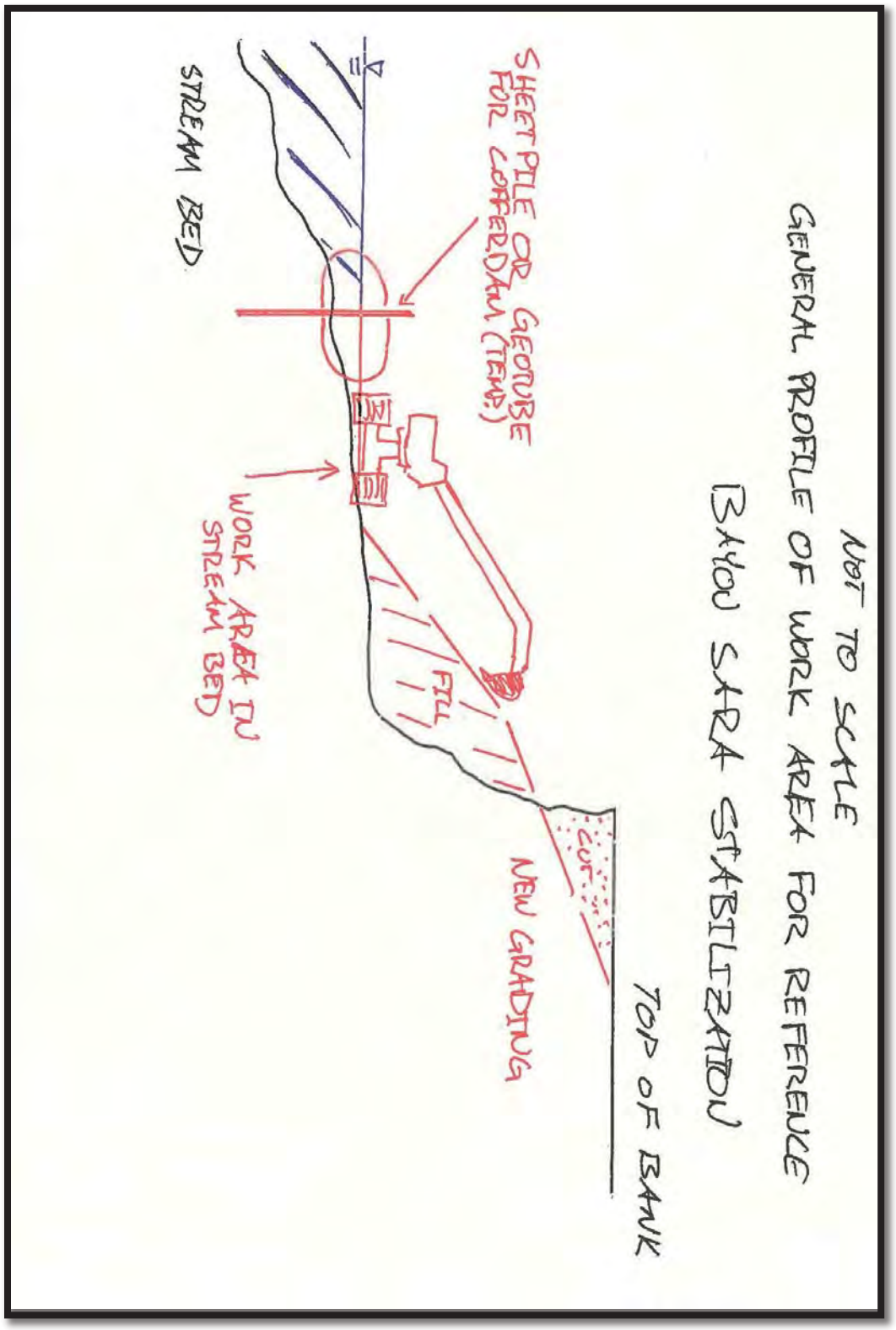

Figure 3. Schematic depicting general profile of work area.

Figure 4. Excerpt from the 1909 U.S. Geological Survey, *St. Francisville, LA* Quadrangle Map with APE location projected.

Figure 5. Revetment-1, facing southeast, displaying modern debris/trash deposit (07/28/2016).

Figure 6. Revetment-2, facing northeast, displaying heavy bank erosion during low water (07/28/2016).

Figure 7. Revetment-2, cut-bank facing northeast, displaying ongoing erosion (03/15/2017)

Figure 8. Revetment-2, facing east, bank profile displaying exposed cultural materials (03/15/2017).

Figure 9. Revetment-1, facing southeast, displaying modern debris/trash deposit (03/15/2017).

Figure 10. Displaying recent erosion, facing east from the northeastern extent of the proposed Revetment-1 area (03/15/2017).

Attachment 1: Research Design for Bayou Sara Bank Stabilization Project Archaeological Mitigation

Potential Research Questions to be Addressed by the Data Recovery of site 16WF37

Building on the previous Phase I results (Carpenter and Kelly 2017), this Research Design is intended to collect data from Site 16WF37 (Bayou Sara) through the sampling of cultural deposits and the identification and excavation of historic features, provide supplemental material culture analysis, and include a public education component.

Site 16WF37 (Bayou Sara) has the potential to contain archaeological deposits associated with periods of historic significance correlating to the following LA SHPO Cultural Units within Management Unit IV (Smith et al. 1983): *Exploration and Colonization* 1541-1803, *Antebellum Louisiana* 1803-1860, *War and Aftermath* 1800-1890, *Industrialization and Modernization* 1890-1940, and continuing up until the early-twentieth century. The subsequent culture historical themes and research goals concerning this region that can potentially be addressed through archaeological Phase III data recovery for the Bayou Sara Bank Stabilization Project have been identified from the *Louisiana Comprehensive Archaeological Plan* (Smith, et al. 1983). Specific themes include: *The Influence of the Mississippi River on Historic Settlement*, *the Development of the Frontier Town*, and *the Steamboat Era*.

Prior to the commencement of field work, FEMA's archaeological contractor will utilize the proposed research questions below and previous archaeological/historical research on Bayou Sara to draft research questions to be addressed in the Phase III fieldwork and submit them to FEMA for review. FEMA will forward the proposed research questions to the consulting parties and provide a five (5) business day review. FEMA will provide the contractor any comments to the research questions so they may be revised appropriately. Additional research goals may be developed if Phase III excavations yield data that is not presently addressed in the research themes.

The former town of Bayou Sara was founded by John Mills in 1790 as a trading post and rapidly became a thriving river port. In its prime, it was one of the largest shipping ports between Natchez and New Orleans prior to 1860. As such, Site 16WF37 provides a unique opportunity to study the development of riverine trading posts in Louisiana beginning near the terminus of the *Exploration and Colonization* 1541-1803 LA SHPO thematic period and continuing up until the early-twentieth century. Examples of research question could include, but are not limited to, the following:

- Did different modes of transportation change the availability of commercial goods? If so, what type of commodities were available and what was the origin of those goods and building materials?
- What percentage of foodstuffs was being produced and consumed locally versus those being exported and imported through river trade?
- Did access to different modes of transportation influence the physical layout of the village of Bayou Sara (e.g., flatboat, steamboat, and railroad)? If so, what type of commodities were available and what was the origin of those goods (local vs. non-local)?
- Is there any evidence of the role Native Americans with the Bayou Sara community? What was the relationship between with Indian Cultures and settlers?
- What can be learned from comparing/contrasting Bayou Sara with other historically significant trading post communities? As is feasible, data recovered should be used to facilitate broad comparisons with other early commerce centers in different regions (e.g., colonial Canada and eastern colonial America) that relied on similar/different modes of transportation.

Treatment Measure IX: Archaeological Research Design and Data Recovery Plan:

The Area of Potential Effects (APE) for archaeology is based on the design plans submitted by the Applicant (See HMGP-1603-00436 AE Consultation Letter: Attachment 2) and measures 9.09 acres (3.67 ha). The Archaeological APE incorporates all access, staging, and construction areas necessary to execute this project. Within the APE, archaeological Phase III mitigation will be focused within the footprints of two (2) proposed revetment areas along the most vulnerable sections of the bank (FOCUS AREA-1 and FOCUS AREA-2; Figure 2). Both revetments will be constructed of block mats, limestone riprap, and compacted fill and include temporary roads that will be constructed along the top bank of Bayou Sara for the length of both revetment areas and will be accessed by means of existing roads.

FOCUS AREA-1

FOCUS AREA-1 (Figure 2) measures approximately 1.99 acres (0.80 ha) and is located in the northern portion of the project area. A Phase I Survey was conducted throughout the entirety of FOCUS AREA-1 in November of 2016 by Coastal Environments, Inc. (CEI; Carpenter and Kelly 2017). A total of 14 shovel test pits were excavated within this area. Generally, shovel testing revealed a buried "A" horizon overlain by approximately 25-30 centimeters (9.8-11.8 in) of more recent flood deposits. Positive STPs (n = 3) were confined to the southern-most portion of this area and contained a mix of materials including pieces of bottle glass, brick, and a sherd of blue transfer printed whiteware. Additionally, in the central portion of FOCUS AREA-1, pedestrian survey identified a remnant (i.e., not in-situ) steam engine or boiler foundation likely associated with the former Bayou Sara Lumber Company mill, and remnant portions of the former Sun Street (asphalt and gravel) could be observed in the cut-bank of Bayou Sarah.

FOCUS AREA-2

FOCUS AREA-2 (Figure 2) measures approximately 2.26 acres (0.91 ha) and is located in the southern portion of the project area. A Phase I Survey was conducted throughout the entirety of FOCUS AREA-2 in November of 2016 by Coastal Environments, Inc. (CEI; Carpenter and Kelly 2017). A total of 18 shovel test pits were excavated within FOCUS AREA-2. Positive STPs (n = 3) were identified both within the northern and central portions of FOCUS AREA-2 and contained a mix of materials including pieces of coal, brick fragments, unidentified ferrous iron, glass, and salt-glazed stoneware. Soil stratigraphy in FOCUS AREA-2 is similar to that of FOCUS AREA-1 (see above). Additionally, in the northern portion of FOCUS AREA-2 pedestrian survey identified brick piers, paving, and rubble concentrations, a possible gravel road, and buried historic ceramic concentrations in the cut-bank of Bayou Sara.

Archaeological Mitigation:

Archaeological investigation will be aimed at controlled sampling of cultural deposits, the identification and excavation of historic features, determining the integrity and significance of any such archaeological deposits and/or features, and to provide site mapping that can be used by others to facilitate future research planning and site treatment measures for 16WF37. To the maximum extent possible, all test units will be placed where intact cultural deposits were identified during the Phase I archaeological survey and/or where available historic maps indicate that subsurface features such are likely to be located. FEMA proposes that a minimum of four (4), and a maximum of six (6), hand–excavated 1 x 1 meter (3.2 x 3.2 ft) test units be excavated to mitigate the potential effects of the proposed undertaking. A minimum of one (1) test unit will be excavated within each focus area (or may use larger excavation blocks if required to reach deeply buried deposits). The placement of all remaining test units will fall within the confines of FOCUS AREA-1 and FOCUS AREA-2 and will be left to the discretion of the supervisory project archaeologist as is warranted. Furthermore, utilizing map data collected during the previous Phase I survey (Carpenter and Kelly 2017), FEMA's contractor will produce a detailed site map that includes all features within, and in reasonably close proximity, to the Archaeological APE. A 7.5 USGS map of the undertaking location is presented in Figure 1 and a map depicting the Archaeological APE and both Focus

Areas is included as Figure 2. The excavation of all test units specified within this research design will adhere to the sampling strategy outlined in the Field Methodology section described below.

Field Methodology

Fieldwork will consist of the hand-excavation of 1 x 1 meter (3.2 x 3.2 ft) test units and detailed site mapping.

Test Units

Test units should be excavated as per the Standards and should be used to recover detailed stratigraphic information, collect provenienced artifact samples, and investigate any cultural features identified.

There is potential that deeply buried strata exist that have not yet been identified within Site 16WF37 that have the potential to yield deposits dating as early as the *Exploration and Colonization* 1541-1803 LA SHPO Management Unit (Smith et al. 1983). If such deposits exist within Site 16WF37 they would likely be contained within these deeply buried strata. All units should extend to a minimum of 20 cm (7.8-in) into culturally sterile sub-soil. Excavation should proceed by 5 to 10 cm levels (1.9-3.9 in) within the natural stratigraphy. In the absence of observable stratigraphy excavation should be proceed using 5 cm or 10 cm (1.9-3.9 in) arbitrary levels. All excavated soils will be minimally screened through ¼ mesh. If cultural features are identified, then each must be mapped in plan-view, photographed, and then bisected and screened. Additionally a minimum of three (3) liters of soil should be taken from non-structural feature and/or midden fill for subsequent flotation and macro-botanical recovery and analysis. Flotation samples from large features such as privies should consist of five (5) to ten liters of feature matrix; however, if a feature is composed of less than three (3) liters of matrix fill, then all fill from that feature should be collected for flotation. Following bisection, each feature must be profiled and photographed in conjunction with a scale, north arrow, and photo board at the time of excavation. Each feature recorded must also be addressed in the technical report. Recordation of each test unit must be conducted according to the Standards. Additionally, the location of each test unit must be mapped and included in the technical report and the site map.

Standards and Reporting

Within 72 hours of completing fieldwork, the contractor will send/email a written notice to FEMA summarizing their findings – 'End of Fieldwork' notification. FEMA will forward this notification to consulting parties.

