Draft Programmatic Environmental Assessment

City of Slidell
Road and Utility Consolidated Improved Project

FEMA-1603-DR-LA

St. Tammany Parish, Louisiana

July 2017

FEMA

U.S. Department of Homeland Security
Federal Emergency Management Agency, Region VI
Louisiana Recovery Office
1500 Main Street
Baton Rouge, LA 70802

TABLE OF CONTENTS

SECTION **PAGE**

1.0 INTRODUCTION 1

1.1 Project Authority 1

1.2 Project Background 1

1.3 Background 1

2.0 PROJECT LOCATION 8

3.0 PURPOSE AND NEED 9

4.0 ALTERNATIVES 10

4.1 Alternative 1 – No Action Alternative. 10

4.2 Alternative 2 (Preferred Alternative) – Comprehensive Infrastructure Repair and Restoration Program. 11

4.2.1 Bayou Pattasat Basin (Project No. 951-5) 15

4.2.2 Bayou Vincent Basin (Project No. 951-6) 16

4.2.3 W-14 Canal Basin (Project No. 951-7) 18

4.2.4 Bayou Bonfouca Basin (Project No. 951-1) 20

4.2.5 Dellwood Basin (Project No. 951-1) 21

4.2.6 Lee Street Basin 22

4.3 Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. 22

5.0 CONSTRUCTION DETAILS 24

5.1 Roadway Repairs 24

5.1.1 Concrete Roadway Repairs 25

5.1.2 Asphalt Road Repairs 25

5.1.3 Curb Repairs 25

5.1.4 Driveway Aprons 25

5.1.5 Sidewalks 25

5.1.6 Handicapped Ramps Replacement or Installation 26

5.1.7 Removal of Existing Vehicle Bridges with Asphalt Decking and Installation of Precast Box Culvert 26

5.1.8 Elevation of Existing Concrete or Asphalt Roadway and Drainage Improvements 28

5.2 Stormwater Collection System Repairs 28

5.2.1 Point Repairs and Line Replacement 28

5.2.2 Catch Basins/Manholes/Inlets 29
5.2.3 Driveway Culvert Replacement 29
5.3 Sanitary Sewer Collection System Repairs 30
5.3.1 Point Repairs 30
5.3.2 Line Replacements 30
5.3.3 Manholes 30
5.4 Water Distribution System Repairs 31
5.4.1 Leak Detection 31
5.4.2 Leak Repairs as Indicated by Leak Detection 31
6.0 AFFECTED ENVIRONMENT AND IMPACTS 32
6.1 Geology, Soils, and Seismicity 32
6.1.1 Regulatory Setting 32
6.1.2 Existing Conditions 32
6.1.3 Environmental Consequences 35
6.2 Waters of the United States and Wetlands 36
6.2.1 Regulatory Setting 36
6.2.2 Existing Conditions 37
6.2.3 Environmental Consequences 39
6.3 Hydrology and Floodplains 45
6.3.1 Regulatory Setting 45
6.3.2 Existing Conditions 46
6.3.3 Environmental Consequences 52
6.4 Water Quality and Resources 54
6.4.1 Regulatory Setting 54
6.4.2 Existing Conditions 55
6.4.3 Environmental Consequences 56
6.5 Land Use and Planning 59
6.5.1 Regulatory Setting 59
6.5.2 Existing Conditions 60
6.5.3 Environmental Consequences 61
6.6 Biological Resources 63
6.6.1 Regulatory Setting 63
6.6.2 Existing Conditions 64

6.6.3 Environmental Consequences 69
6.7 Air Quality 70
6.7.1 Regulatory Setting 70
6.7.2 Existing Conditions 71
6.7.3 Environmental Consequences 71
6.8 Climate Change 72
6.8.1 Regulatory Setting 72
6.8.2 Existing Conditions 73
6.8.3 Environmental Consequences 74
6.9 Noise 75
6.9.1 Regulatory Setting 75
6.9.2 Existing Conditions 75
6.9.3 Environmental Consequences 76
6.10 Traffic 76
6.10.1 Regulatory Setting 76
6.10.2 Existing Conditions 77
6.10.3 Environmental Consequences 77
6.11 Environmental Justice 79
6.11.1 Regulatory Setting 79
6.11.2 Existing Conditions 80
6.11.3 Environmental Consequences 81
6.12 Human Health and Safety 82
6.12.1 Regulatory Setting 82
6.12.2 Existing Conditions 83
6.12.3 Environmental Consequences 83
6.13 Hazardous Materials 84
6.13.1 Regulatory Setting 84
6.13.2 Existing Conditions 85
6.13.3 Environmental Consequences 92
6.14 Cultural Resources 94
6.14.1 Regulatory Setting 94
6.14.2 Existing Conditions 95
6.14.3 Environmental Consequences 96

7.0 CUMULATIVE IMPACTS 100
8.0 EVALUATION 105
9.0 CONDITIONS AND MITIGATION MEASURES 106
10.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION 114
10.1 City of Slidell and FEMA Public Involvement 114
10.2 Agency Coordination 115
11.0 LIST OF PREPARERS 117
12.0 REFERENCES 118

ADDENDICES

Appendix A Construction Drawings and Revised Scope of Work Narrative
Appendix B 8-Step Process
Appendix C Agency Correspondence
Appendix D Public Involvement
Appendix E Public Notice, FONSI

LIST OF TABLES

Table 1. Thresholds for Preparing Tiered Site-Specific Environmental Assessments for City of Slidell Projects 4
Table 2: U.S. Census Socioeconomic/Demographic Data by City of Slidell Zip Codes 81
Table 3: FEMA-funded Project Sites by Program Type and Amount (within City of Slidell) . 101
Table 4: Projects that May Have the Potential to Contribute to Cumulative Impacts 103

LIST OF FIGURES

Figure 1 - Use of PEA in FEMA's Review. 3

Figure 2 - Project Location Map – Slidell, St. Tammany Parish (Source: Google Maps) 8

Figure 3 – Proposed street work within the City of Slidell. (Source: GIS data from the City of Slidell)..... 12

Figure 4 – Proposed sewer and manhole work within the City of Slidell. (Source: GIS data from the City of Slidell)..... 13

Figure 5 - Aerial view of the six project areas to be evaluated in this PEA. The Bayou Pattasat Basin is outlined in blue. The Bayou Vincent Basin is outlined in green. The W-14 Canal Basin is outlined in yellow. The Bayou Bonfouca Basin is outlined in lilac. The Dellwood Basin is outlined in orange. The Lee Street Basin is outlined in bright pink. (Image Source: Google Earth 2017) 14

Figure 6 – Street view of the Bayou Pattasat Basin. (Image Source: Construction Drawings for Bayou Pattasat by Digital Engineering, June 2017) 15

Figure 7 – Street view of the Bayou Vincent Basin project area. (Image Source: Construction Drawings for Bayou Vincent by All South Consulting Engineers, L.L.C., June 2017)..... 16

Figure 8 – Detail of proposed work areas with the Bayou Vincent Basin project area. (Image Source: Construction Drawings for Bayou Vincent by All South Consulting Engineers, L.L.C., June 2017)..... 17

Figure 9 - Street view of the W-14 Canal Basin project area. (Image Source: Construction Drawings for W-14 Canal Basin by All South Consulting Engineers, L.L.C., June 2017) 18

Figure 10 - Detail of proposed work areas with the W-14 Canal Basin project area. (Image Source: Construction Drawings for W-14 Canal Basin by All South Consulting Engineers, L.L.C., June 2017) 19

Figure 11 - Street view of proposed work areas with the Bayou Bonfouca Basin project area. (Image Source: Preliminary Design Construction Drawings for Bayou Bonfouca Basin by CDM Smith, May 2017) 20

Figure 12 - Street view of proposed work areas with the Dellwood Basin project area. (Image Source: Preliminary Design Construction Drawings for Dellwood Basin by CDM Smith, May 2017) 21

Figure 13 - Street view of proposed work areas with the Lee Street Basin project area. (Image Source: Preliminary Design Construction Drawings for the Lee Street Basin by Richard C. Lambert Consultants, LLC, April 2017)..... 22

Figure 14 – Street view of the South Magnolia Street Bridge (Image Source: Google Maps) 27

Figure 15 - Street view of the bridge near the intersection of North Carnation Street and Willow Street (Image Source: Google Maps)..... 28

Figure 16 - Generalized Geologic Map of Louisiana indicating project area (Louisiana Geological Survey 2010)..... 34

Figure 17 - General Soil Map of St. Tammany Parish, Louisiana, revised and updated based on latest soil series nomenclature (USDA 1990) 35

Figure 18 – Map depicting the USFWS designated wetlands within the City of Slidell. (Source: GIS data from the City of Slidell) 38

Figure 19 - Aerial image depicting the location of the Magnolia Street Bridge. According to the map, no USFWS-designated wetlands are mapped in the immediate area. (Image Source: USFWS Wetlands Mapper) 41

Figure 20 – Aerial image depicting the location of the North Carnation Street Bridge and adjacent USFWS-designated wetlands. Directly beneath the bridge is a tributary of Bayou Vincent, which is mapped as riverine wetland. To the northeast of the bridge is an area mapped as freshwater forested/shrub wetland. (Image Source: USFWS Wetlands Mapper) 42

Figure 21 - City of Slidell Drainage Basins (Image provided by the SubRecipient) 47

Figure 22 - Map of Lake Pontchartrain and the Rigolets and Chef Passes. (Source: Google Maps) 49

Figure 23 – FIRM Panel 2202040005C, dated April 21, 1999. (Source: FEMA Map Store) 50

Figure 24 – FIRM Panel 22020400010C, dated April 21, 1999. (Source: FEMA Map Store) ... 51

Figure 25 - Flood zones as determined by FEMA for the City of Slidell based on Preliminary DIRMs dated 30 April 2008. The 100-year flood zones are depicted in pink with flood elevations provided. The DFIRMs from which this data was derived were not adopted by St. Tammany Parish. (Image Source: http://maps.lsuagcenter.com/floodmaps/?FIPS=22103) 52

Figure 26 - Critical Habitat Units for the Dusky Gopher Frog (USFWS 2012) 68

Figure 27 – Aerial view depicting the proposed project footprints and the Bayou Bonfouca and the Southern Shipbuilding Superfund site footprints. The Superfund site footprints are depicted in red. (Image Source – Google 2017) 90

Figure 28 - Location of Bayou Bonfouca Superfund Site and Southern Shipbuilding Superfund Site in relation to the city streets that may be impacted by the proposed project. (Source: GIS data provided by the City of Slidell) 91

Figure 29 - Location of Bayou Bonfouca Superfund Site and Southern Shipbuilding Superfund Site in relation to the city sewer infrastructure that may be impacted by the proposed project. (Source: GIS data provided by the City of Slidell) 92

Figure 30 - Map depicting FEMA-funded project sites within the City of Slidell. 102

LIST OF ACRONYMS

ABFE	Advisory Base Flood Elevation
ACM	Asbestos Containing Materials
ACTT	Alabama-Coushatta Tribe of Texas
ADA	Americans with Disabilities Act
APE	Area of Potential Effects
BFE	Base Flood Elevation
bgs	below ground surface
BMP	Best Management Practices
CAA	Clean Air Act
CATEX	Categorical Exclusions
CBRA	Coastal Barrier Resource Act
CBRS	Coastal Barrier Resources System
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CNO	Choctaw Nation of Oklahoma
CO	Carbon Monoxide
CPRA	Coastal Protection Restoration Authority
CT	Coushatta Tribe of Louisiana
CUP	Coastal Use Permit
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dBA	decibels A
DFIRM	Digital Flood Insurance Rate Map
DNL	Day/Night Noise Level
DPU	Department of Public Utilities
DPW	Department of Public Works
EA	Environmental Assessment
EHP	Environmental & Historic Preservation
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act; Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act

GIS	Geographic Information System
GOHSEP	Louisiana Governor's Office of Homeland Security and Emergency Preparedness
HFC	Hydrofluorocarbons
HMGP	Hazard Mitigation Grant Program
IER	Individual Environmental Reports
JBCI	Jena Band of Choctaw Indians
LaDOTD	Louisiana Department of Transportation and Development
LCRP	Louisiana Coastal Resources Program
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LGS	Louisiana Geological Survey
LNHP	Louisiana Natural Heritage Program
LPDES	Louisiana Pollutant Discharge Elimination System
LSU	Louisiana State University
MBCI	Mississippi Band of Choctaw Indians
MOA	Memorandum of Agreement
MPH	miles per hour
MUTCD	Manual on Uniform Traffic Control Devices
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Pollutants
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Services
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OCM	Office of Coastal Management
O.D.	outer diameter
OPA	Otherwise Protected Area
OSHA	Occupational Safety and Health Administration
PA	Public Assistance
PACM	Possible Asbestos Containing Materials
PAH	Polynuclear Aromatic Hydrocarbons

PCBs	Polychlorinated Biphenyls
PEA	Programmatic Environmental Assessment
PFC	Perfluorinated Compounds
PNP	Private Non-Profit
RCP	Reinforced Concrete Pipe
RCPA	Reinforced Concrete Pipe Arched
RCRA	Resource Conservation and Recovery Act
REC	Record of Environmental Consideration
RHA	Rivers and Harbors Act
ROW	Right of way
SCM	Stormwater Control Measures
SDS	Safety Data Sheets
SDWA	Safe Drinking Water Act
SEA	Site-Specific Environmental Assessment
SELA	Southeast Louisiana Urban Flood Control Project
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office/Officer
SPERP	Spill Prevention and Emergency Response Plan
SWPPP	Stormwater Pollution Prevention Plan
TBTL	Tunica-Biloxi Tribe of Louisiana
TMDLs	Total Maximum Daily Loads
TSCA	Toxic Substance Control Act
µg/kg	microgram per kilogram
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 INTRODUCTION

1.1 Project Authority

Hurricane Katrina, a Category 3 hurricane, at landfall, with a storm surge above normal high tide levels, moved across the Louisiana, Mississippi, and Alabama gulf coasts on August 29, 2005. Maximum sustained winds at landfall were estimated at 125 miles per hour (MPH). President George W. Bush signed a disaster declaration (FEMA-1603-DR-LA) for the state of Louisiana on August 29, 2005, authorizing the Department of Homeland Security's 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. Section 406 of the Stafford Act authorizes FEMA's Public Assistance (PA) Program to repair, restore, and replace state and local government and certain private nonprofit facilities damaged as a result of the declared event.