Field work will be carried out following the Louisiana Division of Archaeology's Phase III Standards (http://www.crt.state.la.us/archaeology/intro106.aspx) as well as the ACHP's "Recommended Approach for Consultation on Recovery of Significant Information for Archaeological Sites," (http://www.achp.gov/archguide.html).

Following completion of the fieldwork, all results will be presented in a report format that meets the Division of Archaeology's Phase III Reporting Standards and the Secretary of Interior Standards for Archaeological Documentation (www.nps.gov/history/locallaw/arch_stnds_7.htm).

A draft report will be produced at the end of fieldwork. FEMA will forward two (2) hard copies and one (1) digital to SHPO and a digital copy to all other consulting parties for a thirty day review. A final report incorporating the consulting parties' comments will be submitted to SHPO and consulting parties. FEMA's archaeological contractor will also submit a site update form that reports the results of the data recovery project to the Division of Archaeology. Following completion of all analysis and the acceptance of the final report, records, photographs, field notes, and those artifacts not requested by property owners will be curated with:

State of Louisiana Department of Culture, Recreation and Tourism – Division of Archaeology
P.O. Box 44247
Baton Rouge, LA 70804-4247
(225) 342-8170
In the curation facility at:
Galvez Building, Room B-023
602 N. Fifth St.
Baton Rouge, LA 70802
(225) 342-4475

Treatment Measure III: Public Interpretation

FEMA has requested West Feliciana Parish's input to identify possible public outreach options and any existing resources that the Parish feels would be effective avenues to present 16WF37 to the public. West Feliciana Parish has expressed interest in working with the West Feliciana Parish Historical Society and Museum to develop and distribute educational material regarding the former town of Bayou Sara and the results of data recovery efforts at Site 16WF37. FEMA agrees that this is an appropriate approach to public outreach and that the educational material (e.g., a pamphlet, booklet, or web page) developed in coordination with SHPO, Tribes, the Parish, the West Feliciana Parish Historical Society and Museum, and any other appropriate party that has the potential to contribute to the overall understanding of the history of Bayou Sarah (16WF37) and West Feliciana Parish. Therefore, in partial fulfillment of the TMs for the Bayou Sarah Bank Stabilization project, FEMA will produce educational material regarding 16WF37. This may include unrestricted use and distribution of educational materials to the West Feliciana Parish Government, the West Feliciana Parish Historical Society and Museum, and other consulting parties.

Within six months of the completion of the draft archaeological report, FEMA will consult with SHPO, Tribes, the GOHSEP, West Feliciana Parish, and the West Feliciana Parish Historical Society to develop, produce, and distribute public outreach materials as required under Treatment Measure III: Public Interpretation.

References:

Carpenter, Michael P., and David B. Kelly
2017 Draft Phase I Archaeological Survey of the Bayou Sara Bank Stabilization Project, West Feliciana Parish, Louisiana. Report prepared by Coastal Environments, Inc. for the Federal Emergency Management Agency (FEMA), U.S. Department of Homeland Security, Louisiana Recovery Office, 1500 Main Street, Baton Rouge, Louisiana 70802 (LA DOA Report No. 22-5503).

Greene, Jerome A., A. Berle Clemensen, John C. Paige, David R. Stuart, Lawrence F. Van Horn
1984 Mississippi River Cultural Resources Survey: A Comprehensive Study: Phase I. Report prepared by the Southeast/Southwest Team of the National Park Service for the U.S. Army Corps of Engineers, New Orleans District. New Orleans, Louisiana (LA DOA Report No. 22-5503).

Smith, Steven D., Phillip G. Rivet, Kathleen M. Byrd and Nancy W. Hawkins
1983 *Louisiana's Comprehensive Archaeological Plan*. State of Louisiana Department of Culture, Recreation and Tourism, Office of Cultural Development, Division of Archaeology, Baton Rouge, Louisiana.

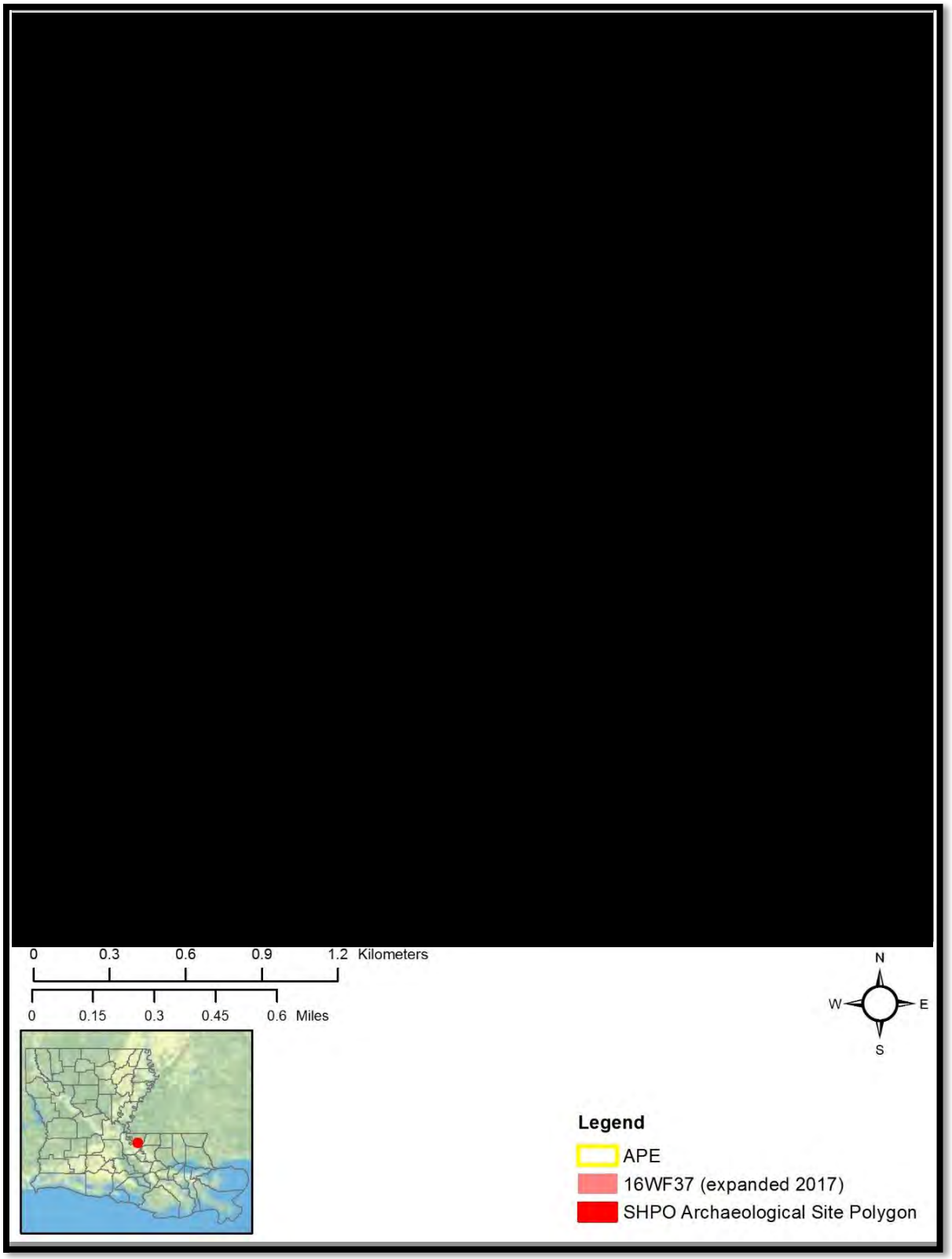

Figure 1. USGS 7.5 Quad map displaying Bayou Sara Bank Stabilization APE with former 16WF37 (1984) and revised (2017) 16WF37 LA SHPO Site Polygon boundaries.

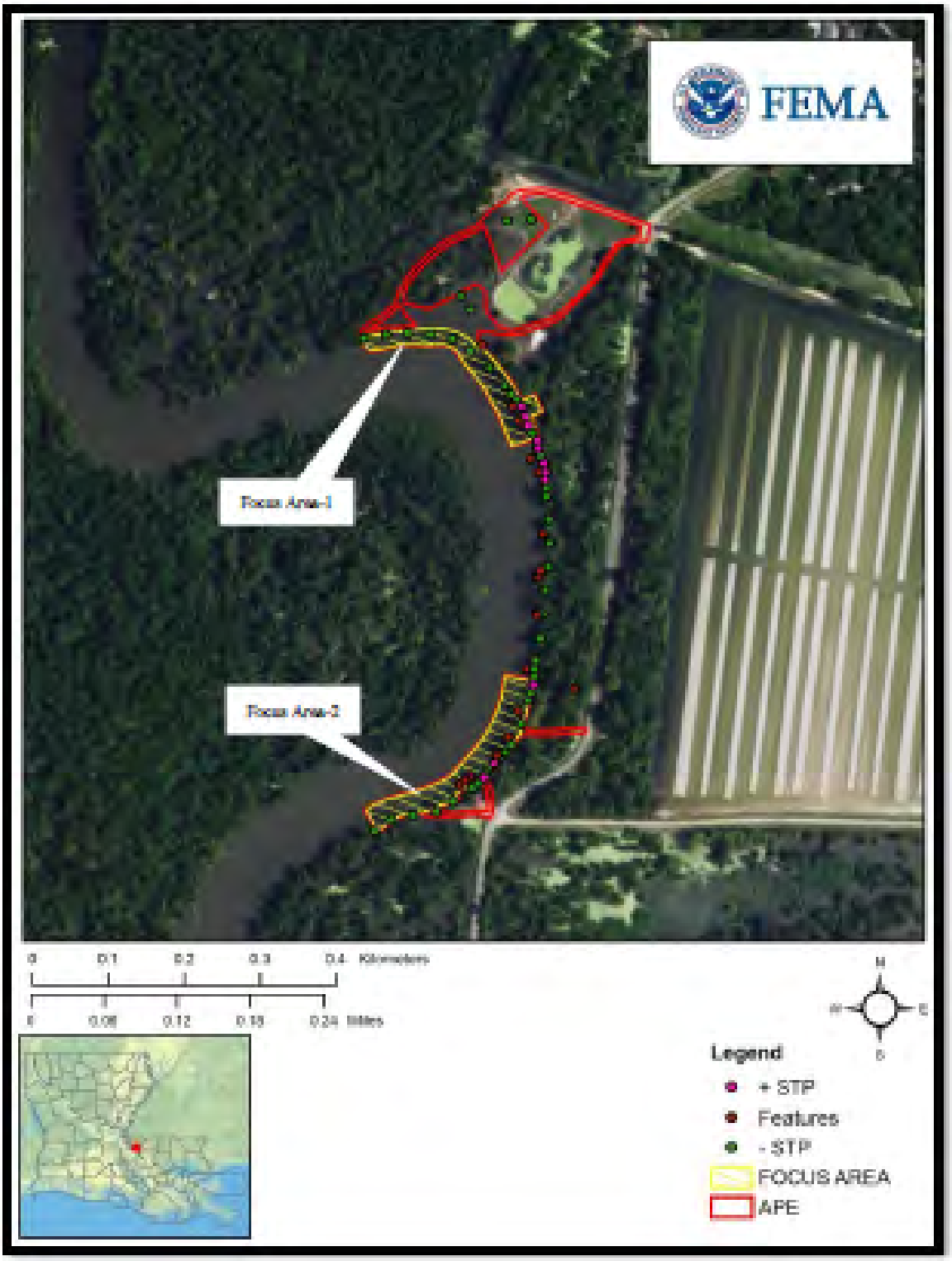

Figure 2. Aerial imagery displaying Bayou Sara Bank Stabilization Archaeological APE, FOCUS AREA locations, and 2017 CEI Phase I testing locations/recorded features.

BILLY NUNGESSER
LIEUTENANT GOVERNOR

State of Louisiana
OFFICE OF THE LIEUTENANT GOVERNOR
DEPARTMENT OF CULTURE, RECREATION & TOURISM
OFFICE OF CULTURAL DEVELOPMENT
DIVISION OF ARCHAEOLOGY

RENNIE S. BURAS, II
DEPUTY SECRETARY

May 8, 2017

Mr. Jeramé J. Cramer
Environmental Liaison Officer
FEMA-DR-1603-LA, FEMA-DR-1607-LA
FEMA Louisiana Recovery Office
1500 Main Street
Baton Rouge, LA 70802

RE: Section 106 Review Consultation, Hurricane Katrina, FEMA-DR-1603--LA
Applicant: West Feliciana Parish
Undertaking: Bayou Sara Bank Stabilization Project, West Feliciana Parish, Louisiana (HMGP# 1603-0436)
Determination: Adverse Effect to Historic Properties

Dear Mr. Cramer:

This is in response to your letter dated April 10, 2017, concerning the above-referenced project. We concur with your recommendation to treat 16WF37 as eligible for listing on the National Register of Historic Places, and concur that the proposed undertaking will have an adverse effect. We have reviewed the enclosed archaeological research design and data recovery plan. We agree with the field methodology. Furthermore, we look forward to working with FEMA and other parties to develop an educational or public interpretive plan.

If you have any questions, please do not hesitate to contact Rachel Watson in the Division of Archaeology at (225) 342-8165 or rwatson@crt.la.gov.

Sincerely,

Kristin P. Sanders

Kristin Sanders
Deputy State Historic Preservation Officer

Seeking Public Comment NHPA/NEPA
West Feliciana Parish
Bayou Sara Bank Stabilization Project
Near St. Francisville, West Feliciana Parish, LA

West Feliciana Parish has requested FEMA funding from the 404 Hazard Mitigation Grant Program (HMGP) to stabilize two section of streambank along Bayou Sara near its confluence with the Mississippi River. Severe erosion of the streambank threatens the Town of St. Francisville's Wastewater Treatment facility; pond levees; and St. Ferdinand Street, the Parish's only access road to the Mississippi River. Ferdinand Street is vital to the Parish economy for its riverboat revenue, tourism, and the U.S. Army Corps of Engineers access to the St. Francisville Casting field. The streambank has eroded to within 160 feet (48.7 m) of the roadway, in close proximity to the pond levees that protect the Parish's wastewater treatment facility. If left unchecked, the road and treatment ponds will become more vulnerable to washout and loss of function. Loss of these facilities would result in significant economic damages, and damage to the sewerage treatment ponds would have environmental consequences.

Federal regulations require FEMA, as funding agency, to identify if any of the properties are historic properties (listed in or eligible for listing in the National Register of Historic Places - NRHP); to assess the effects the project will have on historic properties; to seek ways to avoid, minimize, or mitigate any adverse effects to historic properties; and to evaluate the proposed action's potential for significant impacts to the human and natural environment.

Cut bank at Bayou Sara facing northeast, showing the ongoing erosion. FEMA

FEMA has determined that these activities will adversely affect the site of the village of Bayou Sara, founded in 1790 as a trading post and cotton port. It was one of the largest shipping ports between Natchez and New Orleans. Bayou Sara remained an important center of shipping and commerce until it was abandoned following a series of floods from 1912-1937. FEMA proposes to mitigate the adverse effects through Treatment Measures, Archaeological Research Design and Data Recovery Plan and Public Interpretation, included in the 2016 Statewide Programmatic Agreement among FEMA, the Louisiana State Historic Preservation Officer, the Governor's Office of Homeland Security and Emergency Preparedness, and participating Tribes. Any member of the public is encouraged to provide views on how the project may affect historic properties and ways that these effects may be avoided, minimized, or mitigated.

FEMA requests comments from any member of the public by ***April 27, 2017.***
Comments can be posted at: http://www.crt.state.la.us/culturalassets/fema106/
Or mailed to: FEMA Mail Center/Historic Preservation
1500 Main Street
Baton Rouge, LA 70802
Post your comments soon – all comments must be posted or postmarked by ***April 27, 2017****.*

Caused by the high winds and heavy rains of Hurricanes Katrina and the subsequent widespread flooding damaged many buildings in Orleans Parish, LA. In the aftermath of the hurricane, the FEMA is issuing this public notice as part of its responsibilities under the Advisory Council on Historic Preservation's regulations, 36 CFR Part 800, implementing Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA). This notice applies to activities carried out by the Public Assistance (PA) program implemented under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C.§§5152-5206.

FEMA Seeking Public Comment - West Feliciana

http://wfparish.org/news/2017/4/fema-seeking-public-comment

Seeking Public Comment NHPA/NEPA1 West Feliciana Parish
Bayou Sara Bank Stabilization Project
Near St. Francisville, West Feliciana Parish, LA

West Feliciana Parish has requested FEMA funding from the 404 Hazard Mitigation Grant Program (HMGP) to stabilize two section of streambank along Bayou Sara near its confluence with the Mississippi River. Severe erosion of the streambank threatens the Town of St. Francisville's Wastewater Treatment facility; pond levees; and St. Ferdinand Street, the Parish's only access road to the Mississippi River. Ferdinand Street is vital to the Parish economy for its riverboat revenue, tourism, and the U.S. Army Corps of Engineers access to the St. Francisville Casting field. The streambank has eroded to within 160 feet (48.7 m) of the roadway, in close proximity to the pond levees that protect the Parish's wastewater treatment facility. If left unchecked, the road and treatment ponds will become more vulnerable to washout and loss of function. Loss of these facilities would result in significant economic damages, and damage to the sewerage treatment ponds would have environmental consequences.

Federal regulations require FEMA, as funding agency, to identify if any of the properties are historic properties (listed in or eligible for listing in the National Register of Historic Places - NRHP); to assess the effects the project will have on historic properties; to seek ways to avoid, minimize, or mitigate any adverse effects to historic properties; and to evaluate the proposed action's potential for significant impacts to the human and natural environment.

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FEMA requests comments from any member of the public by April 27, 2017.
Comments can be posted at: (http://www.crt.state.la.us/culturalassets/fema106/)
Or mailed to: FEMA Mail Center/Historic Preservation 1500 Main Street
Baton Rouge, LA 70802
Post your comments soon – all comments must be posted or postmarked by April 27,

2017.

1 Caused by the high winds and heavy rains of Hurricanes Katrina and the subsequent widespread flooding damaged many buildings in Orleans Parish, LA. In the aftermath of the hurricane, the FEMA is issuing this public notice as part of its responsibilities under the Advisory Council on Historic Preservation's regulations, 36 CFR Part 800, implementing Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA). This notice applies to activities carried out by the Public Assistance (PA) program implemented under the authority of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C.§§5152-5206.

Cut bank at Bayou Sara facing northeast, showing the ongoing erosion. FEMA

Access Permits & Inspections Portal (http://www.mypermitnow.org)

View Documents (http://wfparish.org/view/documents)

Watch Meetings (http://new.livestream.com/live70775)

Request Citizens Service (https://westfelicianaparish.formstack.com/forms/csr)

Find Events (http://wfhttp://wfparish.org/view/events0

Tourism Information (http://stfrancisville.us/)

Subscribe to our Newsletter (http://visitor.r20.constantcontact.com/d.jsp?llr=tnsdl6pab&p=oi&m=1116602485171&sit=yjpifgrib&f=ed687b18-208e-487f-bc20-247eed8d1c18)

Contact (http://wfparish.org/i-want-to/contact)

Appendix E

Biological Resources and Wetlands Findings Report

ARCADIS Design & Consultancy for natural and built assets

WEST FELICIANA PARISH

BIOLOGICAL RESOURCES AND WETLAND FINDINGS REPORT

Bayou Sara Streambank Stabilization
West Feliciana Parish, Louisiana
HMGP Project No. 1603-125-003

March 20, 2017

BIOLOGICAL RESOURCES AND WETLAND FINDINGS REPORT

Bayou Sara Streambank Stabilization
West Feliciana Parish, Louisiana
HMGP Project No. 1603-125-0003

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Project Ecologist

Mike Schulze
Project Scientist

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West Feliciana Parish Department of Public Works

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Our Ref.:

LA003333.0001

Date:

March 20, 2017

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CONTENTS

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FIGURES

PERMIT DRAWINGS

APPENDICES

1 INTRODUCTION

West Feliciana Parish is located between Baton Rouge, Louisiana, and Natchez, Mississippi, with its main corridors being U.S. Highway 61 (north-south) and Louisiana Highway 10 (east-west). The Parish is bordered by the Mississippi River from the northwestern corner to the southern side. The Parish is currently being impacted by one of the river's tributaries, Bayou Sara, which is eroding the streambanks near its confluence with the Mississippi River. Construction of the proposed project to mitigate erosion by stabilizing the streambank will take place within the identified Study Area (Figure 1) comprising approximately 3,600 feet along Bayou Sara, in which severe erosion is impacting the Town of St. Francisville's Wastewater Treatment Facility, pond levees, and the Parish's only access road (Ferdinand Street) to the Mississippi River. Ferdinand Street is vital to the Parish economy for its riverboat revenue, tourism, and the U.S. Army Corps of Engineers (USACE) access to the 210-acre Casting Field. The USACE uses Ferdinand Street for access to their Casting Field, where artificial bank materials for the Mississippi River are produced.

Stabilizing the streambank, which has eroded over the past 20 years, at the proposed project site will mitigate the threat of losing access to the Town of St. Francisville's Wastewater Treatment Facility Ponds, as well as access to the river via Ferdinand Street. The streambank degradation has eroded to within 160 feet of the roadway and has migrated in proximity to the pond levees that protect the Wastewater Treatment Facility. The downstream limits of the proposed project are approximately 1,200 feet from the confluence of Bayou Sara and the Mississippi River.

Arcadis U.S., Inc. (Arcadis) performed a study to delineate and evaluate the general quality of wetlands within the Study Area as part of the Bayou Sara Streambank Stabilization project.

2 STUDY AREA

The Study Area comprises approximately 3,600 feet along Bayou Sara, a tributary to the Mississippi River located in West Feliciana Parish, Louisiana. The Study Area is bounded by Bayou Sara on the west and the Town of St. Francisville's Wastewater Treatment Facility to the north. The Study Area was further defined by access roads, staging areas, and an excess cut placement area for the proposed project.

3 STUDY AREA CHARACTERISTICS

West Feliciana Parish is 426 square miles in size, of which 23 square miles are water, and is located along the meander of the Mississippi River. Bayou Sara empties into the Mississippi River at St. Francisville. In the late 1600s, the town of Bayou Sara was established as a river port and became a bustling port town throughout the 1800s. The Bayou originates near the Mississippi state line in the vicinity of Lake Rosemound and flows southward through the Tunica Swamp before reaching the Mississippi River. Bayou Sara currently serves as a recreational location for fishing, hiking, and canoeing with privately owned land housing homes and camps. The Study Area lies within the south-central region of the Mississippi River Delta Plain (Daigle, et. al. 2006) and the Mississippi Alluvial Plain Section, in the western portion of the Parish.

Elevations within West Feliciana Parish range from approximately 30 to 360 feet above mean sea level along the Mississippi River and approximately 38 feet along Bayou Sara near its confluence with the

Mississippi River. West Feliciana Parish is located within a portion of two watersheds: Bayou-Sara Thompson and Lower Mississippi-Baton Rouge. The Study Area is located within the West Central Louisiana Coastal watershed - U.S. Geological Survey [USGS] hydrologic unit code 08070100 (USGS 2016).

4 METHODOLOGY

4.1 Biological and Ecological

Section 7 of the Endangered Species Act of 1973 (as amended) requires that federal agencies ensure any action authorized, funded, or carried out by that agency is not likely to adversely impact threatened or endangered species or result in destruction of critical habitat. A review of the Louisiana Department of Wildlife and Fisheries (LDWF), Louisiana Natural Heritage Program (LNHP; LDWF 2016a, b) database was conducted for the Study Area as well as a review of the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) database for West Feliciana Parish.

Arcadis scientists conducted a site visit on October 27, 2016. The biological team consisted of Mike Schulze and Jason Morrell. The team reviewed species descriptions prior to the field survey to identify suitable habitat for target species provided in the LDWF rare species fact sheet (LDWF 2016a). The Study Area was then assessed for protected species habitat suitability.

4.2 Wetlands and Surface Waters

Wetlands are defined by the U.S. Environmental Protection Agency and USACE as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (40 Code of Federal Regulations [CFR] Subpart 230.3 and 33 CFR Subpart 328.3). Any action that proposes to place dredge or fill materials into wetlands and other waters of the U.S. is regulated by the USACE.

Potential wetland areas were initially identified using the USGS Saint Francisville, Louisiana, 1998 quadrangle map (Figure 2); USFWS online National Wetland Inventory (NWI) wetland mapping tool (2016); USDA/NRCS Custom Soil Resource Report for West Feliciana Parish, Louisiana (2007); Google Earth images, and other available data. This information was used to locate known surface waters and wetlands occurring within the Study Area and to locate areas with the potential for containing jurisdictional wetlands and other waters of the U.S.

All wetlands identified within the Study Area were evaluated in accordance with Executive Order 11990, Protection of Wetlands (1977), and the technical guidelines and methods for wetland delineations as set forth in the USACE Wetland Delineation Manual (1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region Wetland Delineation Manual (2010).

The wetland delineation was performed on October 27, 2016. Each wetland site was documented with photographs and field notes, and boundaries were located using a Trimble Geo 7X global positioning system unit with an external Trimble Zephyr Model 2 antennae. Observations of vegetation, hydrology, soils, and other visible wetland indicators were recorded on Wetland Determination Forms – Atlantic and

Gulf Coastal Plain Region (Appendix A). Nomenclature and indicator status on the data sheets and in this report follow the updated National Wetlands Plant List for the Atlantic and Gulf Coastal Plain (Lichvar et al. 2016), which was also consulted for plant identification purposes.

5 DATA AND DESKTOP SURVEY FINDINGS

The wooded area to the west of the Town of St. Francisville Wastewater Treatment Ponds is mapped as Palustrine Scrub Shrub on the USFWS NWI maps. No other areas within the Study Area are mapped as wetlands on the NWI maps.

Soils within the Study Area are mapped by NRCS as Morganfield and Bigbee soils, frequently flooded (Table 1). Morganfield soils are located on floodplains, consist of silt loam, and are classified as well drained. Bigbee soils are located on terraces, consist of loamy sand to sand, and are classified as excessively drained. The Morganfield and Bigbee soils, frequently flooded map unit is classified by the NRCS as hydric (Appendix B).

Table 1. Study Area Soils

Soil Symbol	Soil Name	Hydric
MB	Morganfield and Bigbee soils, frequently flooded	Yes, Depressions

Source: USGS 2017.

An LNHP database query for rare animals, plants, and natural communities that exist within West Feliciana Parish returned three results: the pallid sturgeon (*Scaphirhynchus albus*) and interior least tern *Sternula antillarum athalassos*) are designated as federally endangered; and the Louisiana black bear (*Ursus americanus luteolus*) has been delisted due to recovery. The USFWS IPaC tool was also used to determine if any species of concern occur within West Feliciana Parish that were not included within the LNHP query results. The IPaC list contains no additional federally listed species that are likely to occur within West Feliciana Parish. Table 2 lists the threatened and endangered species known to occur within West Feliciana Parish and their status.