1.2 Project Background

FEMA has determined that the City of Slidell (Sub-Recipient) is eligible to receive FEMA PA funding to repair, improve, and replace damage to roads, drainage and subsurface utilities resulting from Hurricane Katrina. The City of Slidell has submitted a request for FEMA funding for road and utility repairs in six (6) areas (referred to as basins), of the City of Slidell, with additional road and utility work to follow, collectively referred to as the Road and Utility Consolidated Improved Project. The City of Slidell has requested funding to repair, replace, or make necessary improvements to the road and utility infrastructure in accordance with the National Environmental Policy Act of 1969, 42 U.S.C. § 4321 et seq., (NEPA).

1.3 Background

NEPA mandates that federal agencies take into account the impacts of their actions, including programs, regulations, policies, and grant-funded projects, on the quality of the human and natural environment. In accordance with FEMA Instruction 108-1-1, a Draft Programmatic Environmental Assessment (PEA) has been prepared pursuant to Section 102 of the National Environmental Policy Act (NEPA) of 1969, as implemented by the regulations promulgated by the President's Council on Environmental Quality (Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act 2005). They contain a list of actions, referred to as Categorical Exclusions (CATEX), that typically do not individually or cumulatively have significant impacts on the human environment. An action that would normally qualify for a CATEX may have extraordinary circumstances that disqualify it from the CATEX's applicability. FEMA's list of extraordinary circumstances can be found at 44 CFR 10.8(d)(3). Actions that are not covered by a CATEX or actions covered by a CATEX that have unresolved extraordinary circumstances require the preparation of an Environmental Assessment (EA) under NEPA to determine the nature and extent of impacts of the action and determine whether the action has significant impacts on the quality of the human or natural environment. An Environmental Impact Statement (EIS) is required when an action will have a significant impact on the quality of the human or natural environment.

The CEQ regulations at 40 CFR §§ 1500.4(i), 1502.4 and 1502.20 encourage the development of program-level NEPA environmental documents and tiering for eliminating repetitive discussions and to focus on the issues specific to the subsequent action. CEQ issued "Final Guidance for Effective Use of Programmatic NEPA Reviews" on December 18, 2014. This document outlines and clarifies when and how Federal agencies can use programmatic NEPA reviews in accordance with the National Environmental Policy Act and the CEQ NEPA Regulations. Programmatic NEPA reviews add value and efficiency to the decision-making process when they inform the scope of decisions and subsequent tiered NEPA reviews. According to this (2014) CEQ guidance, a programmatic NEPA review may be appropriate when the action being considered is subject to NEPA requirements and the agency is approving multiple actions or projects that are temporally or spatially connected and that will have a series of associated concurrent or subsequent decisions. This would be the case for the implementation of this PA grant within the City of Slidell. FEMA has developed this PEA under this CEQ authority.

FEMA's experience conducting environmental planning and historic preservation reviews for road repairs, improvements, or replacements has provided the agency's officials and reviewers with sufficient information to determine the likely impacts of this type of action on the human and natural environment. This PEA captures and builds upon this knowledge and experience and furthers the goals of the National Environmental Policy Act.

This PEA will also facilitate FEMA's compliance with other Environmental and Historic Preservation (EHP) requirements by providing a framework to address the impacts of the proposed repair work construction actions under FEMA's PA program. FEMA coordinates and integrates to the maximum extent possible the review and compliance process required under similar requirements such as the Section 106 of the National Historic Preservation Act (NHPA), Section 7 of the Endangered Species Act (ESA), the eight-step process of Executive Order 11988 and 11990, and others. This PEA provides a framework on how FEMA integrates these requirements with NEPA.

Finally, the PEA provides the public and decision-makers with the information required to understand and evaluate the potential environmental consequences of these actions. This PEA meets the NEPA goals of impact identification and disclosure and addresses the need to streamline the NEPA review process.

As plans and specifications for individual basins and associated infrastructure repair, replacement and improvement projects are developed, FEMA will conduct individual project reviews through a FEMA PA grant amendment process. *Figure 1* depicts how this PEA will be used by FEMA to evaluate currently known basins, road, and utility work and future road and utility work within the City of Slidell in an efficient way, while still adhering to NEPA and FEMA standards of EHP review. If the individual project meets the scope, impacts, and mitigation covered in this PEA, then only a Record of Environmental Considerations (REC) would be required. If the scope is covered but the action triggers the need for additional analysis based on the thresholds established in Table 1, FEMA will engage in the appropriate analysis or consultation requirement, prepare a tiered Site-Specific EA (SEA) under this PEA with the additional information, and provide a 30 day comment period to determine whether a Finding of No Significant Impact (FONSI) can be issued or whether an EIS is required. If the proposed scope of work is not covered in this PEA, a separate stand-alone EA will be required.

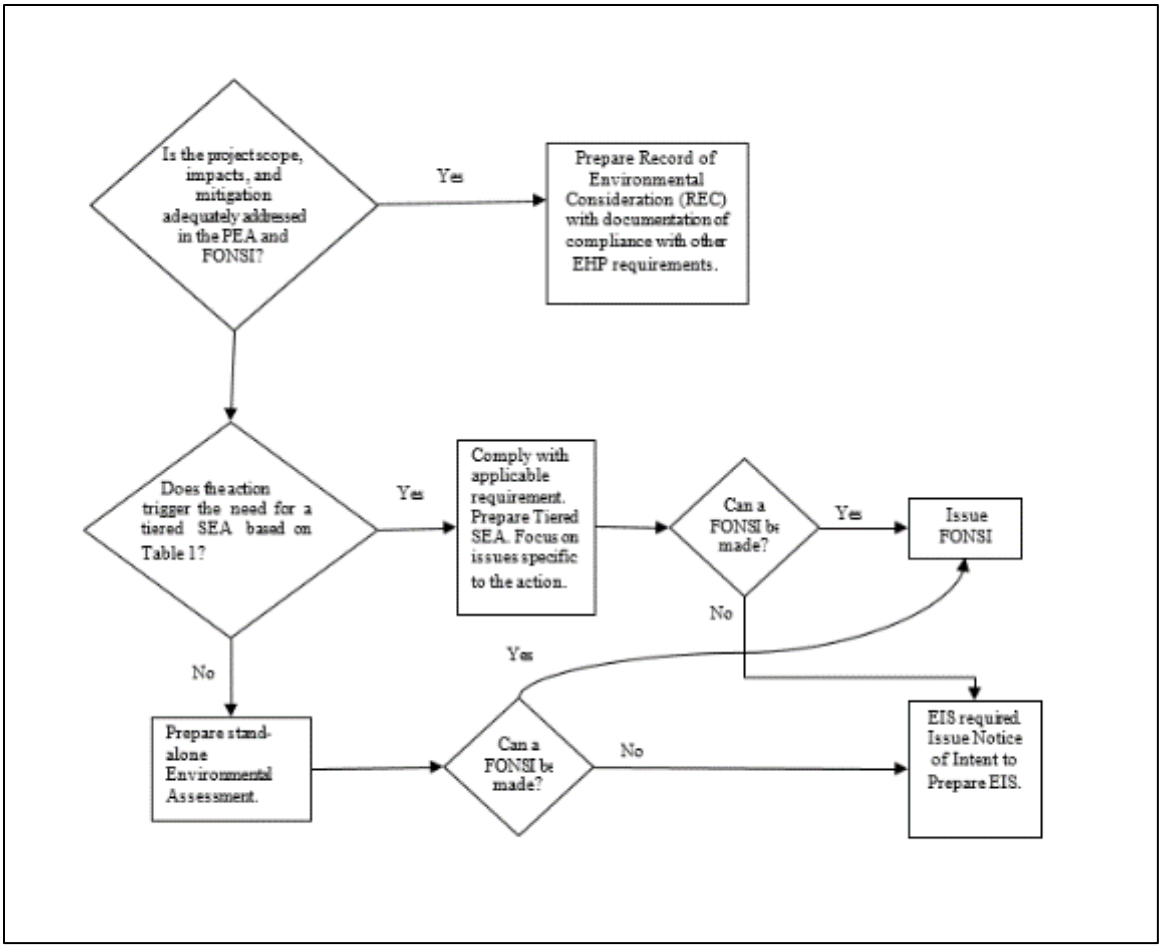

Figure 1 - Use of PEA in FEMA's Review.

Based on the assumption that a signed FONSI will become the resulting clearance document of this PEA process and an EIS would not be required, Table 1 establishes the criteria for determining if a proposed action is covered under the signed FONSI for this PEA and would only require a REC to complete the NEPA review for the specific project, or if a tiered SEA and an additional 30 day public comment period would be required.

Table 1. Thresholds for Preparing Tiered Site-Specific Environmental Assessments for City of Slidell Projects

Area of Evaluation	Action Covered by this PEA	Tiered Site-Specific Environmental Assessment Required
Land Use	No impacts to land use, or the proposed action would have negligible or minor impacts to land use and would be consistent with surrounding or planned land uses. The proposed action would be consistent with respective state Coastal Zone Management plans, CBRA and FPPA. or Mitigation measures are used to reduce the level of impacts below the level of significance.	The proposed action will significantly change the surrounding land uses in the short- and long-term. or The proposed action disturbs more than 5 acres of land. or The proposed action would not be consistent with the surrounding land use and the local land use agency requires a special land use permit or waiver. or The proposed action would not be consistent with state Coastal Zone Management plans or CBRA. or The proposed action may cause significant impacts to prime and unique farmland (project scores more than 160 on Farmland Impact Conversion Rating Form AD-1006).
Geology, Soils, and Seismicity	The proposed action would have no, negligible, or minor impacts to geology, soils, and seismicity. or Mitigation measures are used to reduce the level of impacts below the level of significance.	Impacts on geology, soils, and seismicity as a result of the proposed action may be significant. or The proposed action would disturb more than 5 acres of land.
Water Quality and Resources	The proposed action would have no, negligible or minor impacts to water quality and would be at or below water quality standards or criteria. Localized and short-term alterations in water quality and hydrologic conditions relative to historical baseline may occur. or Mitigation measures are used to reduce the level of impacts below the level of significance.	The proposed action would cause or contribute to existing exceedances of water quality standards on either a short-term or prolonged basis. or The proposed action would disturb more than 5 acres of land.

Area of Evaluation	Action Covered by this PEA	Tiered Site-Specific Environmental Assessment Required
Floodplains	Individual roads covered by the class review under this PEA. or Roads within the 500 year floodplain	Individual road repairs, replacements, and improvements not covered by the class review under this PEA Programmatic 8-step/Final Floodplain Notice. or Roads within the 100-year floodplain not covered by the 2010 Programmatic 8-step/Final Floodplain Notice.
Wetlands	Proposed action is not located in and does not adversely affect wetlands.	Proposed action is located in or would adversely affect wetlands.
Biological Resources	The proposed action would have no, negligible, minor, or moderate impacts to native species, their habitats, or the natural processes sustaining them. Population levels of native species would not be affected. Sufficient habitat would remain functional to maintain viability of all species. and In regard to federally listed species and critical habitat, FEMA can make a "No Effect" determination. or FEMA can make a "Not Likely to Adversely Affect" determination along with concurrence from USFWS or NMFS. or Mitigation measures are used to reduce the level of impacts below the level of significance.	The proposed action may have significant impact on native species, their habitats, or the natural processes sustaining them. Population numbers, population structure, genetic variability, and other demographic factors for species might have large, short-term declines, with long-term population numbers significantly depressed. Loss of habitat would affect the long-term viability of native species. or FEMA determines that the proposed action is likely to adversely affect a listed species or will adversely modify critical habitat. or The proposed action would disturb more than 5 acres of land.
Human Health and Safety	Hazardous or toxic materials and/or wastes resulting from the proposed action would be safely and adequately managed in accordance with all applicable regulations and policies, with limited exposures or risks. There would be no short- or long-term adverse impacts to public safety. or Mitigation measures are used to reduce the level of impacts below the level of significance.	The proposed action would result in a net increase in the amount of hazardous or toxic materials and/or wastes to be handled, stored, used, or disposed of, resulting in unacceptable risk, exceedance of available waste disposal capacity, or probable regulatory violation(s). Public safety would be compromised and vulnerabilities would increase. or A Phase I or II environmental site assessment indicates that contamination exceeding reporting levels are present and further action is warranted.

Area of Evaluation	Action Covered by this PEA	Tiered Site-Specific Environmental Assessment Required
Minority and Low-Income Populations	There would be no disproportionately high and adverse environmental or adverse health effects to low-income and/or minority populations. or Mitigation measures are used to reduce the level of impacts below the level of significance.	There would be unmitigated disproportionately high and adverse environmental and health impacts to low-income or minority populations.
Historic Properties	No historic properties affected determination or FEMA makes a "No Adverse Effect" determination with concurrence from SHPO/THPO.	FEMA makes an "Adverse Effect" determination with concurrence from SHPO/THPO.
Air Quality	Emissions from the proposed action for NAAQS in nonattainment and maintenance areas would be less than exceedance levels. Emissions in attainment areas would not cause air quality to go out of attainment for any NAAQS. or Mitigation measures are used to reduce the level of impacts below the level of significance.	Emissions from the proposed action for NAAQS would be greater than the exceedance levels for nonattainment and maintenance areas. Emissions in attainment areas would cause an area to be out of attainment for any NAAQS.
Noise	Noise levels resulting from the proposed action would not exceed typical noise levels expected from construction equipment or generators. Noise generated by construction and operation of the facility would be temporary or short-term in nature. or Mitigation measures are used to reduce the level of impacts below the level of significance.	Noise levels would exceed typical noise levels expected from construction equipment and generators on a permanent basis or for a prolonged period of time.