Table 2. State and Federally Protected Species within West Feliciana Parish, Louisiana

Common Name	Scientific Name	State Status	Federal Status
Pallid Sturgeon	*Scaphirhynchus albus*	Endangered	Endangered
Louisiana Black Bear	*Ursus americanus luteolus*	Recovery	Delisted
Interior Least Tern	*Sternula antillarum athalassos*	Endangered	Endangered

Source: LNHP list of rare and threatened species in West Feliciana Parish, LA (November 2016; Appendix C) and USFWS IPaC query for West Feliciana Parish, LA (November 2016; Appendix C).

The pallid sturgeon (*Scaphirhynchus albus*) is a bottom-dwelling, slow-growing fish that exists in the Mississippi River below the confluence of the Missouri River. Because this species exists predominantly along the bottom depths of the river and not within the confines of the shallower Study Area of Bayou Sara, a biological determination of “no effect” is recommended for the pallid sturgeon.

The Louisiana black bear (*Ursus americanus luteolus)* was delisted from the Lists of Threatened and Endangered Wildlife under the Endangered Species Act in March of 2016 due to recovery. The habitat of the Louisiana black bear typically remains in deeply wooded areas unaffected by human encroachment.

Because of the Study Area's proximity to Ferdinand Street, the Town of St. Francisville Wastewater Treatment Facilities, and the Mississippi River's landing for the town of St. Francisville, where unloading and boarding of tourists on the American Queen Riverboat occur, human activity and road traffic likely deter bear usage of the area as foraging habitat. Most of the proposed project will take place within the banks of Bayou Sara, with terrestrial impacts limited to temporary access roads and staging areas. A small portion (0.09 acre) of bottomland hardwoods would be impacted by the proposed project. No black bear den trees (visible cavities in trees that have a diameter at breast height ≥36 inches) were noted within the proposed revetment footprint. Therefore, a biological determination of "may affect, but not likely to adversely affect" is recommended for the Louisiana black bear.

Least terns (*Sternula antillarum athalassos*) nest on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, lake and reservoir shorelines, and occasionally gravel rooftops. They hover over and dive into standing or flowing water to catch small fish. No barren sandbars suitable for nesting habitat was observed in the Study Area; however, Bayou Sara could represent foraging habit for least terns. Most of the proposed project will take place within the banks of Bayou Sara. A biological determination of "may affect, but not likely to adversely affect" is recommended for the least tern because of the presence of adjacent suitable habitat.

The National Oceanic and Atmospheric Administration (NOAA) essential fish habitat (EFH) mapping tool was used to determine if EFH would be impacted by the proposed project. Based on the tool, EFH is typically designated within coastal waters or within the Gulf of Mexico. Therefore, the proposed project will not impact EFH (NOAA 2016).

6 FINDINGS

6.1 Biological and Ecological

During the site visit, the field team observed suitable foraging habitat for the least tern and black bear. No federally listed species, nesting habitat, or critical habitat would be impacted by the proposed project. The project "may affect, but not likely to adversely affect" the black bear and least tern. A biological determination of "no effect" is recommended for the pallid sturgeon. No secondary impacts to state species of special concern would be anticipated from construction of the proposed improvements. The bottomland hardwoods along Ferdinand Street could be foraging habitat for the black bear, but no suitable den trees were observed within the proposed revetment footprint.

6.2 Wetlands and Streams

Waters of the U.S. identified within the Study Area include two perennial streams and two wetland areas. These waters are described below and listed in Tables 3 and 4. Wetland determination forms for each wetland and upland data point are included in Appendix A. A photographic log is provided in Appendix C.

Table 3. Potential Wetland Impacts

Resource	Latitude	Longitude	Cowardin Classification	Acres	Total Fill Area Within Project Limits (acre)	Total Fill Within Wetlands (cubic yards)
Wetland 1	30.76772	-91.39453	Palustrine Emergent (PEM)	0.072	0	0
Wetland 2	30.76823	-91.39420	Palustrine Forested (PFO)	4.921	0.09	79.5 (block mats)
			Total	**4.993**	**0.09**	**79.5**

Source: Cowardin et al. 1979.

Table 4. Potential Stream Impacts

Stream Name	Latitude	Longitude	Observed Characteristics	Area of Fill Placement Below OHWM (acres)	Total Fill Below OHWM (cubic yards)	Linear Feet of Impacted Stream	Total Area within Study Area (acres)
Bayou Sara	30.76943	-91.39431	Perennial Stream; 3,600 feet in Study Area, approx. 160 feet wide	2.06	(block mats) 121 (riprap) 16,781 (compacted fill) 367	1,991	13.223
Unnamed Tributary of Bayou Sara	30.77209	-91.39567	Perennial Stream; 542 feet in Study Area, approx.1 foot wide	0	0	0	0.012
			Total	**2.06**	**17,269**	**1,991**	**13.235**

6.2.1 Wetlands

Wetland 1 is located just north of Reach 2 adjacent to Bayou Sara and below the ordinary high water mark (OHWM). Wetland 1 is inundated by Bayou Sara during high water stages.

A data point was collected within Wetland 1 to confirm the presence of jurisdictional wetlands at this location. The dominant vegetative species for Wetland 1 is seedbox (*Ludwigia alternifolia*). Black willow (*Salix nigra*) was present but not dominant in Wetland 1 because of inundation and foraging by North American beaver (*Castor canadensis*). The soils are Morganfield and Bigbee, frequently flooded, which are classified by NRCS as hydric in depressions. The hydric soil indicator redox dark surface (F6) was present at this site. Primary hydrology indicators at this site include surface water (A1), high water table (A2), saturation (A3), drift deposits (B3), inundation visible on aerial imagery (B7), and oxidized rhizospheres along live roots (C3). Secondary wetland hydrology indicators included surface soil cracks (B6) and geomorphic position (D2). Wetland 1 is a palustrine emergent (PEM) wetland (Cowardin et al. 1979).

Wetland 2 is located just south of Reach 1 and extends to Reach 2 along the top of bank adjacent to Bayou Sara. Wetland 2 is inundated by Bayou Sara during high water stages. Water levels in Bayou Sara in this portion of the watershed are controlled by the Mississippi River.

A data point was collected within Wetland 2 to confirm the presence of jurisdictional wetlands at this location. The dominant vegetative species for Wetland 2 are Ash-leaf maple (*Acer negundo*), black tupelo (*Nyssa sylvatica*), southern dewberry (*Rubus trivialis*), horsebrier (*Smilax rotundifolia*), and muscadine (*Vitis rotundifolia*). Soils are Morganfield and Bigbee, frequently flooded, which are classified by NRCS as hydric in depressions. The hydric soil indicator depleted matrix (F3) was present at this site. The primary hydrology indicator for this site was inundation visible on aerial imagery (B7). Secondary wetland hydrology indicators included drainage patterns (B10) and geomorphic position (D2). Wetlands 2 is a palustrine forested (PFO) wetland (Cowardin et al. 1979).

No improvements to the access road through Wetland 2 are proposed; only clearing with hand tools and the temporary use of timber mats may be necessary for the access road. Access roads will be restored to pre-project conditions upon completion of work. Portions of Wetland 2 (0.09 acres) will be impacted by the proposed revetment due to the placement of 79.5 cubic yards of concrete block mats.

6.2.2 Streams

An unnamed perennial stream was delineated in the Study Area flowing from the southernmost Wastewater Treatment Pond in a westerly direction to its confluence with an unnamed tributary of Bayou Sara. This stream was mapped on the USGS quadrangle adjacent to Town of St. Francisville property, but beyond the Study Area (See Figure 2). Within the Study Area, the perennial stream is conveyed beneath an access road within the Wastewater Treatment Facilities property via a 12-inch corrugated metal pipe culvert. No improvements are proposed for the culvert, and the stream will not be impacted by the proposed project.

Bayou Sara is a perennial tributary to the Mississippi River and drains a large portion of West Feliciana Parish. The Bayou flows south and connects to the Mississippi River just south of the Study Area. The Mississippi River flows to the southeast where it empties into the Gulf of Mexico. Stabilization of the downstream left bank of Bayou Sara is the primary purpose of the proposed project. Therefore, the OHWM of the downstream left bank was delineated throughout the Study Area.

All access roads within the Study Area are existing and do not cross waters of the U.S. except where noted above. No other waters of the U.S. or wetlands were observed in or crossing the access roads, staging area, or excess cut placement area.

6.3 Wetland Function and Value

Not all wetlands perform all wetland functions nor do they perform all wetland functions equally well. The

To determine the value of each wetland within the proposed revetment footprint, ecologists used the USACE New Orleans District, Louisiana Wetlands Rapid Assessment Method (LRAM) for compensatory mitigation (USACE 2015). The output from LRAM can be used for calculating compensatory mitigation associated with USACE-authorized activities under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 and in accordance with the 2008 Final Rule – Compensatory Mitigation for Losses of Aquatic Resources (33 CFR Part 332). Table 5 shows the factors and possible ratings for the LRAM method.

The LRAM classifies each wetland impacted by the proposed action based on the five factors shown in Table 5. Each factor is assigned an option and each option has an associated impact value or i-value. The i-value for each factor is added, then multiplied by the area of the impacted wetland (acres), and a

LRAM debit is generated. Equation 1 below shows the formula for calculating LRAM debits.

Equation 1: $LLLLLLLL\ DDDDDDDDD = \Sigma(\square\square) \times WWDDDDWWWWWWW\ LLAAAADD$

Table 5. Louisiana Rapid Assessment Method (LRAM) Factors and Associated i-Value

Factor	Option	i-Value
Wetland Status	Rare, Imperiled, Difficult to Replace (RID)	3
	Secure	2
	Degraded	1
Habitat Condition	High	3
	Medium	2
	Low	1
Hydrologic Condition	High	3
	Medium	2
	Low	1
Negative Influences	High	-0.5
	Medium	-0.2
	Low	0
Impact Type	Full/Permanent Loss	3
	Partial/Temporary Loss	0.5

Source: USACE Louisiana Rapid Assessment Method V1.0, 2015.

6.4 Potential Wetland Impacts

Wetland impacts from the proposed revetment are based on the fill area necessary for a stable revetment and slopes of the revetment to provide an acceptable safety factor for bank stabilization. The impact type for Wetland 2 was classified as “full/permanent loss.” Although this site is within the required revetment footprint for the proposed project, it will not be converted to other land use. Wetland 1 will be within the clear zone for the proposed project and will maintain its current function. Table 6 shows the LRAM options selected for Wetland 2 and the calculated i-value for the impacted wetland.

Table 6. LRAM Impact Factors for Each Wetland within the Proposed Revetment Footprint

Wetland	Wetland Status	Habitat Condition	Hydrologic Condition	Negative Influences	Impact Type	i-Value
Wetland 2	2	3	2	-0.2	3	9.8
					Total	**9.8**

Wetland mitigation is discussed in Section 6.6. However, because the area of impacted wetlands is less than the threshold required for mitigation (0.1 acre) set forth by the 2012 Nationwide Permit General Conditions (Federal Register 2012), the final LRAM debit was not calculated. Table 6 shows the total i-value for the impacted wetland.

6.5 Potential Impacts to Surface Waters

Table 4 in Section 6.2 shows the potential impact the proposed project would have on surface waters. Approximately 1,991 linear feet (2.06 acres) of Bayou Sara would be impacted by the proposed project. Approximately 17,269 cubic yards of material (121 cubic yards of block mats, 16,781 cubic yards of riprap, and 367 cubic yards of compacted fill) would be placed within the OHWM of Bayou Sara for bank stabilization. The proposed project would not impact the unnamed tributary of Bayou Sara.

6.6 Wetland Mitigation

Wetlands impacted due to construction of the proposed project do not meet the mitigation requirements set forth by the USACE 2012 Nationwide Permit General Conditions as mentioned in Section 6.4.

Construction activities associated with the proposed revetment would impact wetlands and surface waters to varying degrees. Land clearing during construction would remove vegetative cover with the potential to increase surface runoff during storm events leading to erosion and increased sediment deposited in surface waters. To aid in minimizing such impacts, placement and monitoring of erosion control measures for soil stabilization along with temporary and permanent vegetation measures at the start of, during, and after construction would be incorporated into project construction plans and specifications.

Measures to minimize impacts to wetlands include hand clearing of wetland vegetation as well as limiting clearing to the minimum required for construction and the use of wetland areas outside the construction limits will be prohibited for construction support activities (borrow sites, waste sites, storage, parking, access, etc.). To minimize impacts resulting from the proposed action, the project specifications require that the contractor take certain measures toward reducing environmental (wetland) impacts.

It has been determined that there is no practicable alternative to the proposed project involving impacts to streams and wetlands, and the proposed action includes all practicable measures to minimize harm to waters of the U.S. that may result from this project.

7 REFERENCES

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Site: Bayou Sara City/County: West Feliciana Sampling Date: 10/27/2016

Applicant/Owner: West Feliciana Parish State: LA Sampling Point: Wetland 1

Investigator(s): M. Schulze, J. Morrell Section, Township, Range: SEC 42, T3S, R3W

Landform: (hillslope, terrace, etc.): Terrace along Bayou Sara Local relief (concave, convex, none): none Slope %: 5%

Subregion (LRR or MLRA): LRR-O Lat. 30.76766 Long. -91.39455 Datum: NAD83

Soil Map Unit Name: (MB) Morganfield and Bigbee Soils, frequently flooded NWI Classification: None

Are climatic/hydrologic conditions on the site typical for time of year? Yes X No (If no, explain in the Remarks)

Are Vegetation No Soil No or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No Soil No or Hydrology No naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No

Hydric Soil Present? Yes X No

Wetland Hydrology Present? Yes X No

Is the Sampled Area within a Wetland? **Yes** X **No**

Remarks: All criteria met: Wetland. PEM shelf along Bayou Sara where bank has sloughed and water is penetrating soil layer.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (check all that apply)				Secondary Indicators	
X	Surface Water (A1)		Aquatic Fauna (B13)	X	Surface Soil Cracks (B6)
X	High Water Table (A2)		Marl Deposits (B15) **(LRR U)**		Sparsely Vegetated Concave Surface (B8)
X	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)	X	Oxidized Rhizosphere along Live Roots (C3)		Moss Trim Lines
	Sediment Deposits (B2)		Presence of Reduced Iron (C4)		Dry-Season Water Table (C2)
X	Drift Deposits (B3)		Recent Iron Reduction in Tilled Soil (C6)		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Thin Muck Surface (C7)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Other (Explain in Remarks)	X	Geomorphic Position (D2)
X	Inundation Visible on Aerial Imagery (B7)				Shallow Aquitard (D3)
	Water Stained Leaves (B9)				FAC-Neutral Test (D5)
					Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present? Yes No X Depth (inches) No

Water Table Present? Yes X No Depth (inches) 4"

Saturation Present? Yes X No Depth (inches) Surface

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerial Photographs 1998, 1999, 2004 through 2016. Area was inundated during site visits on 7/28/16 and 12/30/2016.

Remarks:

Water on surface outside of soil pit. Shelf along perennial stream with sloughing of bank, which has allowed water to saturate soil from upslope. Photo of soil pit and in all four cardinal directions. Six primary and two secondary indicators observed.

VEGETATION Sampling Point: Wetland 1

Tree Stratum (Plot size: r=30')	Absolute % Cover	Dominant Species	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total Cover: 0	20% of Total Cover: 0		

Sapling Stratum (Plot size: r=15')			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total Cover:	20% of Total Cover: 0		

Shrub Stratum (Plot size: r=10')			
1.			
2.			
3.			
4.			
5.			
6.			
	0 = Total Cover		
50% of total Cover: 0	20% of Total Cover: 0		

Herb Stratum (Plot size: r=5')			
1. *Ludwigia alternifolia*	40	Y	OBL
2. *Salix nigra*	10	N	OBL
3. *Cyperus strigosus*	5	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	55 = Total Cover		
50% of total Cover: 27.5	20% of Total Cover: 11		

Woody Vine Stratum (Plot size: r=30')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
50% of total Cover: 0	20% of Total Cover: 0		

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 1 (A)

Total number of dominant species across all strata: 1 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet

Total % cover of:				
OBL species	50	x	1	50
FACW species	5	x	2	10
FAC species	0	x	3	0
FACU species	0	x	4	0
UPL species	0	x	5	0
Column Total	55 (A)			60 (B)

Prevalence Index: 1.1 (B/A)

Hydrophytic Vegetation Indicators:

- x 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- x 3 - Prevalence Index is ≤3.0*
- _____ Problematic Hydrophytic Vegetation* (Explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines, 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling - Woody plants, excluding woody vines, approximately 20 ft. (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

SHRUB - Woody Plants, excluding woody vines, approximately 3 to 20 ft. (1 to 6 m) in height.

HERB - All herbaceous (non-Woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vine - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present?

Yes X **No** _____

Remarks: Shrub willows outside plot. Majority have been eaten by beavers. *Sagittaria latifolia* outside plot. Vegetation is sprouting after inundation observed during recent months including site visits on 7/28/2016.

SOIL Sampling Point: Wetland 1

Profile Description: (Describe to depth needed to document the indicator or confirm absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type*	Loc**	Texture	Remarks
0-1	10YR 4/4	100	NA					Silt loam
1-6	2.5Y 3/1	90	7.5YR 3/4	10	C	PL		Silt loam
6-16	5Y 4/2	100	NA					Silt loam

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains **Location: PL=Pore Lining, M=Matrix

Soil Indicators:				**Indicators for Problematic Hydric Soils *****
	Histosol (A1)		Polyvalue Below Surface (S8) **(LRR S, T, U)**	1 cm Muck (A9) **(LRR O)**
	Histic Epipedon (A2)		Thin Dark Surface (S9) **(LRR S, T, U)**	2 cm Muck (A10) **(LRR S)**
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(LRR O)**	Reduced Vertic (F18) **(Outside MLRA 150A,B)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)	Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
	Stratified Layers (A5)		Depleted Matrix (F3)	Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
	Organic Bodies (A6) (LRR P, T, U)	X	Redox Dark Surface (F6)	Red Parent Material (TF2)
	5 cm Mucky Mineral (A7) **(LRR P, T, U)**		Depleted Dark Surface (F7)	Very Shallow Dark Surface (TF12)
	Muck Presence (A8) **(LRR U)**		Redox Depressions (F8)	Other (Explain in Remarks)
	1 cm Muck (A9) **(LRR P, T)**		Marl (F10) **(LRR U)**	
	Depleted Below Dark Surface (A11)		Depleted Ochric (F11) (**MLRA 151**)	
	Thick Dark Surface (A12)		Iron-Manganese Masses (F12) (**LRR O, P, T**)	
	Coast Prairie Redox (A16) **(MLRA 150A)**		Umbric Surface (F13) (**MLRA 136, 122**)	*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
	Sandy Mucky Mineral (S1) **(LRR O, S)**		Delta Ochric (F17) **(MLRA 151)**	
	Sandy Gleyed Matrix (S4)		Reduced Vertic (F17) **(MLRA 150A, 150B)**	
	Sandy Redox (S5)		Piedmont Floodplain Soils (F19) (**MLRA 149A**)	
	Stripped Matrix (S6)		Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**	
	Dark Surface (S7) **(LRR P, S, T, U)**			

Restrictive Layer (if observed)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

Freshly deposited silt layer on surface.

Site: Bayou Sara City/County: West Feliciana Sampling Date: 10/27/2016

Applicant/Owner: West Feliciana Parish State: LA Sampling Point: Wetland 2

Investigator(s): M. Schulze, J. Morrell Section, Township, Range: SEC 42, T3S, R3W

Landform: (hillslope, terrace, etc.): Terrace along Bayou Sara Local relief (concave, convex, none): none Slope %: 2%

Subregion (LRR or MLRA): LRR-O Lat. 30.76771 Long. -91.3943 Datum: NAD83

Soil Map Unit Name: (MB) Morganfield and Bigbee Soils, frequently flooded NWI Classification: None

Are climatic/hydrologic conditions on the site typical for time of year? Yes X No (If no, explain in the Remarks)

Are Vegetation No Soil No or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No Soil No or Hydrology No naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No

Hydric Soil Present? Yes X No

Wetland Hydrology Present? Yes X No

Is the Sampled Area within a Wetland? **Yes** X **No**

Remarks: All criteria met - area is a Palustrine Forested wetland. Area is frequently inundated for long periods of time because water depth in Bayou Sara is controlled by the Mississippi River. Standing water frequently observed, especially in winter and spring.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (check all that apply)				Secondary Indicators	
	Surface Water (A1)		Aquatic Fauna (B13)		Surface Soil Cracks (B6)
	High Water Table (A2)		Marl Deposits (B15) **(LRR U)**		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)	X	Drainage Patterns (B10)
	Water Marks (B1)		Oxidized Rhizosphere along Live Roots (C3)		Moss Trim Lines
	Sediment Deposits (B2)		Presence of Reduced Iron (C4)		Dry-Season Water Table (C2)
	Drift Deposits (B3)		Recent Iron Reduction in Tilled Soil (C6)		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Thin Muck Surface (C7)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Other (Explain in Remarks)	X	Geomorphic Position (D2)
X	Inundation Visible on Aerial Imagery (B7)				Shallow Aquitard (D3)
	Water Stained Leaves (B9)				FAC-Neutral Test (D5)
					Sphagnum Moss (D8)**(LRR T, U)**

Field Observations:

Surface Water Present? Yes No X Depth (inches)

Water Table Present? Yes No X Depth (inches)

Saturation Present? Yes No X Depth (inches)

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerial Photographs 1998, 1999, 2004 through 2016.

Remarks:

Plot on top of bank - above Wetland 1. Subject to Mississippi River flooding especially in winter and spring. Photo of soil pit and in all four cardinal directions. One primary and two secondary indicators observed.

VEGETATION Sampling Point: Wetland 2

		Absolute % Cover	Dominant Species	Indicator Status
Tree Stratum (Plot size: r=30')				
1.	*Acer negundo*	40	Y	FAC
2.	*Platanus occidentalis*	15	N	FACW
3.	*Carya illinoinensis*	15	N	FACU
4.	*Celtis laevigata*	10	N	FACW
5.				
6.				
		80	= Total Cover	
	50% of total Cover: 40	20% of Total Cover: 16		
Sapling Stratum (Plot size: r=15')				
1.	*Nyssa sylvatica*	10	Y	FAC
2.	*Celtis laevigata*	2	N	FACW
3.				
4.				
5.				
6.				
		12	= Total Cover	
	50% of total Cover: 6	20% of Total Cover: 2.4		
Shrub Stratum (Plot size: r=10')				
1.				
2.				
3.				
4.				
5.				
6.				
		0	= Total Cover	
	50% of total Cover: 0	20% of Total Cover: 0		
Herb Stratum (Plot size: r=5')				
1.	*Rubus trivialis*	40	Y	FACU
2.	*Smilax rotundifolia*	10	Y	FAC
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		50	= Total Cover	
	50% of total Cover: 25	20% of Total Cover: 10		
Woody Vine Stratum (Plot size: r=30')				
1.	*Vitis rotundifolia*	30	Y	FAC
2.	*Smilax rotundifolia*	20	Y	FAC
3.	Toxicodendron radicans	10	N	FAC
4.	*Mikania scandens*	2	N	FACW
5.				
		62	= Total Cover	
	50% of total Cover: 31	20% of Total Cover: 12.4		

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 5 (A)

Total number of dominant species across all strata: 6 (B)

Percent of dominant species that are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index Worksheet

Total % cover of:				
OBL species	0	x 1		0
FACW species	29	x 2		58
FAC species	120	x 3		360
FACU species	55	x 4		220
UPL species	0	x 5		0
Column Total	204	(A)		638 (B)

Prevalence Index: 3.1 (B/A)

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- x 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0*
- ___ Problematic Hydrophytic Vegetation* (Explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines, 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling - Woody plants, excluding woody vines, approximately 20 ft. (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

SHRUB - Woody Plants, excluding woody vines, approximately 3 to 20 ft. (1 to 6 m) in height.

HERB - All herbaceous (non-Woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vine - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present?

Yes X **No** ___

Remarks: Shrub willows outside plot have been eaten by beavers. *Sagittaria latifolia* outside plot.

SOIL Sampling Point: Wetland 2

Profile Description: (Describe to depth needed to document the indicator or confirm absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	10YR 4/2	85	7.5YR 4/6	15	C	M		Sandy loam
6-16	2.5Y 4/3	85	7.5 YR 3/4	15	C	M		Sandy loam

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains **Location: PL=Pore Lining, M=Matrix

Soil Indicators:				**Indicators for Problematic Hydric Soils** ***
	Histosol (A1)		Polyvalue Below Surface (S8) **(LRR S, T, U)**	1 cm Muck (A9) **(LRR O)**
	Histic Epipedon (A2)		Thin Dark Surface (S9) **(LRR S, T, U)**	2 cm Muck (A10) **(LRR S)**
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(LRR O)**	Reduced Vertic (F18) **(Outside MLRA 150A,B)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)	Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
	Stratified Layers (A5)	X	Depleted Matrix (F3)	Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
	Organic Bodies (A6) (LRR P, T, U)		Redox Dark Surface (F6)	Red Parent Material (TF2)
	5 cm Mucky Mineral (A7) **(LRR P, T, U)**		Depleted Dark Surface (F7)	Very Shallow Dark Surface (TF12)
	Muck Presence (A8) **(LRR U)**		Redox Depressions (F8)	Other (Explain in Remarks)
	1 cm Muck (A9) **(LRR P, T)**		Marl (F10) **(LRR U)**	
	Depleted Below Dark Surface (A11)		Depleted Ochric (F11) (**MLRA 151**)	
	Thick Dark Surface (A12)		Iron-Manganese Masses (F12) (**LRR O, P, T**)	
	Coast Prairie Redox (A16) **(MLRA 150A)**		Umbric Surface (F13) (**MLRA 136, 122**)	*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
	Sandy Mucky Mineral (S1) **(LRR O, S)**		Delta Ochric (F17) **(MLRA 151)**	
	Sandy Gleyed Matrix (S4)		Reduced Vertic (F17) **(MLRA 150A, 150B)**	
	Sandy Redox (S5)		Piedmont Floodplain Soils (F19) (**MLRA 149A**)	
	Stripped Matrix (S6)		Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**	
	Dark Surface (S7) **(LRR P, S, T, U)**			

Restrictive Layer (if observed)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

Wetland boundary corresponds to a series of shallow ditches that drain from the wetland to Bayou Sara. Three locations have a shallow ditch that drains water from Ferdinand Street toward Bayou Sara.