Area of Evaluation	Action Covered by this PEA	Tiered Site-Specific Environmental Assessment Required
Hazardous Materials	Projected impacts resulting from the proposed action would not exceed typical exposure to hazardous chemicals and environments from construction equipment or generators. Exposure to hazardous materials or environments by construction and operation of the facility would be temporary or short-term in nature. or Mitigation measures are used to reduce the level of impacts below the level of significance.	The potential exposure to hazardous materials would exceed typical exposures during construction activities. or A portion of a given proposed scope of work would occur within or adjacent to, or would impact or be impacted by either of the two Superfund sites located in Slidell, LA, (see Section 6.13).

2.0 PROJECT LOCATION

The City of Slidell, which was established in 1882-1883, is located in southeast St. Tammany Parish. The city is located in southeast Louisiana (*Figure 2*). St. Tammany Parish is approximately 1,124 square miles in size, of which approximately 846 square miles (approximately 75.3 percent) is land, the remainder, 278 square miles, is open water. St. Tammany Parish is bordered to the east by the Pearl River, Hancock County, Mississippi, and Pearl River County, Mississippi; to the south by Orleans Parish and Lake Pontchartrain; to the west by Tangipahoa Parish; and to the north by Washington Parish. St. Tammany Parish had approximately 233,740 residents according to 2010 census figures. Major transportation routes within St. Tammany Parish include Interstate Highways 10, 12, and 59; and U.S. Highways 11, 90, and 190. The City of Slidell had approximately 27,068 residents, according to 2010 census information.

Slidell is comprised of 15.2 square miles, of which 14.8 square miles is land, and 0.35 square miles is open water. The largest industries in Slidell are comprised of educational services, health care, and social assistance. Other important contributors to the Slidell economy are retail trades; professional, scientific, managerial, and administration; the arts, entertainment, and recreation; and construction trades. Slidell is located approximately 82 miles east of Baton Rouge, the state capitol of Louisiana, approximately 30 miles northeast of New Orleans, and approximately 140 miles north-northwest from the Gulf of Mexico.

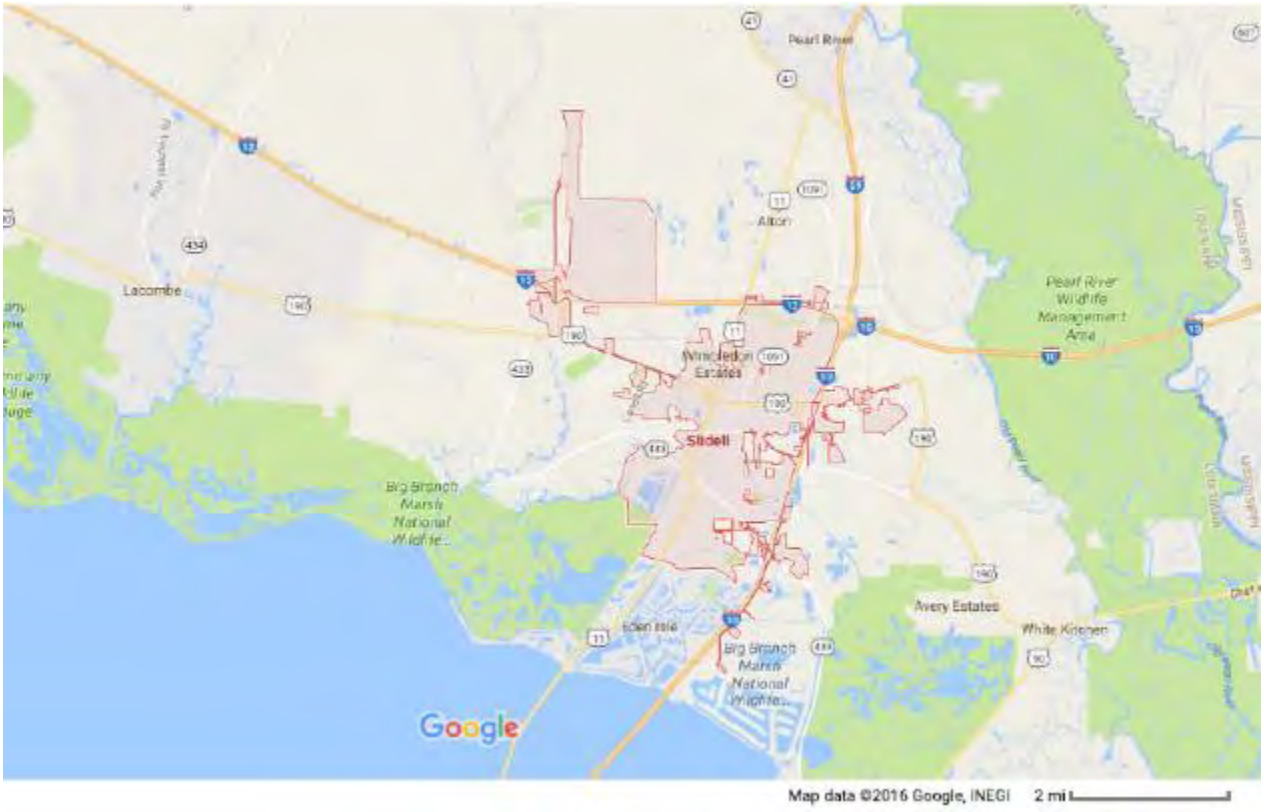

Figure 2 - Project Location Map – Slidell, St. Tammany Parish (Source: Google Maps)

3.0 PURPOSE AND NEED

The purpose of this project is to restore damage sustained as a result of Hurricane Katrina to roads, drainage lines, and sewer lines within the City of Slidell in St. Tammany Parish and restore this infrastructure to its pre-storm condition and functionality in order to provide safe and adequate transportation facilities that promote future community growth and economic development, more efficiently support fire protection, support the public health of all residents, improve sewerage collection services to support public safety and sanitation, and more effectively collect and convey stormwater out of the city to reduce the risk from future flooding events. Storm-related damage is negatively impacting the ability of these critical infrastructure systems to function as intended, inhibiting growth and economic development, accelerating further degradation due to normal usage, and exposing the public to undo hardship and health risks.

The objective of FEMA's PA Grant Program is to provide assistance to State, Tribal and local governments, and certain types of Private Not-for-Profit (PNP) organizations, so that communities can quickly respond to, recover from, and mitigate major disasters and emergencies. Thus, an objective of this PEA is for FEMA PA funding to be utilized to restore Hurricane Katrina damaged roads and public utilities in the City of Slidell, LA.

4.0 ALTERNATIVES

NEPA requires Federal agencies to consider the effects of a proposed action and any reasonable alternatives on the human and natural environment. Therefore, a key step in the environmental assessment process is to identify a range of reasonable alternatives to be studied in detail in the EA. This step is commonly referred to as an alternatives development and screening process. Its purpose is to identify reasonable alternatives to the proposed action to allow for meaningful subsequent comparison of how these alternatives may affect the human and natural environment. This section describes alternatives proposed and considered in addressing the purpose and need. The following categories reflect the criteria established for the screening process: ability to satisfy purpose and need, ability to minimize impacts on the human and natural environments, ability to repair and restore the damaged City of Slidell transportation system, and consideration of overall conceptual cost estimates.

Currently, according to the *MySlidell* website (MySlidell, 2016), road maintenance and utility repairs are conducted by different divisions of the Slidell Department of Public Works (DPW) and the Slidell Department of Public Utilities (DPU):

- The Streets Division of the DPW is responsible for concrete street panels, sidewalk and curbing repairs. This division also maintains all asphalt streets and new asphalt overlays. The street sweeper is assigned to this division, cleaning and sweeping all curbed streets within the City of Slidell on a yearly schedule.
- The Wastewater Collection Division of the DPU is responsible for the repair of broken sewer mains; the installation and repair of clean-outs, laterals, and service lines; the repair and construction of manholes; the maintenance and repair of wastewater force mains from lift stations; and the maintenance of all lift stations in the City of Slidell.
- The Water Division of the DPU is responsible for the repair of broken water mains, the installation and repair of service lines and water taps and the operation of water wells in the City of Slidell.

This PEA presents an analysis of three alternatives involving proposed work to be performed:

Alternative 1 - (No Action Alternative), **Alternative 2 - (Preferred Alternative – Comprehensive Infrastructure Repair and Restoration Program)**, and **Alternative 3 - (Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements**).

4.1 Alternative 1 – No Action Alternative.

Under the No Action Alternative, the City of Slidell would not receive FEMA funding to repair any damaged roads, drain lines, water lines, and sewer lines. Storm-related damage would continue to negatively impact the ability of these roads, drain lines, water lines, and sewer lines to function as intended. Consequently, the community would be deprived of critical infrastructure which would inhibit the City's future growth and economic development, accelerating further degradation of the City's transportation network, drainage system, water distribution system, and sewerage collection system, and exposing the public to undue risk. This alternative does not meet the purpose and need, but will continue to be evaluated throughout this PEA and serve as a baseline comparison of impacts from other action alternatives.

4.2 Alternative 2 (Preferred Alternative) – Comprehensive Infrastructure Repair and Restoration Program.

The preferred action alternative would utilize FEMA-provided PA funding to repair, replace, or improve storm-damaged roads and underground utility lines to pre-storm condition and functionality throughout much of the City of Slidell. In 2016, the City of Slidell formally requested that FEMA consolidate nine (9) existing infrastructure PWs into one large project. Doing this would eliminate a huge administrative burden for the City of Slidell as well as allow for the City to make additional repairs. Comprehensive infrastructure repair and restoration projects would consist of one or more of the following project elements: drainage system damage assessment, underground utility line point repair or replacement, incidental repairs, minor rehabilitation, and major rehabilitation and full roadway reconstruction (see Construction Details in Section 5.0 for additional details). Equipment utilized to perform this work may include, but is not limited to, dump trucks, powered hand equipment to saw cut pavement and break-up damaged pavement, front end loaders, backhoes, boring machines, excavators, pipe pullers, pipe lining machines, concrete trucks, compactors, bulldozers, graders, milling machines, asphalt pavers, roadway striping machines, and asphalt rollers. The City of Slidell has provided FEMA with GIS data depicting the scope of the proposed programmatic undertaking (*Figures 3 and 4*).

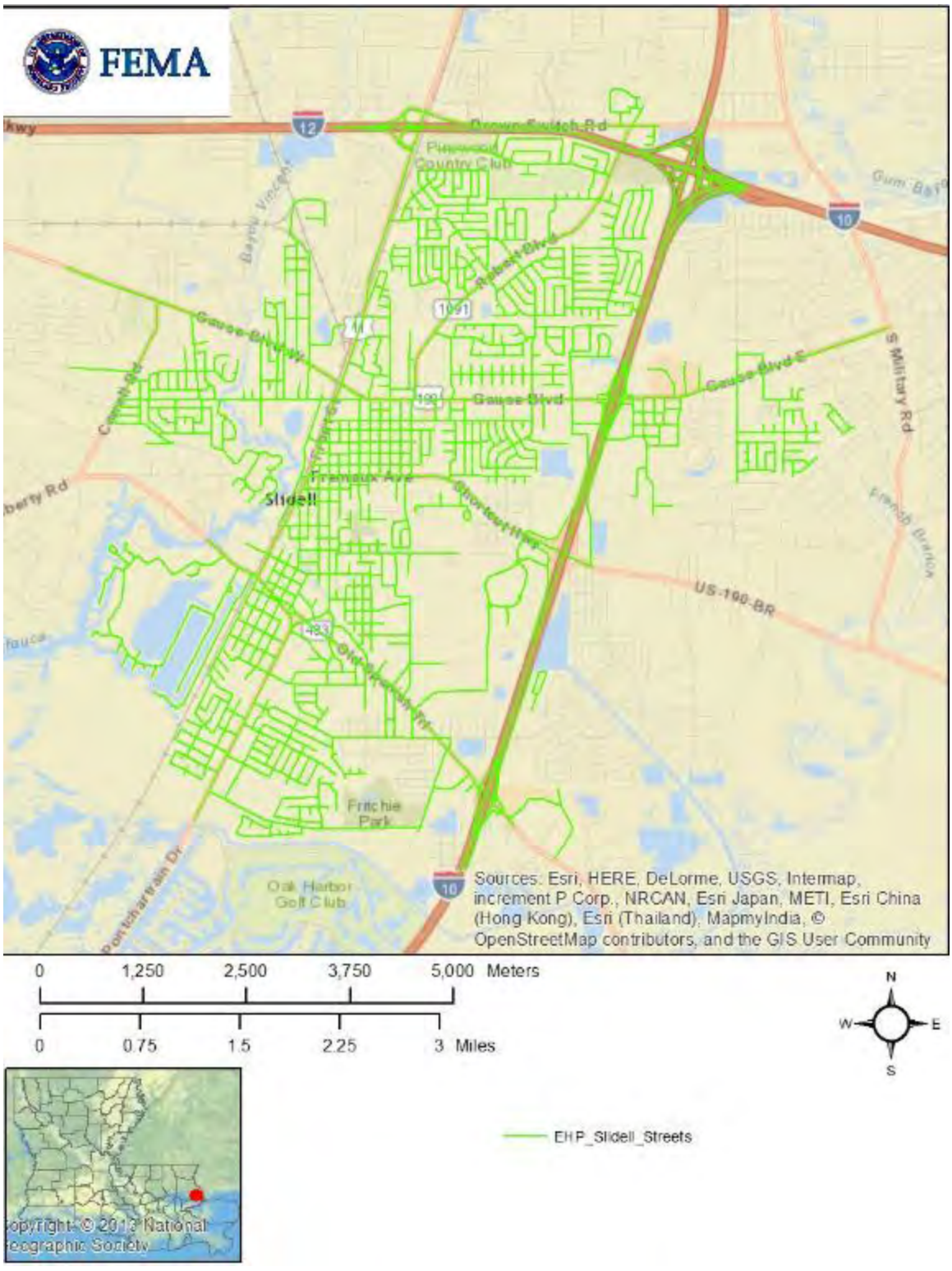

Figure 3 – Proposed street work within the City of Slidell. (Source: GIS data from the City of Slidell)