Site: Bayou Sara City/County: West Feliciana Sampling Date: 10/27/2016

Applicant/Owner: West Feliciana Parish State: LA Sampling Point: UPLAND

Investigator(s): M. Schulze, J. Morrell Section, Township, Range: SEC 42, T3S, R3W

Landform: (hillslope, terrace, etc.): Terrace along Bayou Sara Local relief (concave, convex, none): none Slope %: 2%

Subregion (LRR or MLRA): LRR-O Lat. 30.77155 Long. -91.39705 Datum: NAD83

Soil Map Unit Name: (MB) Morganfield and Bigbee Soils, frequently flooded NWI Classification: PFO

Are climatic/hydrologic conditions on the site typical for time of year? Yes X No (If no, explain in the Remarks)

Are Vegetation No Soil No or Hydrology No significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation No Soil No or Hydrology No naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No
Hydric Soil Present?	Yes	No X
Wetland Hydrology Present?	Yes X	No

Is the Sampled Area within a Wetland? **Yes** **No** X

Remarks: Hydric soils not present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (check all that apply)				Secondary Indicators	
	Surface Water (A1)		Aquatic Fauna (B13)	X	Surface Soil Cracks (B6)
	High Water Table (A2)		Marl Deposits (B15) **(LRR U)**		Sparsely Vegetated Concave Surface (B8)
	Saturation (A3)		Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
	Water Marks (B1)		Oxidized Rhizosphere along Live Roots (C3)		Moss Trim Lines
	Sediment Deposits (B2)		Presence of Reduced Iron (C4)		Dry-Season Water Table (C2)
	Drift Deposits (B3)		Recent Iron Reduction in Tilled Soil (C6)		Crayfish Burrows (C8)
	Algal Mat or Crust (B4)		Thin Muck Surface (C7)		Saturation Visible on Aerial Imagery (C9)
	Iron Deposits (B5)		Other (Explain in Remarks)	X	Geomorphic Position (D2)
	Inundation Visible on Aerial Imagery (B7)				Shallow Aquitard (D3)
	Water Stained Leaves (B9)				FAC-Neutral Test (D5)
					Sphagnum Moss (D8)**(LRR T, U)**

Field Observations:

Surface Water Present? Yes No X Depth (inches) > 16"

Water Table Present? Yes No X Depth (inches) > 16"

Saturation Present? Yes No X Depth (inches) > 16"

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Aerial Photographs 1998, 1999, 2004 thru 2016.

Remarks:

Two secondary indicators observed. Flat area along Bayou Sara - dominated by *Salix nigra* trees. Photo of soil pit and in all four cardinal directions.

VEGETATION — Sampling Point: UPLAND

Tree Stratum (Plot size: r=30')	Absolute % Cover	Dominant Species	Indicator Status
1. *Salix nigra*	45	Y	OBL
2. *Platanus occidentalis*	5	N	FACW
3. *Carya illinoinensis*	3	N	FACU
4.			
5.			
6.			
	53	= Total Cover	

50% of total Cover: 26.5 — 20% of Total Cover: 10.6

Sapling Stratum (Plot size: r=15')			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	

50% of total Cover: 0 — 20% of Total Cover: 0

Shrub Stratum (Plot size: r=10')			
1.			
2.			
3.			
4.			
5.			
6.			
	0	= Total Cover	

50% of total Cover: 0 — 20% of Total Cover: 0

Herb Stratum (Plot size: r=5')			
1. *Campsis radicans*	30	Y	FAC
2. *Heliotropium procumbens*	20	Y	FACW
3. *Clematis crispa*	16	N	FACW
4. *Cardiospermum microcarpum*	5	N	FAC
5. *Carya illinoinensis*	5	N	FACU
6. *Vernonia fasciculata*	2	N	FACW
7. *Saururus cernuus*	2	N	OBL
8. *Solanum nigrum*	2	N	FACU
9. *Betula nigra*	1	N	FACW
10. *Salix nigra*	1	N	OBL
11.			
	84	= Total Cover	

50% of total Cover: 42 — 20% of Total Cover: 16.8

Woody Vine Stratum (Plot size: r=30')			
1. *Campsis radicans*	20	Y	FAC
2. *Clematis crispa*	5	Y	FACW
3.			
4.			
5.			
	25	= Total Cover	

50% of total Cover: 12.5 — 20% of Total Cover: 5

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: 5 (A)

Total number of dominant species across all strata: 5 (B)

Percent of dominant species that are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL species	48	x	1	48
FACW species	49	x	2	98
FAC species	55	x	3	165
FACU species	10	x	4	40
UPL species	0	x	5	0
Column Total	162	(A)		351 (B)

Prevalence Index: 2.2 (B/A)

Hydrophytic Vegetation Indicators:

_ 1 - Rapid Test for Hydrophytic Vegetation

x 2 - Dominance Test is >50%

x 3 - Prevalence Index is ≤3.0*

_ Problematic Hydrophytic Vegetation* (Explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata:

Tree - Woody plants, excluding vines, 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling - Woody plants, excluding woody vines, approximately 20 ft. (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

SHRUB - Woody Plants, excluding woody vines, approximately 3 to 20 ft. (1 to 6 m) in height.

HERB - All herbaceous (non-Woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vine - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present?

Yes X **No** _

Remarks: Indicators of hydrophytic vegetation observed.

SOIL Sampling Point: UPLAND

Profile Description: (Describe to depth needed to document the indicator or confirm absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type*	Loc**	Texture	Remarks
0-6	2.5Y 3/4	97	5YR 3/4	3	C	PL	Silty Clay Loam	
6-8	2.5Y 4/3	90	5YR 3/4	10	C	M	Silt Loam	
8-16	2.5Y 4/3	98	5YR 3/4	2	C	PL	Loam	

*Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand grains **Location: PL=Pore Lining, M=Matrix

Soil Indicators:				**Indicators for Problematic Hydric Soils *****
	Histosol (A1)		Polyvalue Below Surface (S8) **(LRR S, T, U)**	1 cm Muck (A9) **(LRR O)**
	Histic Epipedon (A2)		Thin Dark Surface (S9) **(LRR S, T, U)**	2 cm Muck (A10) **(LRR S)**
	Black Histic (A3)		Loamy Mucky Mineral (F1) **(LRR O)**	Reduced Vertic (F18) **(Outside MLRA 150A,B)**
	Hydrogen Sulfide (A4)		Loamy Gleyed Matrix (F2)	Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
	Stratified Layers (A5)		Depleted Matrix (F3)	Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
	Organic Bodies (A6) (LRR P, T, U)		Redox Dark Surface (F6)	Red Parent Material (TF2)
	5 cm Mucky Mineral (A7) **(LRR P, T, U)**		Depleted Dark Surface (F7)	Very Shallow Dark Surface (TF12)
	Muck Presence (A8) **(LRR U)**		Redox Depressions (F8)	Other (Explain in Remarks)
	1 cm Muck (A9) **(LRR P, T)**		Marl (F10) **(LRR U)**	
	Depleted Below Dark Surface (A11)		Depleted Ochric (F11) (**MLRA 151**)	
	Thick Dark Surface (A12)		Iron-Manganese Masses (F12) (**LRR O, P, T**)	
	Coast Prairie Redox (A16) **(MLRA 150A)**		Umbric Surface (F13) (**MLRA 136, 122**)	
	Sandy Mucky Mineral (S1) **(LRR O, S)**		Delta Ochric (F17) **(MLRA 151)**	
	Sandy Gleyed Matrix (S4)		Reduced Vertic (F17) **(MLRA 150A, 150B)**	
	Sandy Redox (S5)		Piedmont Floodplain Soils (F19) (**MLRA 149A**)	
	Stripped Matrix (S6)		Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**	
	Dark Surface (S7) **(LRR P, S, T, U)**			

*** Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed)

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

No hydric soil indicators observed.

APPENDIX B

Custom Soil Resource Report for West Feliciana Parish, Louisiana, and Hydric Soil List

APPENDIX C

Photographic Log

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
1	10/27/2016

Description:
View of east bank (downstream left) of Bayou Sara near southern limit of Study Area (end of Reach 2), facing south.

Photo No.	Date:
2	10/27/2016

Description:
View of east bank of Bayou Sara near southern limit of Study Area, facing north (boat launch in background) along Reach 2.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
3	10/27/2016

Description:
View of east bank of Bayou Sara, facing south in Reach 2 (note slope failure).

Photo No.	Date:
4	10/27/2016

Description:
View of east bank of Bayou Sara near middle of Study Area, facing south.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
5	10/27/2016

Description:
Soil sample at Sampling Point Wetland 1.

Photo No.	Date:
6	10/27/2016

Description:
Overview of Wetland 1, facing north. Wetland 1 is north of Reach 2.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
7	10/27/2016

Description:
Overview of Wetland 1, facing east.

Photo No.	Date:
8	10/27/2016

Description:
Overview of Wetland 1, facing south.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
9	10/27/2016

Description:
Overview of Wetland 1, facing west across Bayou Sara.

Photo No.	Date:
10	10/27/2016

Description:
Overview from northern end of Wetland 1, facing south (note surface water).

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
11	10/27/2016

Description:
Overview of Bayou Sara near the end of Reach 1, facing south.

Photo No.	Date:
12	10/27/2016

Description:
Overview of Bayou Sara in Reach 1, facing northwest (Wastewater Treatment Facility property).

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
13	10/27/2016

Description:
Overview of Bayou Sara near the beginning of Reach 1, facing east.

Photo No.	Date:
14	10/27/2016

Description:
Soil sample at Sampling Point Upland.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
15	10/27/2016

Description:
Overview of Sampling Point Upland, facing west.

Photo No.	Date:
16	10/27/2016

Description:
Overview of Sampling Point Upland, facing north.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
17	10/27/2016

Description:
Overview of Sampling Point Upland, facing east.

Photo No.	Date:
18	10/27/2016

Description:
Overview of Sampling Point Upland, facing south.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
19	10/27/2016

Description:
Perennial stream from west side of access road, facing west.

Photo No.	Date:
20	10/27/2016

Description:
Perennial stream from east side of access road, facing west (12-inch corrugated metal pipe culvert inlet).

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
21	10/27/2016

Description:
Perennial stream from west side of access road, facing east (12-inch corrugated metal pipe culvert outlet).

Photo No.	Date:
22	10/27/2016

Description:
Soil at Sampling Point Wetland 2.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
23	10/27/2016

Description:
Overview of Sampling Point Wetland 2, facing south.

Photo No.	Date:
24	10/27/2016

Description:
Overview of Sampling Point Wetland 2, facing west.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
25	10/27/2016

Description:
Overview of Sampling Point Wetland 2, facing north.

Photo No.	Date:
26	10/27/2016

Description:
Overview of Sampling Point Wetland 2, facing east.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
27	10/27/2016

Description:
Overview of Wetland 2 near northern end showing drainage patterns, facing east toward Ferdinand Street.

Photo No.	Date:
28	10/27/2016

Description:
Overview of boundary of Wetland 2 near northern end showing shallow ditch, facing south.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
29	10/27/2016

Description:
Overview of boundary of Wetland 2 near northern end showing shallow ditch, facing north.

Photo No.	Date:
30	10/27/2016

Description:
Overview of Wetland 2 near middle of wetland, facing east toward Ferdinand Street.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
31	10/27/2016

Description:
Overview of Wetland 2 near southern end, facing south.

Photo No.	Date:
32	4/2011 (Google Street View)

Description:
Access Road to Reach 2 from Ferdinand Street, facing west.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
33	10/27/2016

Description:
Access Road to Reach 2 from Ferdinand Street, facing west.

Photo No.	Date:
34	4/2011 (Google Street View)

Description:
Access Road to northern end of Reach 2 from Ferdinand Street, facing west.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
35	10/27/2016

Description:
Southern access road to St. Francisville Wastewater Treatment Ponds from Ferdinand Street, facing southwest.

Photo No.	Date:
36	10/27/2016

Description:
Northern access road to St. Francisville Wastewater Treatment Ponds from Ferdinand Street, facing southwest.

PHOTOGRAPHIC LOG

ARCADIS Design & Consultancy for natural and built assets

Client Name:	Site Location:	Contact/Task No.
West Feliciana Parish	Bayou Sara	LA003333.0001

Photo No.	Date:
37	10/27/2016

Description:
Overview of staging area, facing south.

Photo No.	Date:
38	

Description:
Overview of excess cut placement area, facing northeast.

ARCADIS Design & Consultancy for natural and built assets

Arcadis U.S., Inc.

10352 Plaza Americana Drive

Baton Rouge, Louisiana 70816

Tel 225 292 1004

Fax 225 218 9677

www.arcadis.com

Appendix F

8-Step Process, Public Notice, and Draft Findings of No Significant Impact

8-STEP PROCESS

EO 11988-FLOODPLAIN MANAGEMENT
EO 11990-WETLAND PROTECTION

DATE: 3/12/2018
PREPARED BY: Bonnie Porter
PROJECT: Bayou Sara Streambank Stabilization
Hazard Mitigation Grant Program Project No. 1603-436, FEMA Disaster 1603-DR-LA
LOCATION: West Feliciana Parish, LA
LATITUDE/ LONGITUDE: 30.772841, -91.392866

STEP 1 **Determine whether the proposed action is located in a wetland and/or The 100-yr floodplain (500-year floodplain for critical actions [44 CFR 9.4]), or whether it has the potential to affect or be affected by a floodplain or a wetland (see 44 CFR 9.7).**

A wetlands delineation was conducted along the Bayou Sara project corridor on October 27, 2016. The results of this survey were documented in a Biological Resources and Wetlands Findings Report prepared by ARCADIS Design & Consultancy for West Feliciana Parish on March 20, 2017. Wetlands identified along the project corridor were evaluated in accordance with EO 11990.

A palustrine forested (PFO) wetland was identified just south of Reach 1, which is along the large bend of the east bank of Bayou Sara adjacent to the St. Francisville Sewage Treatment Plant (STP). This PFO wetland extends southward to Reach 2, which is along the large bend of the east bank of Bayou Sara adjacent to the Oyster Bar (see Figure 2 in the Biological Resources and Wetlands Findings Report in Appendix E). Approximately 0.09 acre of the wetland would be covered by revetment fill material consisting of riprap and concrete block mats. Wetland functions would be permanently lost from this fill activity.

An additional palustrine emergent (PEM) wetland was also identified to the north of Reach 2 along the east bank of Bayou Sara (see Figure 2 in Appendix B). This wetland would not be affected by the proposed action.

Flood Insurance Rate Map (FIRM) Community-Panel Number 220245-006B Effective Date of February 13, 1979, shows the Bayou Sara project corridor area within Flood Zone A with no base flood elevations (BFEs) determined.

Arcadis Consulting conducted a Hydraulic and Hydrologic (H&H) Analysis on May 31, 2016. The results of the H&H showed a maximum increase of 0.70 feet

in the Bayou Sara Water Surface Elevation (WSE) when the Mississippi River discharge is very low (approximately 400,000 cubic feet/second (cfs)), such as in August and September. A 100-year flood event was modeled using a flow of 40,329 cfs down Bayou Sara. The results showed no change in WSEs in cross-sections near the revetments when stages were at or higher than the 100-year BFE. For downstream cross-sections near the Mississippi River, there was no observable differences in WSE due to implementation of the project. The overall impact of the proposed action on the hydrology and floodplain of Bayou Sara and the Mississippi River would be expected to be negligible.

Per 44 CFR 9.11(d)(4)…Until a regulatory floodway is designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within the base floodplain unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community. The above H&H results show that this regulatory requirement is satisfied for the project.

STEP 2 **Notify the public at the earliest possible time of the intent to carry out an action in a floodplain or wetland, and involve the affected and interested public in the decision making process (see 44 CFR 9.8).**

A cumulative public notice concerning the Hazard Mitigation Grant Program (HMGP) Assistance in floodplain and wetland areas has been or will be published (???) in the New Orleans Times-Picayune, Baton Rouge Advocate, Lafayette Daily Advertiser, Lake Charles American Press, Hammond Star, Monroe News-Star, Shreveport Times, and the Alexandria Daily Town Talk.

STEP 3 **Identify and evaluate practicable alternatives to locating the proposed action in a floodplain or wetland (including alternative sites, actions and the "no action" option) [see 44 CFR 9.9]. If a practicable alternative exists outside the floodplain or wetland, FEMA must locate the action at the alternative site.**

The No Action Alternative does not meet the purpose and need of protecting the St. Francisville STP lagoons from being eroded away by Bayou Sara and is not a practicable alternative.

The proposed action and considered alternatives described in draft EA Sections 3.2 and 3.3, respectively, are within the Bayou Sara and Mississippi River floodplain. Since FIRM Community-Panel #22045-006B shows Flood Zone A extending northward of the St. Francisville STP, there are no practicable alternative sites outside of the floodplain. The location and siting of the proposed action revetments along the east bank of Bayou Sara have minimized impacts to

wetlands along this corridor. There is no practicable alternative that avoids impacts to wetlands while meeting the project purpose and need.

STEP 4 **Identify the full range or potential direct or indirect impacts associated with, the occupancy or modification of floodplains and wetlands and the potential direct and indirect support of floodplain and wetland development that could result from the proposed action (see 44 CFR 9.10).**

In addition to the permanent loss of 0.09 acre of PFO wetland south of Reach 1 described in Step 1, vegetation removal along a 375-foot section of existing access road covering 0.17 acre within this wetland adjacent to the north portion of Reach 2 north of the Oyster Bar would also occur (see Sheet P-06 in Appendix E.

The PEM wetland described in Step 1, which covers 0.07 acre, would be permanently lost to the additional revetment that would be constructed between Reach 1 and 2 under the Considered Alternative.

The H&H results, summarized in Step 1, show minimal changes in WSEs in Bayou Sara during low flow conditions on the Mississippi River to no observable differences in BFE WSEs during modeled 100-year flood events. These floodplain effects are considered to be negligible.

STEP 5 **Minimize the potential adverse impacts and support to or within floodplains and wetlands to be identified under step # 4, restore and preserve the natural and beneficial values served by floodplains, and preserve and enhance the natural and beneficial values served by wetlands (see 44 CFR 9.11).**

Vegetation removal along the existing access road within the PFO wetland adjacent to the north portion of Reach 2 north of the Oyster Bar described in Step 4 would be accomplish using hand tools. Timber mats would be laced over the access road section within this wetland surface, if necessary. Upon completion of revetment construction, access roads would be restored to pre-project conditions. Clearing would be limited to the minimum required for construction and the use of wetland areas outside the construction limits would be prohibited for support activities, including borrow sites, paring and access road use, etc. The proposed action would include all practicable measures to minimize hard to wetlands that may result from this project.

The New Orleans District (NOD) is also requiring West Feliciana Parish to purchase 0.1 acres of wetland credits from an approved wetlands mitigation bank. West Feliciana Parish purchased 0.1 acre of credit from Cypress Plantation Mitigation Bank on February 20, 2018. The wetland impacts from construction of the proposed action would be expected to be minor. The purchase of the mitigation bank credits is judged by USACE NOD to be suitable mitigation for this impact.

If the Considered Alternative continuous revetment were constructed, hand tools and timber mats would be used in the manner described for the Proposed Action. The clearance area would be limited to the minimum required for construction and the use of wetland areas outside construction limits would be prohibited as described for the Proposed action. Wetland mitigation would also be required.

No floodplain mitigation is required beyond coordination with the West Feliciana Parish Floodplain Administrator.

STEP 6 **Reevaluate the proposed action to determine first, if it is still practicable in light of its exposure to flood hazards, the extent to which it will aggravate the hazards to others. And it's potential to disrupt floodplain and wetland values and second, if alternatives preliminarily rejected at step # 3 are practicable in light of the information gained in steps # 4 and # 5. FEMA shall not act in a floodplain or wetland unless it is the only practicable location (see 44 CFR 9.9).**

The H&H included in appendix C of the EA demonstrates the project will not increase the WSE within the floodway and have minimal potential to disrupt floodplain values. On February 20, 2018, West Feliciana Parish purchased 0.1 acre of credit from Cypress Plantation Mitigation Bank in order to offset the 0.1 acres of wetlands that would be loss during this project. After reevaluating the hazards against the benefits of the proposed project, FEMA has determined the project is practicable. The potential to disrupt wetland values has been minimized as evidenced by the granting of the Clean Water Act Section 404 permit by USACE NED under NWP 13. The H & H analysis demonstrates a minimal potential to disrupt floodplain values.

STEP 7 **Prepare and provide the public with a finding and public explanation of any final decision that the floodplain or wetland is the only practicable alternative (see 44 CFR 9.12).**

Public notice of the availability of the draft EA was published in the St. Francisville Democrat and the Advocate. Public notices published in the St. Francisville Democrat on two (2) consecutive Thursdays (month/day and month/day, 2017) and for five (5) consecutive weekdays in The Advocate beginning Monday, month/day and ending on Friday, month/day, 2017 to alert the public that the Draft EA and FONSI are available for review at the West Feliciana Parish Library, 5114 Burnett Road in St. Francisville, and the West Feliciana Parish Courthouse at 4785 Prosperity Street, St. Francisville. There wasl be a 30-day comment period beginning on day, month/day and concluding on day, month/day at 4 pm.

STEP 8 **Review the implementation and post-implementation phases of the proposed action to ensure that the requirements of the order are fully implemented. Oversight responsibility shall be integrated into existing processes.**

APPROVAL CONDITIONED ON REVIEWS OF IMPLEMENTATION AND POST IMPLEMENTATION PHASES TO ENSURE COMPLIANCE WITH THE ORDER(S).

Project has been reviewed for compliance with 44 CFR Part 9.

FEMA PUBLIC NOTICE
OF AVAILABILITY FOR THE
DRAFT ENVIRONMENTAL ASSESSMENT AND
DRAFT FINDING OF NO SIGNIFICANT IMPACT
FOR THE PROPOSED BAYOU SARA STREAMBANK STABILIZATION PROJECT
IN ST. FRANCISVILLE, WEST FELICIANA PARISH, LOUISIANA

Interested parties are hereby notified that the Federal Emergency Management Agency (FEMA) has prepared a draft Environmental Assessment (EA) and draft Finding of No Significant Impact (FONSI) in compliance with the National Environmental Policy Act (NEPA). The purpose of the draft EA is to assess the effects on the human and natural environment from constructing revetments along Bayou Sara adjacent to the St. Francisville Sewage Treatment Plant (STP) and the Oyster Bar in West Feliciana Parish, St. Francisville, Louisiana.

The proposed project is intended to prevent erosion of the Bayou Sara streambank from undercutting the STP lagoons and protect Ferdinand Street, which provides access to the U.S. Army Corps of Engineers' St. Francisville Casting Field, located east of Ferdinand Street, and is St. Francisville's sole road access to the Mississippi River.

The purpose of the draft EA is to analyze the potential environmental impacts associated with the preferred action and alternatives. The draft EA evaluates a No Action Alternative; the Preferred Alternative: Construct two (2) Revetments Adjacent to the St. Francisville STP and the Oyster Bar; and a Considered Alternative: Construct a Continuous Revetment from the St. Francisville STP to the Oyster Bar.

The draft FONSI is FEMA's finding that the proposal would not have a significant effect on the human and natural environment.

The Draft EA and Draft FONSI is available for review at the West Feliciana Library, at 5114 Burnett Road in St. Francisville, LA 70775. The documents can also be downloaded from FEMA's website at http://www.fema.gov/resource-document-library.

This public notice is published in The Advocate for five (5) days beginning Monday, August 20, 2018 and ending on Friday, August 24, 2018. This public notice will also be published in the St. Francisville Democrat (journal of record), the Clinton Watchman, and The Zachary Advocate & Plainsman on consecutive Thursdays - August 23, 2018 and August 30, 2018. There is a 30 day comment period, beginning on Monday, August 20, 2018 and concluding on Wednesday, September 19, 2018 at 4 p.m.

Comments may be mailed to: DEPARTMENT OF HOMELAND SECURITY-FEMA EHP-Bayou Sara Streambank Stabilization, 1500 MAIN STREET, BATON ROUGE, LOUISIANA 70802. Comments may be emailed to: fema-noma@fema.dhs.gov or faxed to: 225-346-5848. Verbal comments will be accepted or recorded at 225-267-2962. If no substantive comments are received, the draft EA and associated draft FONSI will become final.

U.S. Department of Homeland Security
Federal Emergency Management Agency
Region VI - Louisiana Recovery Office
1500 Main Street
Baton Rouge, Louisiana 70802

DRAFT FINDING OF NO SIGNIFICANT IMPACT FOR THE BAYOU SARA STREAMBANK STABILIZATION PROJECT ST. FRANCISVILLE, WEST FELICIANA PARISH, LOUISIANA HAZARD MITIGATION GRANT PROGRAM *HMGP 1603-0436/DR-1603-LA*

BACKGROUND

The West Feliciana Parish Government, the applicant, through the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) has requested federal funding through the Federal Emergency Management's (FEMA) 404 Hazard Mitigation Grant Program (HMGP) to prevent streambank erosion from damaging utility and road infrastructure in the Parish.

The east bank of Bayou Sara has experienced significant erosion on the reach between St. Francisville and the confluence with the Mississippi River. The streambank along a large bend on the east bank of the Bayou and an access road west of a sewage treatment lagoon at the St. Francisville Sewage Treatment Plant (STP) has experienced significant erosion since at least 1998. Streambank erosion at this location was estimated to average over five (5) feet per year from 1998 to 2005, over eight (8) feet per year in 2006 and 2007, over 14 feet per year from 2008 to 2010, and approximately four (4) feet per year from 2012 to 2014. An estimated 3.4 acres of land at this bench area has been lost to streambank erosion during this period.

This project would provide mitigation necessary to prevent erosion of the streambank and undercutting the sewage treatment lagoon, which serves more than 700 customers. The project would also provide erosion protection for Ferdinand Street, which provides access to a U. S. Army Corps of Engineers (USACE) storage facility to the east of the street, and a local boat launch. Ferdinand Street is also St. Francisville's sole road access to the Mississippi River, which is important for local tourism derived from riverboat visits.

An Environmental Assessment (EA) was prepared in accordance with the FEMA Instruction 108-1-1 and the Department of Homeland Security Instruction 023-01-001-01, pursuant to Section 102 of the National Environmental Policy Act of 1969 (NEPA), as implemented by the regulations promulgated by the President's Council on Environmental Quality (40 Code of Federal Regulations [CFR] Parts 1500-1508). The purpose of the EA was to analyze the potential environmental impacts associated with the proposed work, and

to determine whether to prepare an Environmental Impact Statement (EIS) or Finding of No Significant Impact (FONSI).