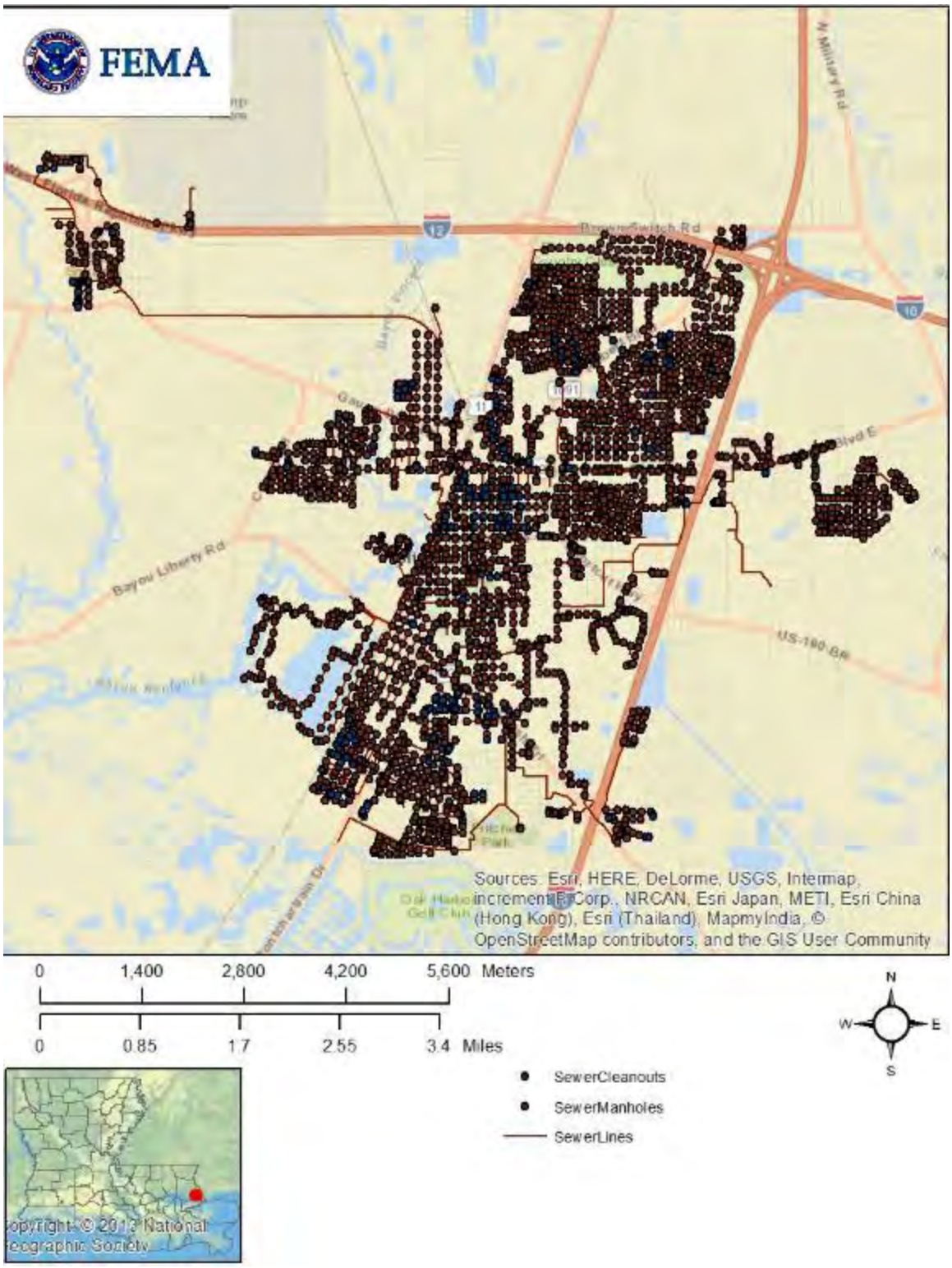

Figure 4 – Proposed sewer and manhole work within the City of Slidell. (Source: GIS data from the City of Slidell)

Although this PEA is written to be programmatic in nature, and is intended to evaluate all potential road and utility work that could be performed throughout the City of Slidell with FEMA funding, the City of Slidell has provided FEMA with proposed scopes of work, in various stages of development, for six (6) of the basins within the City, which will be evaluated in this PEA. The proposed specific road and utility repair and replacement work within the six (6) basins is described below. Upon the finalization of this PEA, FEMA EHP staff will conduct a final review and prepare the appropriate tiered EHP documentation (consisting of a REC or an SEA) for each Basin based on criteria in *Figure 1* and Table 1. *Figure 5* depicts the locations of the Basins in Slidell.

As of 28 June 2017, the City of Slidell had provided FEMA with 90 percent completed construction drawings, technical specifications, and a narrative description of the road and utility repair and replacement work proposed for the Bayou Pattasat Basin, the Bayou Vincent Basin, and the W-14 Basin. In addition, FEMA has received preliminary (50 percent completed) drawings and technical specifications for the Bayou Bonfouca Basin, the Dellwood Basin, and the Lee Street Basin.

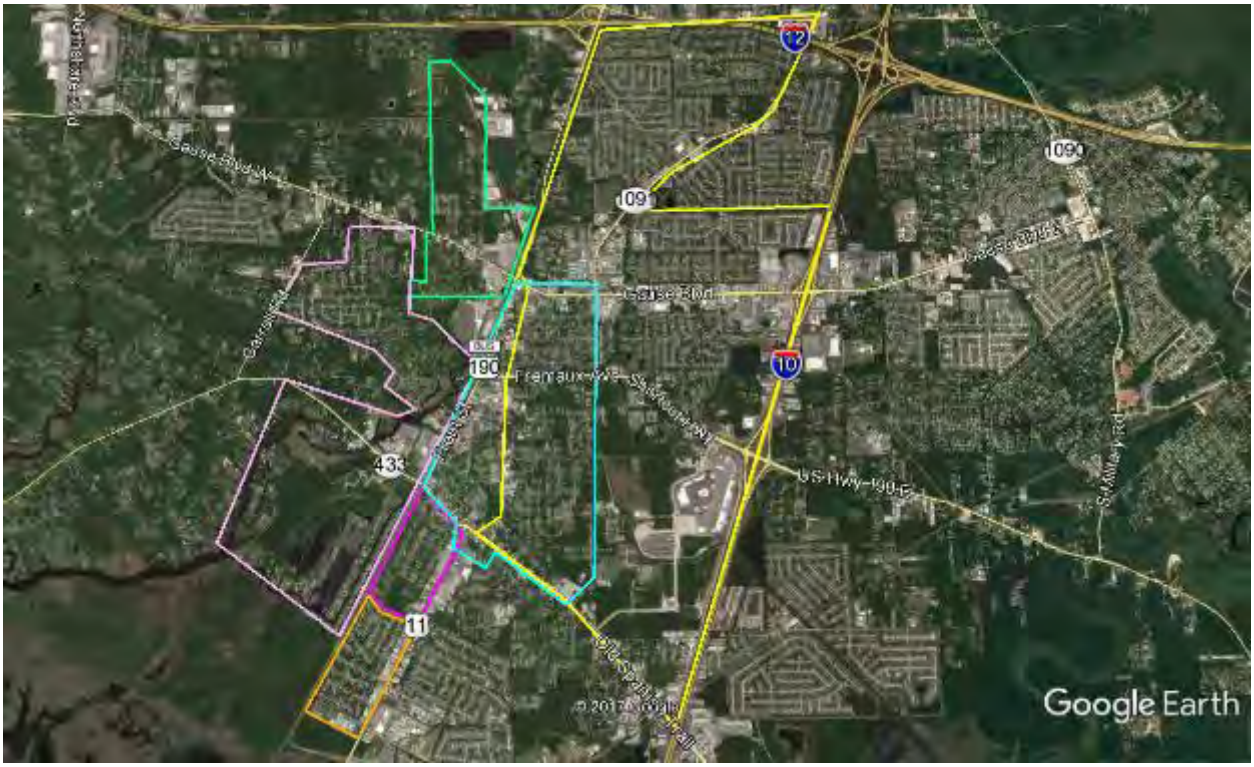

Figure 5 - Aerial view of the six project areas to be evaluated in this PEA. The Bayou Pattasat Basin is outlined in blue. The Bayou Vincent Basin is outlined in green. The W-14 Canal Basin is outlined in yellow. The Bayou Bonfouca Basin is outlined in lilac. The Dellwood Basin is outlined in orange. The Lee Street Basin is outlined in bright pink. (Image Source: Google Earth 2017)

4.2.1 Bayou Pattasat Basin (Project No. 951-5)

The Bayou Pattasat Basin is bounded to the north by Gause Boulevard, to the east by 11th Street and Terrace Avenue, to the south by Old Spanish Trail (LA State Highway 433), and to the west by Front Street (U.S. Highway 11). *Figure 6* depicts a street view of the Bayou Pattasat Basin project area. The Latitude and Longitude of the four corners of the proposed work area footprint are:

- Northwest 30.284522 -89.780434
- Northeast 30.284899 -89.771386
- Southeast 30.255757 -89.772178
- Southwest 30.268063 -89.788634

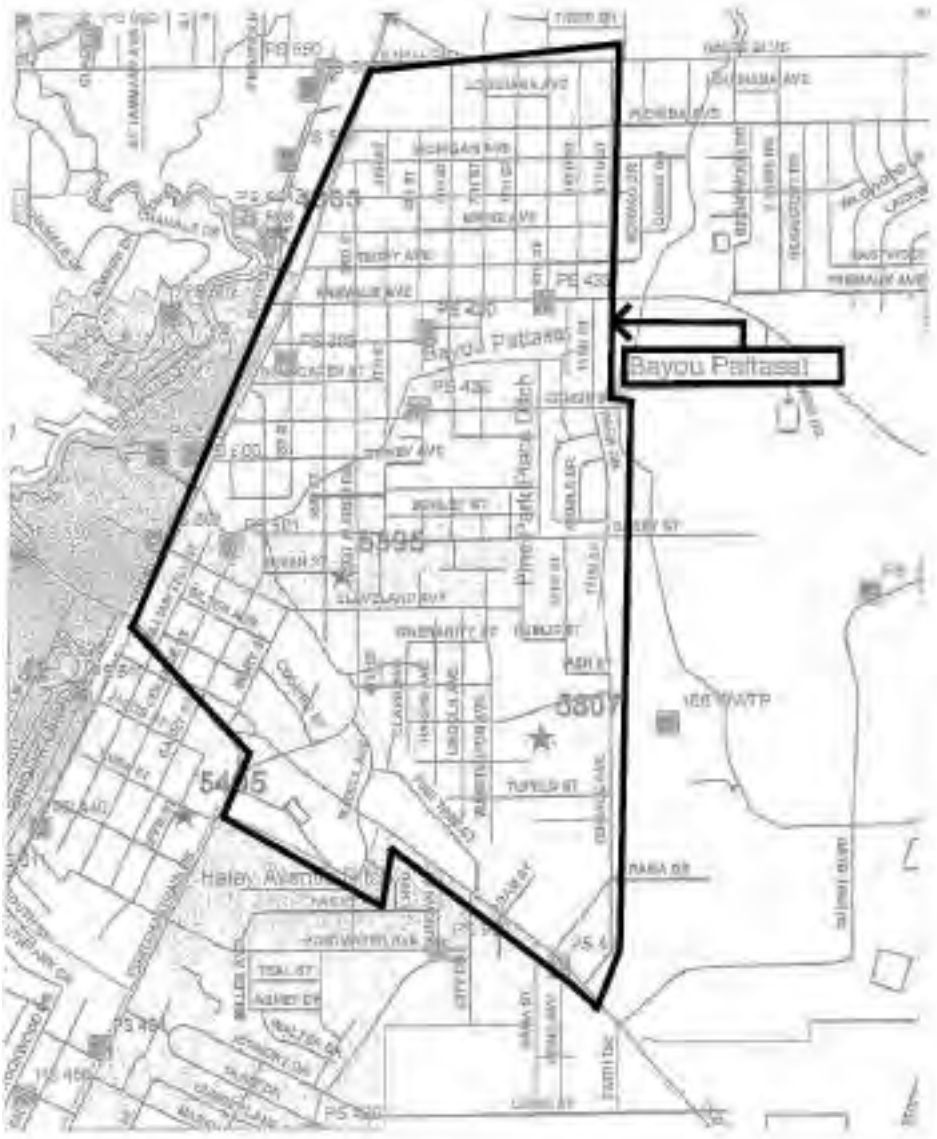

Figure 6 – Street view of the Bayou Pattasat Basin. (Image Source: Construction Drawings for Bayou Pattasat by Digital Engineering, June 2017)

4.2.2 Bayou Vincent Basin (Project No. 951-6)

The Bayou Vincent Basin is bounded to the north by Holly Street, to the east by Front Street (U.S. Highway 11) and North Carnation Street, to the south by West Hall Avenue, and to the west by Donya Street and Jackson Road. *Figure 7* depicts a street view of the Bayou Vincent Basin project area and *Figure 8* depicts specific work areas within the Bayou Vincent Basin project footprint. The Latitude and Longitude of the four corners of the proposed work area footprint are:

- Northwest 30.306657 -89.789268
- Northeast 30.291421 -89.777721
- Southeast 30.284767 -89.780211
- Southwest 30.284332 -89.790951

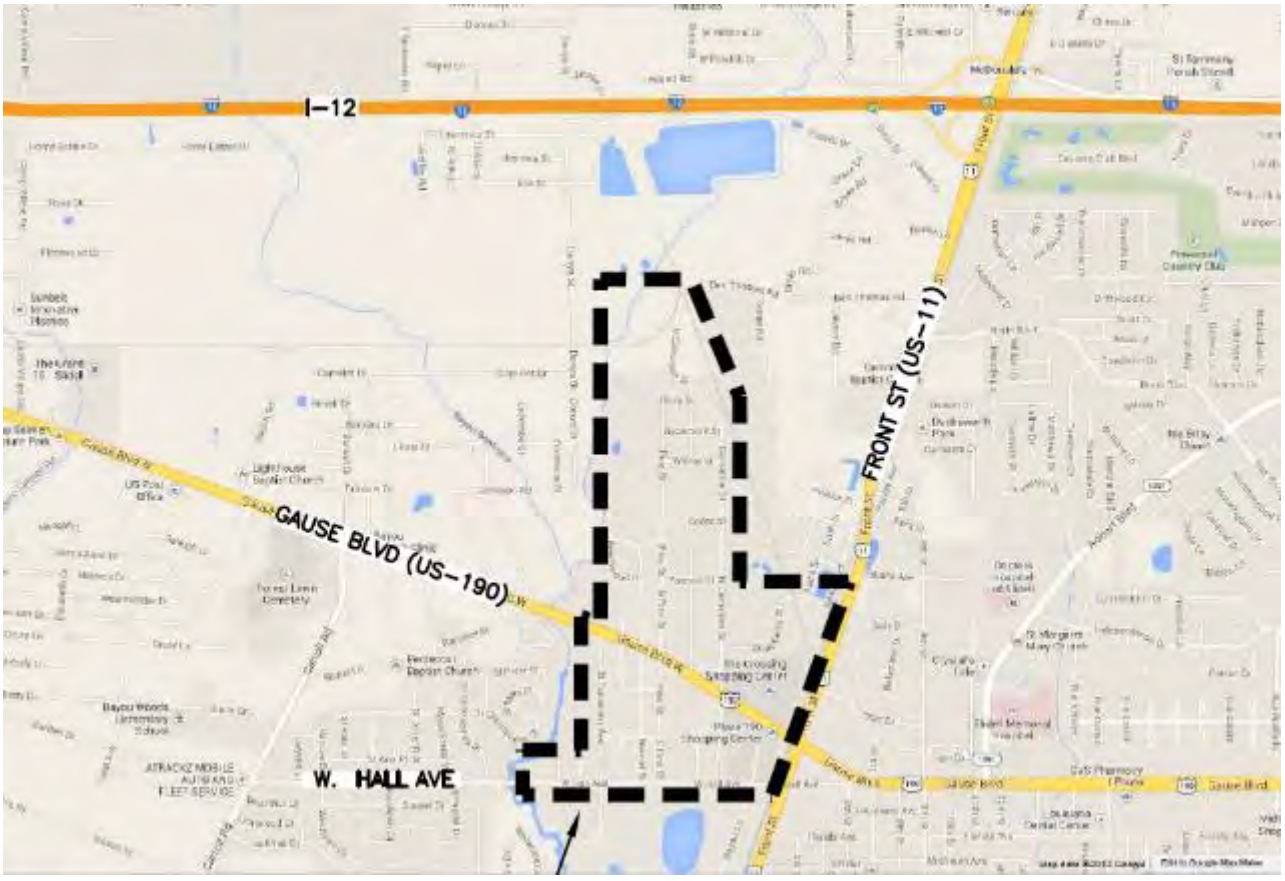

Figure 7 – Street view of the Bayou Vincent Basin project area. (Image Source: Construction Drawings for Bayou Vincent by All South Consulting Engineers, L.L.C., June 2017)

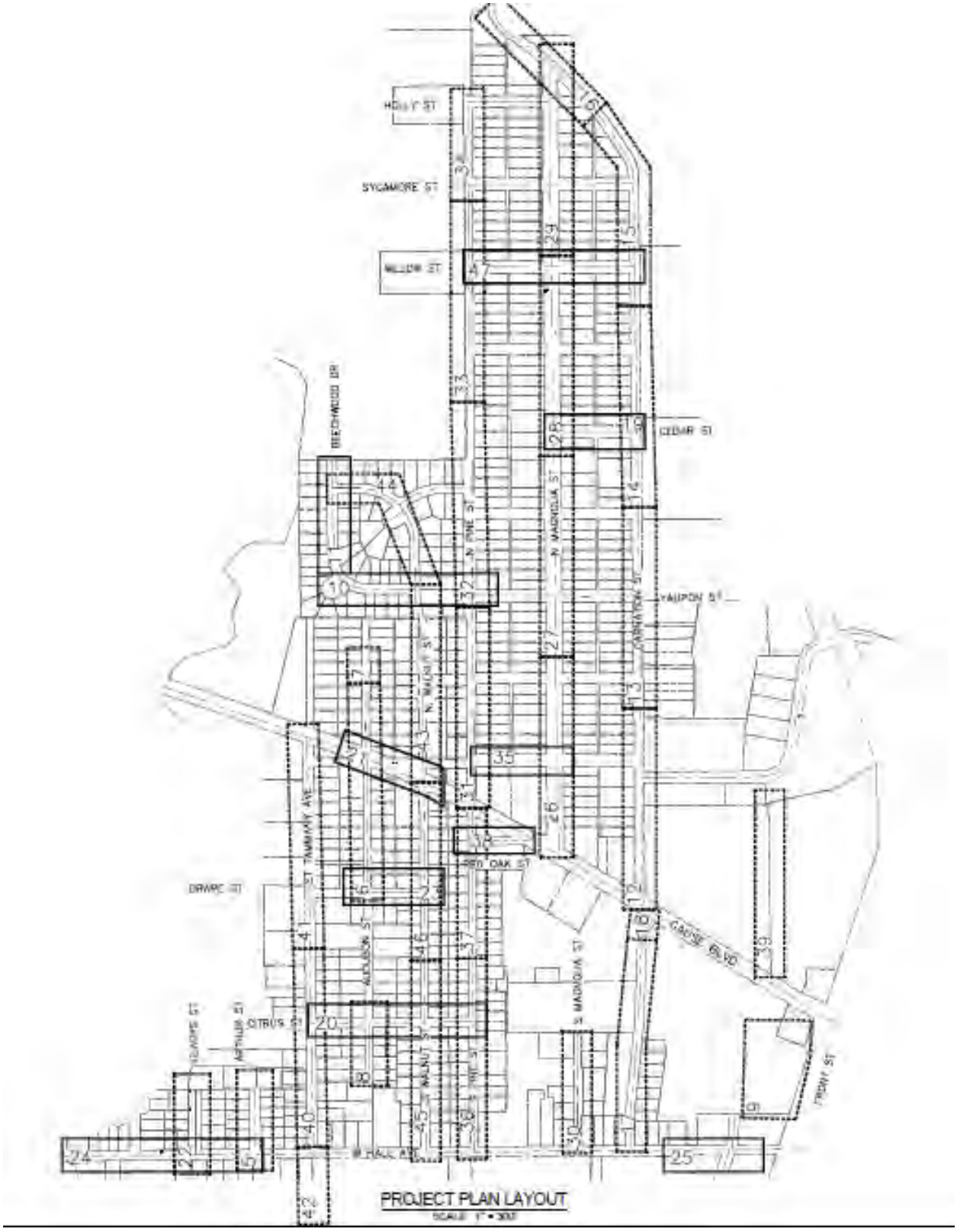

Figure 8 – Detail of proposed work areas with the Bayou Vincent Basin project area. (Image Source: Construction Drawings for Bayou Vincent by All South Consulting Engineers, L.L.C., June 2017)

4.2.3 W-14 Canal Basin (Project No. 951-7)

The W-14 Canal Basin is bounded to the north by Interstate 12, Brownswitch Road, and the W-15 Canal, to the east by Interstate 10 and State Highway 1091 (Robert Boulevard), to the south by Old Spanish Trail (LA State Highway 433), and to the west by Front Street (U.S. Highway 11) and Sgt. Alfred Drive. *Figure 9* depicts a street view of the W-14 Canal Basin project area and *Figure 10* depicts specific work areas within the W-14 Canal Basin project footprint. The project overlaps with portions the Bayou Pattasat Basin footprint discussed in Section 4.2.1. The Latitude and Longitude of the four corners of the proposed work area footprint are:

- Northwest 30.311055 -89.770028
- Northeast 30.310391 -89.746809
- Southeast 30.246985 -89.762654
- Southwest 30.261980 -89.780317

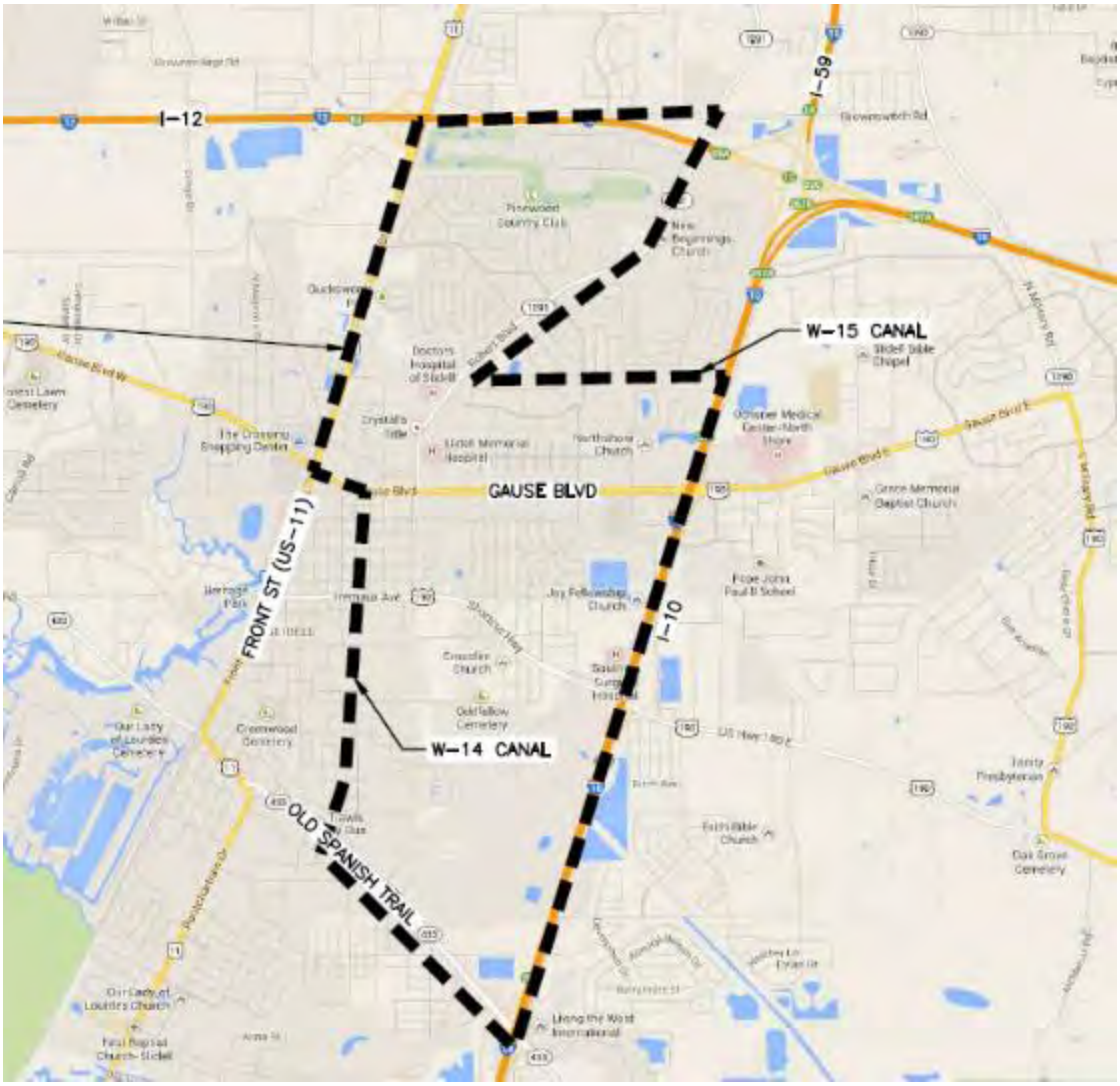

Figure 9 - Street view of the W-14 Canal Basin project area. (Image Source: Construction Drawings for W-14 Canal Basin by All South Consulting Engineers, L.L.C., June 2017)