The proposed action is to construct two (2) revetments along the large bends of the east bank of Bayou Sara adjacent to the STP (Reach 1) and downstream near the Oyster Bar (Reach 2). The EA also analyzed a No Action Alternative, and a Considered Alternative of constructing a continuous revetment from the St. Francisville STP to the Oyster Bar that would include the two (2) revetments included in the proposed action plus an additional section of streambank located between Reaches 1 and 2. A complete description of these alternatives is included in the EA, which is incorporated by reference in this document.

FINDINGS

FEMA has evaluated the proposed project for significant adverse impacts to geology and soils, water resources (surface water, groundwater, and wetlands), floodplains, air quality, biological resources (vegetation, fish and wildlife, Federally-listed threatened or endangered species and critical habitats), cultural resources, environmental justice, climate change, traffic and transportation, public health and safety, noise, hazardous materials and cumulative impacts. The results of these evaluations as well as consultations and input from other federal and state agencies are presented in the EA.

CONDITIONS AND MITIGATION MEASURES

The following conditions must be met as part of the implementation of the project. Failure to comply with these conditions may jeopardize federal funds:

- The Applicant must follow all applicable local, state, and federal laws, regulations, and requirements and obtain and comply with all required permits and approvals prior to initiating work.
- Applicant must follow all conditions listed in U.S. Army Corps of Engineers MVN-2017-0368-CQ Nationwide Permit-13
- Applicant must, install and monitor appropriate erosion and sediment controls, and stabilization practices.
- Applicant must obtain and/or update all necessary approvals and environmental permits regarding this proposed project.
- If your project results in a discharge to waters of the state, submittal of a Louisiana Pollutant Discharge Elimination System (LPDES) application may be necessary.
- If the project results in a discharge of wastewater to an existing wastewater treatment system, that wastewater treatment system may need to modify its LPDES permit before accepting the additional wastewater.
- All precautions should be observed to protect the groundwater of the region.

- All precautions should be observed to control nonpoint source pollution from construction activities. Louisiana Department of Environment Quality (LDEQ) has stormwater general permits for construction areas equal to or greater than one (1) acre. It is recommended that you contact the LDEQ Water Permits Division at (225) 219-9371 to determine if your proposed project requires a permit.
- If your project will include a sanitary wastewater treatment facility, a Sewage Sludge and Biosolids Use or Disposal Permit is required. An application or Notice of Intent will be required if the sludge management practice includes preparing biosolids for land application or preparing sewage sludge to be hauled to a landfill.
- Please be advised that water softeners generate wastewaters that may require special limitations depending on local water quality considerations. Therefore, if your water system improvements include water softeners, you are advised to contact the LDEQ Water Permits to determine if special water quality-based limitations will be necessary.
- Any renovation or remodeling must comply with Louisiana Administrative Code (LAC) 33:III.Chapter 28, Lead-Based Paint Activities; LAC 33:III.Chapter 27, Asbestos-Containing Materials in Schools and State Buildings (includes all training and accreditation); and LAC 33:III.5151, Emission Standard for Asbestos for any renovations or demolitions.
- Vehicle operation times should be kept to a minimum. Area soils must be covered and/or wetted, if necessary, during construction to minimize dust
- After construction of revetments, restore existing access roads to pre-project conditions.
- Use all practicable measures to minimize hazards to wetlands.
- Conduct revetment construction activities during low-flow periods to the maximum extent possible.
- If any solid or hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's Single-Point-of-Contact (SPOC) at (225) 219-3640 is required. Additionally, precautions should be taken to protect workers from these hazardous constituents.
- If any species that are tracked by the Louisiana Natural Heritage Program (LNHP) are encountered, contacting the LNHP Data Manager at 225-765-2643 is required.
- Use existing access roads to the maximum extent possible.
- Execute the Phase III Data Recovery Project (LA Statewide PA TM IX).
- Develop and implement Public Interpretation (LA Statewide PA TM III).
- Louisiana Unmarked Human Burial Sites Preservation Act: If human bone or unmarked grave(s) are present within the project area, notify the West Feliciana Parish Sheriff's Office within 24 hours of discovery. The Applicant shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within 72 hours of discovery.

- Construction activities must comply with Occupational Safety and Healthy Act (OSHA) Construction Industry Standards.
- Implementation of a "no wake" zone on Bayou Sara during construction near the revetments is recommended.
- Installation of temporary fencing between the Oyster Bar parking lot and the Reach 2 revetment is also recommended.
- The following steps should be taken to comply with West Feliciana Parish Code Chapter 115: Install, if necessary, a screen or a buffer between uses in order to minimize the harmful impact of noise, dust and other debris, motor vehicle headlight glare or other artificial light intrusion, and other objectionable activities or impacts conducted on or created by an adjoining or nearby use. Install silt fences, if necessary, to prevent storm and run-off erosion, particularly along embankments on water ways and road ways.
- The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and/or toxic waste in accordance with all local, state and Federal agency requirements. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files.
- The applicant shall handle, manage, and dispose of petroleum products, hazardous materials and toxic waste in accordance with all local, state and Federal requirements.
- If spills of fuels, oils or hydraulic fluids from vehicles and equipment occur, use sorbent pads or other spill control supplies to stop the release of these materials and promptly containerize any contaminated materials and/or sediment/soil. Leaky vehicles and equipment must be taken out of service for repair before returning them to service. If any hazardous wastes, or soils and/or groundwater contaminated with hazardous constituents are encountered during the project, notification to LDEQ's SPOC at (225) 219-3640 is required.
- Notification to the National Response Center at 800-424-8802 if an oil discharge to water occurs.
- The construction contractor shall comply with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substance release reporting requirement, if an applicable release occurs.
- If hazardous materials are unexpectedly encountered in the project area during the proposed construction operations, appropriate measures for the proper assessment, remediation, management and disposal of the contamination would be initiated in accordance with applicable federal, state, and local regulations.
- Failure to comply with these conditions may make part of all of the project ineligible for FEMA funding.

- During the project impact analysis process developers should identify project-related impacts to migratory birds and the conservation measures that will be used to mitigate them. For additional Migratory Bird Conservation recommendations, guidance and tools to help reduce impacts to birds and their habitats please visit the LESO webpage: https://www.fws.gov/lafayette/Migratory _Birds/MigBird. html and the Service's Migratory Bird Program Webpage (https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers. php).
- The applicant must review the National Bald Eagle Management (NBEM) Guidelines is available at: http://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf to minimize potential project impacts to bald eagles, particularly where such impacts may constitute "disturbance," which is prohibited by the Bald and Golden Eagle Protection Act (BGEPA).
- If a bald eagle nest occurs or is discovered within 660 feet of the proposed project area, then USFWS requires an evaluation to be performed to determine whether the project is likely to disturb nesting bald eagles. The applicant is required to conduct the evaluation on-line at: https://www.fws.gov/southeast/our-services/eagle-technical-assistance. Following completion of the evaluation, that website will provide a determination of whether additional consultation is necessary. All coordination pertaining to these activities should be documented and copies forwarded to the state and FEMA as part of the permanent project files
- U.S. Fish and Wildlife Service (USFWS) recommends that a qualified biologist inspect the proposed work site for the presence of undocumented nesting colonies during the nesting season because some waterbird colonies may change locations year-to-year. To minimize disturbance to colonial nesting birds please refer to the colonial nesting waterbird guidance on the Louisiana Ecological Services Office (LESO) Web page https://www.fws.gov/lafayette/Migratory _Birds/MigBird. html.

The following conservation measures for Pallid sturgeon must be employed by construction personnel as a requirement of FEMA funding:

- All personnel related to the construction project will receive worker awareness training on the Pallid sturgeon. This training will include at a minimum: the laws protecting the sturgeon (Endangered Species Act of 1973) as a federally threatened species, a definition of "*take*" as it applies to the Endangered Species Act § 3.19, the fines and possible imprisonment for *take* of a sturgeon, and images of the sturgeon as it is likely to be seen in Bayou Sara and the Mississippi River. All personnel must sign a worker awareness training *sign-in sheet* as a record of their attendance and training received. Any new workers that did not receive the initial training will need to be trained before working in or near construction areas.
- Informational signs will be posted at visible locations in any construction area where in-water work occurs, including all project-related vessels. The signs will have an image of a sturgeon as it is likely to be seen in Bayou Sara, the federal listing status of the sturgeon, possible punishment for

take of a sturgeon, and phone numbers to immediately call in the event a sturgeon is seen: USFWS's Lafayette Field Office, (337) 291-3100, and the LNHP, (225) 765-2800.

- These informational signs will be weather-proofed (laminated) and large enough so that they can be read from a distance of 20 feet. Signs will be posted prior to and for the duration of the construction project.
- One (1) person per construction site will be made responsible by their crew lead (if not the lead personally) to call the phone numbers stated above in the event a sturgeon is sighted.
- All construction personnel will be responsible for monitoring water-related activities for the presence of sturgeons as part of their regular duties.
- The following are special conditions that will be followed in the event a sturgeon is sighted within 100 yards of the project area:
    i. All construction personnel will have "*Stop Work"* authority if they see a sturgeon within 50 feet of a construction activity, including moving vessels.
    ii. All vessels will operate at no-wake/idle speeds within 100 yards of the work area.
    iii. In-water sediment barriers or siltation barriers will need to be re-secured and monitored.
    iv. Work will only resume without restriction when a previously sighted sturgeon is greater than 100 yards away from the project area.
- Construction work shall only be done during fall low water, outside the spawning season of Pallid sturgeon.

- Per 44 CFR 9.11(d)(4) "there shall be no encroachments, including fill, new construction, substantial improvements of structures or facilities, or other development within a designated regulatory floodway that would result in any increase in flood levels within the community during the occurrence of the base flood discharge. Until a regulatory floodway is designated, no new construction, substantial improvements, or other development (including fill) shall be permitted within the base floodplain unless it is demonstrated that the cumulative effect of the proposed development, when combined with all other existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community."
- Coordination with the West Feliciana Parish Floodplain Administrator is required.

- 44 CFR 9.11(d)(6), no project should be built to a floodplain management standard that is less protective than what the community has adopted in local ordinances through their participation in the National Flood Insurance Program. The applicant is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to the LA GOHSEP and FEMA for inclusion in the permanent project files.
- Sediment control features (Best Management Procedures [BMPs]) will be implemented on land to limit sediment delivery to the Bayou Sara and Mississippi River. Sediment control features will be required around all dredged material, unclean gravel, sand, and/or soil stockpiles. These features may include, but would not be limited to: sediment (silt) fences, straw wattles (fiber rolls), straw bales, sandbag barriers, plastic sheeting, storm drain inlet protection, and street sweeping/vacuuming. As with any stormwater control methods, the implementation of the appropriate controls will be dictated by the type and amount of sediment being controlled and the forecasted environmental conditions. Monitoring of sediment control features will be required prior to and during rain events to ensure control features are installed correctly and are functioning properly.
- In-water silt barriers (turbidity curtains) will be utilized within the Bayou Sara for all aspects of the project, including bank cut and installation of geo-fabric and riprap. Silt barriers will need to be installed in a manner that contains the dislodged sediments within the immediate work area.
- The applicant agrees that if it receives any Federal aid as a result of the attached project application, it will accept responsibility, at its own expense if necessary, for the routine maintenance of any real property, structures, or facilities acquired or constructed as a result of such Federal aid. Routine maintenance shall include, but not be limited to, such responsibilities as keeping vacant land clear of debris, garbage, and vermin; keeping stream channels, culverts, and storm drains clear of obstructions and debris; and keeping detention ponds free of debris, trees, and woody growth.
- The choice of erosion control measure to be employed will be based on the type and duration of disturbance. For example, areas disturbed due to heavy equipment may receive mulch or hydroseeding to control sediment runoff, as needed.
- Any floating debris will be trapped by the silt barrier and removed from the water, and in-water work will only be conducted when waters are calm enough to allow for the efficacy of the silt barrier system. Disposal of all debris will conform to local, state, and federal laws and standards.
- In-water work and all BMPs identified above may be subject to additional stipulations based on permitting requirements by the U.S. Army Corps of Engineer under § 10 of the Rivers and Harbors Act of 1899 and § 404 of the Clean Water Act under the Nationwide Permit No. 13 (Bank Stabilization), dated March 9, 2018.

- Applicant must comply with all conditions listed in following permits: The Louisiana Department of Environmental Quality (LDEQ) issued the Water Quality Certification (WQC) 160629-02 for the USACE Reissuance of Nationwide Permits, including NWP 13, to the New Orleans District (NOD) on February 14, 2017. The WQC is subject to the State of Louisiana NWP Regional Conditions, February 2017.
- All coordination pertaining to these activities and applicant compliance with any conditions should be documented and copies forwarded to GOHSEP and FEMA for inclusion in the permanent project files. New construction must also be compliant with current codes and standards.

CONCLUSIONS

Based upon the incorporated EA, and in accordance with Presidential Executive Orders 12898 (Environmental Justice), 11988 (Floodplain Management), and 11990 (Wetland Protection), FEMA has determined that the proposed action implemented with the conditions and mitigation measures outlined above and in the EA will not have any significant adverse effects on the quality of the natural and human environment. As a result of this FONSI, an EIS will not be prepared (FEMA Instruction 108-1-1) and the proposed action alternative as described in the EA may proceed.

APPROVALS

Jerame Cramer Date
Environmental Liaison Officer
Louisiana Recovery Office

Thomas M. "Mike" Womack Date
Director of the Louisiana Recovery Office
FEMA –DR-1603-1607-LA