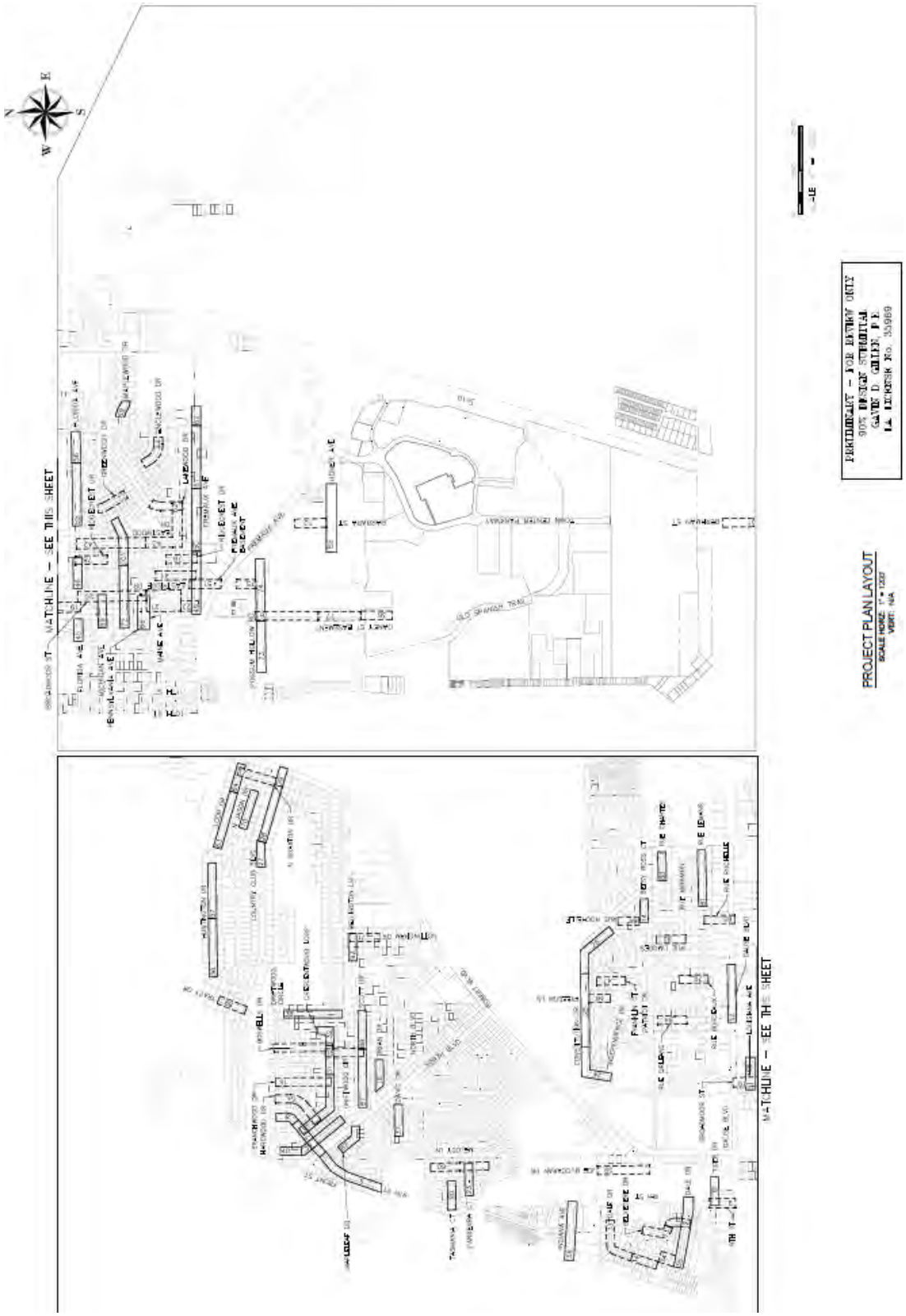

Figure 10 - Detail of proposed work areas with the W-14 Canal Basin project area. (Image Source: Construction Drawings for W-14 Canal Basin by All South Consulting Engineers, L.L.C., June 2017)

4.2.4 Bayou Bonfouca Basin (Project No. 951-1)

The Bayou Bonfouca Basin is bounded to the north by Gause Boulevard (State Highway 190), to the east by Front Street (U.S. Highway 11), to the south by West Camellia Drive and Bayou Bonfouca, and to the west by Bayou Bonfouca and Carroll Road. *Figure 11* depicts a street view of the Bayou Bonfouca Basin project area. The Latitude and Longitude of the four corners of the proposed work area footprint are:

- Northwest 30.287501 -89.801127
- Northeast 30.279257 -89.783201
- Southeast 30.255311 -89.796101
- Southwest 30.263094 -89.808568

Figure 11 - Street view of proposed work areas with the Bayou Bonfouca Basin project area. (Image Source: Preliminary Design Construction Drawings for Bayou Bonfouca Basin by CDM Smith, May 2017)

4.2.5 Dellwood Basin (Project No. 951-1)

The Dellwood Basin is bounded to the north by Southpark Drive to the east by Pontchartrain Drive (U.S. Highway 11), to the south by the First Baptist Christian School complex, and to the west by Front Street and railroad tracks. *Figure 12* depicts a street view of the Dellwood Basin project area. The Latitude and Longitude of the four corners of the proposed work area footprint are:

- Northwest 30.258828 -89.793385
- Northeast 30.256431 -89.788733
- Southeast 30.247172 -89.794099
- Southwest 30.249455 -89.799253

Figure 12 - Street view of proposed work areas with the Dellwood Basin project area. (Image Source: Preliminary Design Construction Drawings for Dellwood Basin by CDM Smith, May 2017)

4.2.6 Lee Street Basin

The Lee Street Basin is bounded to the north and to the east by Pontchartrain Drive (U.S. Highway 11), to the south by Southpark Drive, and to the west by Front Street and railroad tracks. *Figure 13* depicts a street view of the Lee Street Basin project area. The Latitude and Longitude of the four corners of the proposed work area footprint are:

- Northwest 30.267858 -89.788397
- Northeast 30.263994 -89.784375
- Southeast 30.256331 -89.788524
- Southwest 30.259098 -89.793384

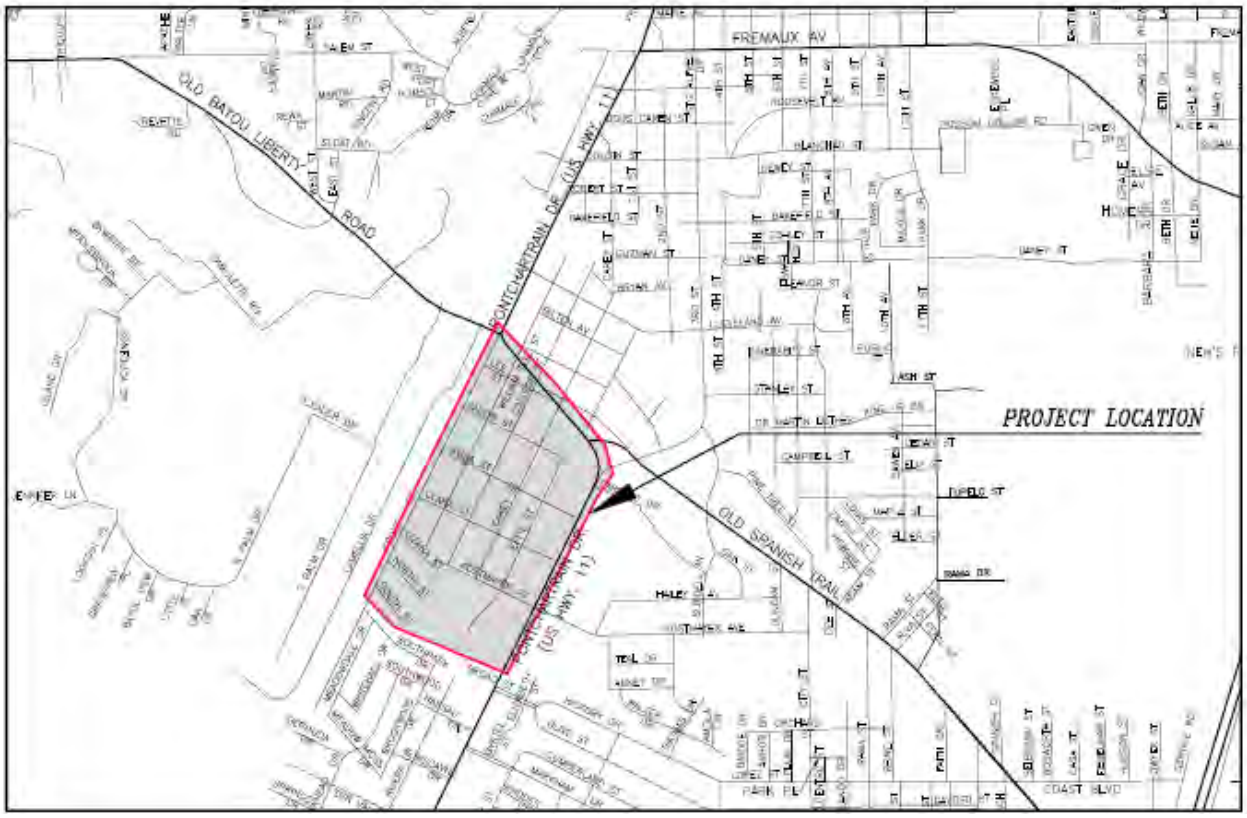

Figure 13 - Street view of proposed work areas with the Lee Street Basin project area. (Image Source: Preliminary Design Construction Drawings for the Lee Street Basin by Richard C. Lambert Consultants, LLC, April 2017)

4.3 Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements.

This alternative consists of the completion of repairs to roads in same project areas described in Alternative 2, but only to pre-disaster condition. The City of Slidell DPW would perform street repairs and replacement as required, possibly separate and independent of repairs to sewer lines in the project areas by the City of Slidell DPU, allowing completion of the repairs and replacements according as required, as the need for each type of repair or replacement arises. Under this

Alternative, there would be no enhancements constructed to improve drainage or improve the efficiency of service delivery, as all construction work would only be performed only to maintain pre-disaster conditions. This alternative would likely result in newly paved roads being torn up to enable the completion of water and/or sewer line repairs, increasing construction-related impacts to residents and increasing the risk for a duplication of PA program benefits. Additionally, this Alternative does not allow for upgrades that may be required to accommodate an increasing population or to mitigate potential damage from future storms. This alternative is a less desirable alternative; however, it does not necessarily render this action alternative unreasonable. Although the conflicts inherent in this alternative must be considered, the alternative meets the purpose and need of the action. This action alternative, therefore, will continue to be evaluated throughout this PEA.

5.0 CONSTRUCTION DETAILS

The project will be limited to roadway, infrastructure, and utility repairs in existing City of Slidell right of ways (ROW) consisting of the following:

1. Roadway Repairs
2. Stormwater Collection System Repairs
3. Sanitary Sewer Collection System Repairs
4. Water Distribution Repairs

Construction activities would have a temporary moderate impact on businesses and residences in the study area. During construction, motorists and other people living and working in the surrounding area could experience temporary inconveniences associated with traffic delay, detours and construction dust and noise.

This section provides a more detailed description of the construction methods that would be utilized under each of the action alternatives considered in the impact analysis. Due to ongoing design efforts for this project, the City of Slidell anticipates that the project scope for any road segment may include any or all aspects of the scope work detailed in this PEA.

All work performed as part of the action alternatives will be planned, designed and completed in accordance with the latest editions of the following:

1. City of Slidell Standard Maintenance Practices;
2. Louisiana Department of Transportation and Development Standard Plans and Specifications;
3. Federal Highways Administration Guidelines;
4. Americans with Disabilities Act (ADA) and Public Rights of Way Accessibility Guidelines;
5. American Association of State Highway and Transportation Officials Policy on the Geometric Design of Highways and Streets; and
6. Other applicable local, state, and federal codes and ordinances. Any design or repair exceptions required will be coordinated with the appropriate agency prior to any repairs or alteration being initiated.

5.1 Roadway Repairs

Roadway repair would consist of the following components:

1. Concrete Roadway Repairs
2. Asphalt Road Repairs
3. Curb Repairs
4. Driveway Aprons
5. Sidewalk Repairs
6. Handicapped Ramps Replacement or Installation
7. Removal of Existing Vehicle Bridge with Asphalt Decking and Installation of Precast Box Culvert

8. Elevation of Existing Concrete or Asphalt Roadway and Drainage Improvements

5.1.1 Concrete Roadway Repairs

Concrete roadway repairs would consist of excavation of existing pavement and base, with a typically 16 inches to 24 inches. New 8-inch thick limestone base, 8-inch thick concrete pavement, and up to 24 inches of sand fill, as required, would be placed where weak subgrades are found during repairs. All repairs would maintain existing pavement limits and drainage patterns would be maintained.

5.1.2 Asphalt Road Repairs

Asphalt road repairs may involve mill and overlay or full depth replacement. Mill and overlay involves mill and removal of up to 4 inches of existing asphalt and overlay with approximately 2 to 4 inches of new asphalt. The existing roadway base course would be not be disturbed.

Full depth replacement would involve the removal of existing asphalt roadway pavement and base course. Existing pavement sections vary from 16 to 24 inches. Full depth replacement involves the placement of new 12 inches limestone base, 3 to 9 inches of asphalt pavement, and up to 24 inches of sand fill, as required, where weak subgrades are found during repairs. All repairs would maintain existing pavement limits and drainage patterns would be maintained.

5.1.3 Curb Repairs

Existing curb lines would be maintained. Existing curb heights vary from 2 inches for depressed curbs to 6 inches for barrier curbs. For curbs on concrete roadways, referred to as integral curbs, the curb would be poured on top of the existing concrete panel. In locations where existing panels are damaged, the damaged panel would be saw-cut and replaced. This would require up to 16 inches of excavation, replacement with 8 inches of stone base, and 8 inches of concrete pavement.

For curbs on asphalt roadways, referred to as curb and gutter, excavation would be required to remove the existing curb and gutter and stone base, up to 24 inches below the existing pavement grade. New 12 inch thick stone base and new curb and gutter to match the existing curb and gutter would be placed. Removal and replacement of approximately 12 inches of asphalt pavement and base course adjacent to the curb and gutter would be required.

5.1.4 Driveway Aprons

Driveway apron repairs would require excavation and removal of up to 12 inches of the existing driveway pavement and base. New 6-inch thick concrete and sand fill, as required to match the existing driveway, would be put in place. New driveway aprons may vary slightly from the existing driveway depending on the existing driveway construction.

5.1.5 Sidewalks

Sidewalk repairs would require excavation and removal of the existing sidewalk placement and 4- to 8-inch thick subgrade. New 4-inch thick concrete sidewalk and sand base, as required to match

the existing sidewalk, would be placed. Sidewalk width and grading may vary from the existing, as required, to meet ADA minimum dimensions and slopes.

5.1.6 Handicapped Ramps Replacement or Installation

Handicapped ramp repairs would require excavation and removal of the existing handicap ramps and base, up to 12 inches. New handicap ramps meeting ADA minimum dimension and slops would be placed. Dimensions of the new handicap ramps may vary from the existing ramps as required to provide ADA-compliant design.

Construction of new handicap ramps would consist of placement of 4 to 6 inches of concrete pavement with up to 8 inches of sand base. Adjacent sidewalk section may be replaced to provide ADA minimum slopes, as required.

5.1.7 Removal of Existing Vehicle Bridges with Asphalt Decking and Installation of Precast Box Culvert

Although scopes of work for two specific bridge locations are provided in this section, due to the programmatic nature of this PEA, this section is intended to evaluate all similar types of work throughout the City of Slidell. Due to the varying potential types of environmental circumstances that may be involved in this type of scope of work, bridge replacement projects may vary considerably in types of EHP documentation required.

For the currently proposed work, removal of two (2) existing structures located within the Bayou Vincent Basin, (discussed in further detail below), would consist of removal of the asphalt bridge decking, removal all above ground structures, and cutting of existing timber piles three (3) feet below grade with abandonment in place.

Installation of the precast box culvert would consist of excavation to a width of the existing bridge plus 2.0 feet. The excavation depth of –12 inches below existing canal grade for installation of bedding material. The proposed box culvert size is typically no larger than 10 foot by 10 foot, however, dimensions can vary in both width and depth of box to match the cross-sectional area of the existing canal and to fit the existing roadway conditions. The newly installed culvert would be sized to provide capacity equivalent to the existing channel.

Dimensions of new road to match the existing roadway including safety railings along the shoulder of the roadway. Installation of base course and asphalt roadway on top of the proposed box culvert plus 5.0 feet beyond the extents of the proposed box culvert, (which may vary based on the designer's recommendations). Mill and overlay would be constructed from 5.0 feet beyond the extents of full depth replacement to provide a smooth transition. New guard rails would be installed, as required.

Timber Vehicular Bridge located south of 1258 South Magnolia Street in the Bayou Vincent Drainage Basin

The existing bridge is located approximately 475 feet north of West Hall Avenue at the approximate Latitude 30.286051, Longitude -89.783688. The bridge dimensions are estimated to be 15 foot wide and 20 foot in length. During construction temporary access would be required for the residences north of the existing bridge. A temporary access structure would be constructed, consisting of a 36 inch to 48 inch pipe segment placed

within the existing canal and covered with temporary fill. Short term impacts include impacts to vegetation (one Crape Myrtle tree) from the installation of the temporary access. Long term impacts include the removal of the Crape Myrtle tree. The contractor would remove the temporary access once residential access is restored. *Figure 14* is a street view photograph of the existing bridge on South Magnolia Street that would be removed and replaced with new asphalt roadway.

Figure 14 – Street view of the South Magnolia Street Bridge (Image Source: Google Maps)

Vehicle Bridge located south of the intersection of North Carnation Street and Willow Street in the Bayou Vincent Drainage Basin

The existing bridge is located on North Carnation Street, approximately 200 feet south of the intersection of North Carnation Street and Willow Street at the approximate Latitude 30.296224, Longitude -89.782593. The bridge dimensions are estimated to be 20 foot wide and 20 foot in length. According to the SubRecipient, no temporary access would be required. Short term impacts are estimated as impacts to vegetation. *Figure 15* is a street view photograph of the existing bridge on North Carnation Street that would be removed and replaced with new asphalt roadway.

Figure 15 - Street view of the bridge near the intersection of North Carnation Street and Willow Street (Image Source: Google Maps)

5.1.8 Elevation of Existing Concrete or Asphalt Roadway and Drainage Improvements

The scope of work consists removal of the existing concrete roadway and the installation of improved drainage structures. The drainage trench depth would be 12 inches below invert of existing drainage structure for installation of stone bedding. The depth of the drainage trench is estimated to be between 4 and 6 feet below the surface elevation. The depth of the nearest downstream catch basin estimated to be 4.23 feet relative to the existing elevation. The invert of the drainage structure is not anticipated to exceed the depth of the nearest downstream catch basin. The drainage trench width would be the pipe outer diameter plus 2.0 feet (typically 3 feet to 5 feet). The roadway and embankment would be excavated up to the limits of the existing City ROW. Fill would be added to raise the elevation of the roadway between 1 foot and 2 feet. Areas affected by construction activities would be graded to provide positive drainage.

5.2 Stormwater Collection System Repairs

Stormwater collection system repair would consist of the following components:

1. Point Repairs and Line Replacement
2. Catch Basins/Manholes/Inlets
3. Driveway Culvert Replacement

5.2.1 Point Repairs and Line Replacement

For point repair and line replacements using open cut trenching, the trench width would be approximately the pipe outer diameter plus 2.0 feet, which would typically be 3 feet to 5 feet in width. The trench length would be typically be 12 feet for point repairs or the length of structure-to-structure for full line replacements and recommended by the design engineer. The trench depth would be approximately 16 inches below the existing pipe invert for installation of sand bedding. The typical depth would be 4 feet to 8 feet, with a maximum depth of 15 feet. Concrete pavement

repair may involve replacement of multiple panels, depending on the location of repair to existing pavement joints. Where lines are replaced from structure to structure, existing lines less than 15 inches in diameter would be replaced with 15-inch diameter lines per City of Slidell Standard Maintenance Practices. All lines greater than 15 inches in diameter would be replaced in kind. If instructed, lines would be increased in capacity per the engineer's recommendation.

5.2.2 Catch Basins/Manholes/Inlets

Catch Basin/Manhole/Inlet rehabilitation/repair would consist of mortar repair and resetting frames and covers. Minimal or no excavation would be required, repairs would be performed from the interior of the manhole or catch basin. Catch Basin/Manhole/Inlet replacement would require excavation, typically approximately 24 inches from the face of the existing structure. Excavation depth would be approximately 24 inches below the existing invert for removal/replacement of foundation and stone base. The depth of existing structures varies from 3 feet to 8 feet below the ground surface.

For the installation of new catch basins, work would consist of excavation to the width of the Manhole I.D. plus 2.0 feet, (typically 3 feet to 5 feet in total width). The excavation depth would be approximately 12 inches below the existing open ditch or pipe; bedding material and bottom of drainage structure. The new drainage structure would be installed per the City of Slidell's standard maintenance procedures and standard details.

5.2.3 Driveway Culvert Replacement

For driveway culvert replacement, the trench width would be approximately the pipe outer diameter plus 2.0 feet, which would typically be 3 feet to 5 feet in width. The trench depth would be approximately 6 inches below the existing pipe and sand bedding. Culverts less than 15 inches in diameter would be replaced with 15-inch diameter lines per City of Slidell Standard Maintenance Practices. All lines greater than 15 inches in diameter would be replaced in kind.

For work involving the enclosure of open residential drainage ditches (minor), involving the closing of an existing minor drainage ditch in front of a resident's home with the City ROW, the trench width would be the width of the existing ditch (typically 3 feet to 5 feet in width). The trench depth would be approximately 6 inches below the invert of the existing ditch bedding material. The pipe size, shape, and material would consist of up to 30 inch reinforced concrete pipe (RCP) or up to 36 inch to 23 inch reinforces concrete pipe arched (RCPA).

For work involving the enclosure of a drainage canal, involving the closing of an existing drainage canal with a box culvert, the trench width would be the width of the existing ditch (typically 6 feet to 10 feet in width). The trench depth would be approximately 12 inches below the invert of the existing canal bedding material. The box culvert size would typically be no larger than 10 feet by 10 feet; however, the dimensions can vary in both width and depth of the box to match the cross-sectional area of the existing canal and to fit the existing conditions.

5.3 Sanitary Sewer Collection System Repairs

Sanitary sewer collection system repair would consist of the following components:

1. Point Repairs
2. Line Replacements
3. Manholes

5.3.1 Point Repairs

For point repairs, the trench width would be approximately the pipe outer diameter plus 2.0 feet, which would typically be 3 feet to 5 feet in width. The trench length would be determine by the length of damaged segment, but is typically 12 feet for point repairs or length of structure-to-structure for full line replacements recommended by the design engineer.

5.3.2 Line Replacements

Sewer line replacements may be performed via the open cut method, the pipe bursting method, or pipe lining. For the open cut method, the trench width would be approximately the pipe outer diameter plus 2.0 feet, which would typically be 3 feet to 5 feet in width. The trench depth would be approximately 6 inches below the bottom of the existing pipe. Sand bedding lines less than 8 inches in diameter requiring full replacement by the open cut method would be replaced with 8-inch diameter lines per City of Slidell standard maintenance procedures. All sewer lines 8 inches in diameter of larger would be replaced in kind.

The pipe bursting method requires excavation for the bursting pit, which would be approximately 5 feet wide by 12 feet long to accommodate the required pipe bursting equipment. The bursting pit depth would vary according to existing pipe depth, but would be within 5 feet to 15 feet in depth. After completion of the required work, the bursting pit would be filled with sand or select excavation material.

Pipe lining work may require excavation of launching pits; however, where feasible repairs would be performed through manholes or catch basin without excavation.

5.3.3 Manholes

Manhole rehabilitation/repair would consist of mortar repair and resetting frames and covers. The manhole would be coated with spray liner. Minimal or no excavation would be required, repairs would be performed from the interior of the manhole or catch basin. Manhole replacement would require excavation, typically approximately 24 inches from the face of the existing structure. Excavation depth would be approximately 24 inches below the existing invert for removal/replacement of foundation and stone base. The depth of existing structures varies from 3 feet to 15 feet below the ground surface.

For locations that required the installation of a new manhole, the trench width would be the Manhole I.D. plus 1.0 foot, (typically 4 feet to 5 feet in total width). The trench depth with be approximately 24 inches below the existing invert, stone base, and bottom of the existing manhole. New manholes would be installed per the City of Slidell's standard maintenance procedures and standard details.

5.4 Water Distribution System Repairs

5.4.1 Leak Detection

Leak detection would be performed using acoustic technologies and/or manual detection methods.

5.4.2 Leak Repairs as Indicated by Leak Detection

To repair any leaks detected in the water distribution system, construction methods would include digging trench having the width of the water distribution pipe O.D. plus 2.0 feet, typically 3 feet to 5 feet in width. The trench length require would be determined by the length of damaged segment. Typical lengths would be 10 feet for repair saddles, or approximately 20 feet to 25 feet per full joint to joint length of pipe to be replaced. The trench depth would typically be 4 feet, with a maximum of 6 feet to 8 feet in depth.

Currently available construction plans and the revised scope of work narrative for the currently proposed work within the Bayou Pattasat Basin, the Bayou Vincent Basin, and the W-14 Canal Basin are attached to this PEA in Appendix A.

6.0 AFFECTED ENVIRONMENT AND IMPACTS

This section discusses the baseline conditions and environmental impacts of the various alternatives. Due to the parish-wide programmatic approach of this analysis, FEMA is providing a regulatory background and description of the current conditions of the environmental resources. In the impacts analysis for the alternatives, FEMA provides a description of the impacts of the action based on the following scale:

- **No effect** – no discernible effect is expected.
- **Negligible effect** – the effect is so small that it cannot be measured in meaningful way.
- **Minor effect** – the effect is measurable but would be minor.
- **Moderate effect** – the effect is measurable and may require mitigation to be adequately addressed.
- **Significant impact** – the effects meets the criteria for significance as defined in the Council on Environmental Quality's NEPA implementation regulations in 40 CFR 1508.27.

Based on the assumption that a FONSI is the resulting clearance document of this PEA process and an EIS would not be required, Table 1 (see Section 1.3) establishes the criteria for determining if a proposed action is covered under the FONSI for this PEA, or if a tiered SEA and an additional 30 day public comment period are needed. If the project meets the scope, impacts, and mitigation covered in this PEA, then NEPA documentation consisting of a REC would be required.

6.1 Geology, Soils, and Seismicity

6.1.1 Regulatory Setting

The Farmland Protection Policy Act (FPPA) (P.L. 97-98, §§ 1539-1549; 7 U.S. Code [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. The FPPA does not authorize the federal government to regulate the use of private or non-federal land or, in any way, affect the property rights of owners.

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service is responsible for protecting significant agricultural lands from irreversible conversions that result in the loss of essential food or environmental resources. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and farmland of statewide or local importance. Prime farmland is characterized as land with the best physical and chemical characteristics for production of food, feed, forage, fiber, and oilseed crops (USDA 2016a). Farmland subject to FPPA requirements does not currently have to be used for cropland; it also can be forest land, pastureland, or other land, but not water or built-up land.

6.1.2 Existing Conditions

Within the City of Slidell, approximate surface elevations range from 20 feet above sea level in the northern areas of the city to three (3) feet above sea level within the drained wetlands north of

the Eden Isles. Undrained marshes and swamps typically range from two (2) feet below sea level to about two (2) feet above in elevation (Google Earth 2016). According to the Louisiana Geological Survey, the geology in the vicinity of the project site is predominantly Easter Pleistocene Terraces, which also covers about 40 percent of the state (Louisiana Geological Survey 2008) (*Figure 16*). The Pleistocene Epoch began approximately began approximately 2,588,000 years ago and ended approximately 11,700 years ago.

The deposits associated with Easter Pleistocene Terraces consist of sand, gravel, and mud, but underlie raised, flat surfaces with varying degrees of tilt and dissection depending on their relative ages. These surfaces are remnants of pre-existing flood plains, and form both trends along the major rivers in north Louisiana and coast-parallel belts in southern Louisiana. They were raised as the coastal plain tilted in response to down-warping of the crustal floor of the Gulf of Mexico, which is the result of the deposition of voluminous deltaic sediment ever farther into the Gulf through time. During glacial episodes in the Pleistocene, sea level dropped, shorelines moved seaward, and the Mississippi River carried an increased sediment load. When this occurred, the Mississippi River switched from a meandering regime to a braided regime, rivers flowing into the Gulf of Mexico could deposit their sediment farther out than before, and outwash deposits of sand, gravel, and silt, now preserved as terraced braided-stream deposits, were deposited in the lower Mississippi valley. The remnants of these late Pleistocene braided-stream deposits occur in eastern north and central Louisiana along the western edge of the Mississippi River flood plain and, like the other Pleistocene terraces, form flat surfaces that rise above it. The large quantity of glacial outwash in the Mississippi River valley at this time was the source of loess, the silt fraction entrained, suspended, and redeposited by strong winds. Loess deposits up to several meters thick covered and remain preserved along large areas flanking the valley.

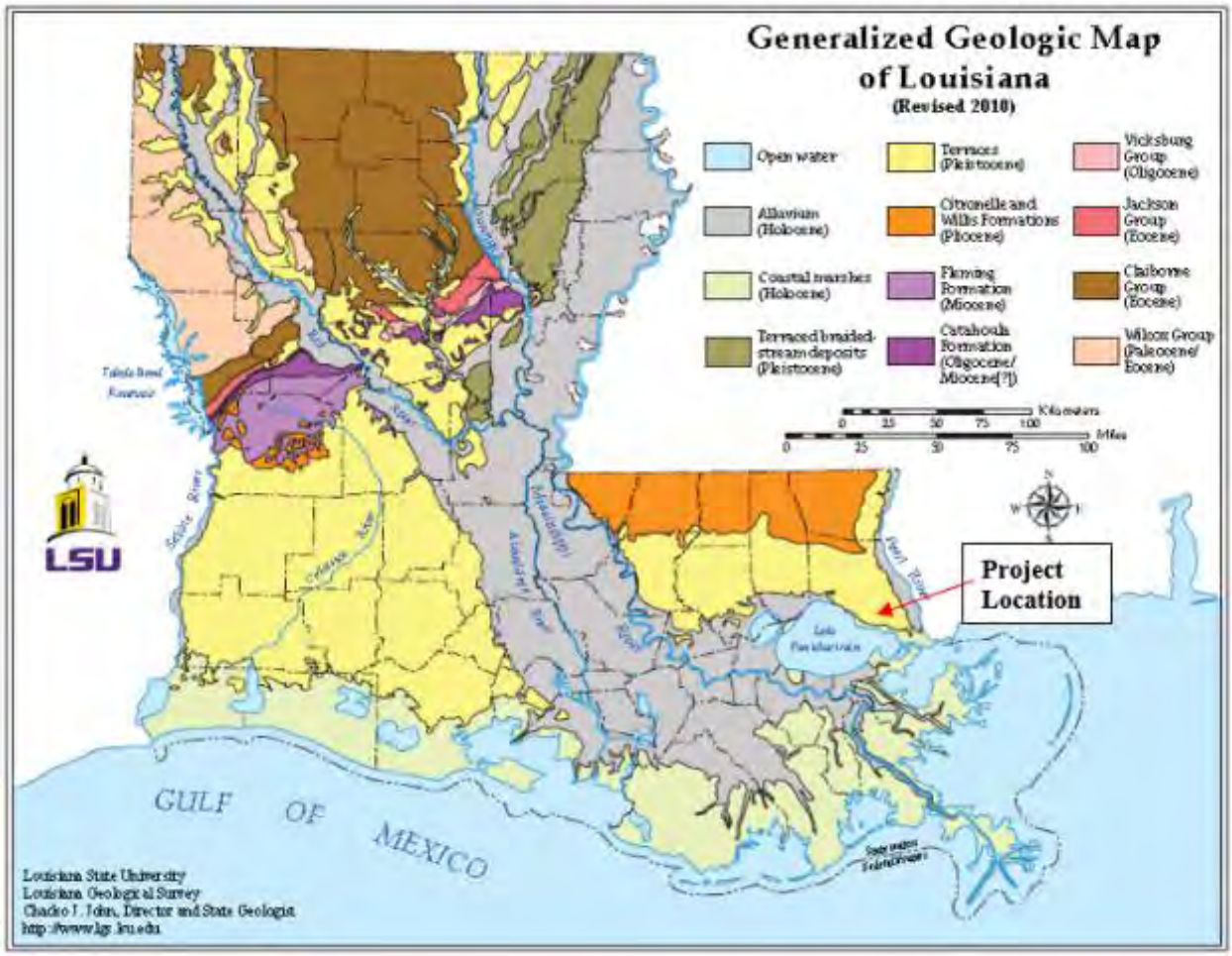

Figure 16 - Generalized Geologic Map of Louisiana indicating project area (Louisiana Geological Survey 2010)

The soils of the City of Slidell vary in their potential for land use and urban development. According to the *Soil Survey of St. Tammany Parish, Louisiana* (USDA 1990) and the Web Soil Survey (USDA 2016b), there are three different major soil mapping units within the project area of City of Slidell. FEMA has examined these broader soil groups, which are depicted in *Figure 17*.

The Guyton-Abita-Brimstone general map unit consists of level to gently sloping, poorly to somewhat poorly drained soils that are silty loamy throughout. Flooding is a hazard. Slopes range from 0 percent to 5 percent. The soils are well suited to woodland use. These soils are moderately well suited to pastureland, crops, residential, and commercial uses. Small acreages are used for these activities. These soils are poorly suited to urban uses and intensive recreation activities such as playgrounds and campsites. Low strength for roads, slow permeability, and wetness are limitations (USDA 1990).

The Myatt-Stough-Prentiss general map unit consists of level to gently sloping, very poorly to moderately well drained soils that are loamy throughout. Flooding is a hazard. These soils are found in flats, depressed areas, and drainage-ways. These soils are well suited to woodlands. The

soils are moderately well suited to cropland uses, and well suited to use as pastureland. Erosion is slight hazard with these soils. These soils are poorly suited to urban uses and moderately well suited to intensive recreation uses (USDA 1990).

The Ouachita-Bibb general map unit consists of nearly level, well drained to poorly drained soils that are loamy throughout. These soils are found in floodplains of major streams. Landscape is slightly undulating with low ridges and shallow swales. Slopes range from 0 percent to 2 percent. The soils are moderately well suited to woodland use, with a small acreage use as pastureland. These soils are poorly suited to cropland uses. These soils are poorly suited to urban intensive recreation uses. Flooding is a hazard (USDA 1990).

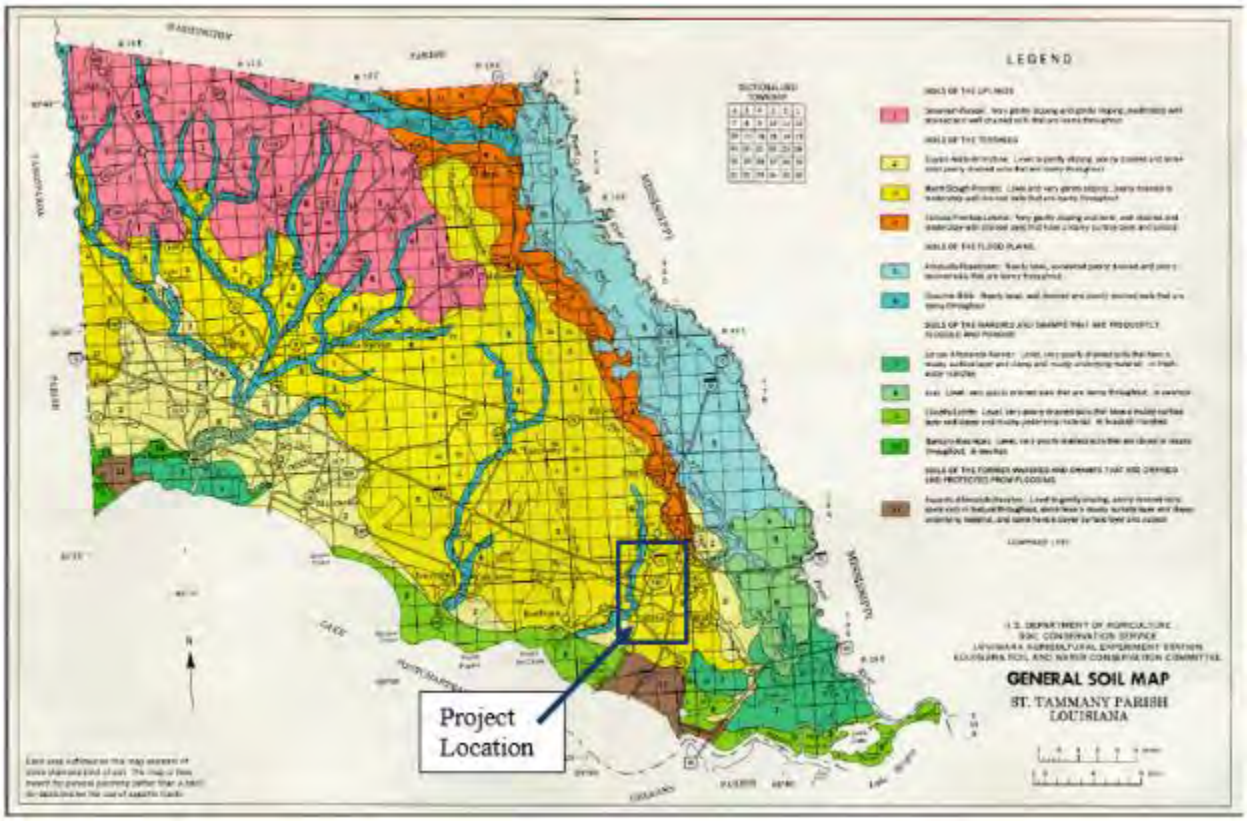

Figure 17 - General Soil Map of St. Tammany Parish, Louisiana, revised and updated based on latest soil series nomenclature (USDA 1990)

6.1.3 Environmental Consequences

Alternative 1 – No Action. The "No Action" alternative would have no effect on prime farmland, unique farmland, farmland of statewide or local importance, or other important geologic resources.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). The locations proposed for infrastructure repair and restoration are fully developed, with no natural soil surface remaining. The FPPA addresses the conversion of farmland to non-farmland uses only. Because the various proposed project locations would already be developed,

urbanized areas, the FPPA is precluded. The preferred alternative would have no effect on other geologic resources.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. As with the Preferred Alternative, the proposed repairs under this option would be located within fully developed areas. As such, the FPPA would be precluded. This action alternative would have no effect on other geologic resources.

6.2 Waters of the United States and Wetlands

6.2.1 Regulatory Setting

Wetlands have important ecological functions and are biologically diverse. They assimilate nutrients in surrounding surface waters, remove suspended solids and pollutants from stormwater, and protect shorelines from wind and wave action and storm-generated forces. Actions that would impact wetlands require review under several regulatory programs.

The United States Army Corps Engineers (USACE) regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to Sections 401 and 404 of the Clean Water Act (CWA). Wetlands are identified as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, or that under normal hydrologic conditions do or would support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The USACE also regulates the building of structures in waters of the U.S. pursuant to Section 10 of the Rivers and Harbors Act (RHA). Executive Order (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. FEMA regulations for complying with EO 11990 are codified at 44 CFR Part 9, Floodplain Management and Protection of Wetlands.

The U.S. Environmental Protection Agency (USEPA) regulates discharges to waters of the United States through permits issued under Section 402 of the CWA, entitled the National Pollutant Discharge Elimination System (NPDES), which authorizes and sets forth standards for state administered permitting programs regulating the discharge of pollutants into navigable waters within each state's jurisdiction. On August 27, 1996, USEPA Region VI delegated the authority to administer the NPDES program for matters within the jurisdiction of the State of Louisiana. Having assumed NPDES responsibilities, Louisiana directly issues NPDES permits and has primary enforcement responsibility for facilities located within the State, with certain exceptions such as Indian Country Lands. Louisiana administers the NPDES Program and surface water discharge permitting system under the Louisiana Pollutant Discharge Elimination System (LPDES) program.

The LPDES requires permits for the discharge of pollutants/wastewater from any point source into waters of the State. Per the CWA, the term "point source" is defined as "any discernible, confined, and discrete conveyance such as a pipe or a ditch." Prior to assumption of the program, permittees were required to hold both a valid state and federal permit. Today, all point source discharges of pollutants to waters in the state of Louisiana are subject to a LPDES permit issued by the Louisiana Department of Environmental Quality (LDEQ). Additionally, the LDEQ requires a Stormwater Pollution Prevention Plan (SWPPP) for land disturbing activities greater than one (1) acre. For

land disturbing activities greater than five (5) acres the LDEQ requires: 1) a SWPPP 2) a Notice of Intent and 3) a Notice of Completion.

Section 303(d) of the CWA requires states to develop a list of impaired waters. Water is considered impaired if the current quality does not meet the numeric or narrative criteria in a water quality standard, or the designated use described by that state is not achieved. Section 303(d)(2) requires that states submit and USEPA approve or disapprove lists of waters for which existing technology-based pollution controls are not stringent enough to attain or maintain state water quality standards, and for which total maximum daily loads (TMDLs) must be prepared (40 CFR §130.7). Total maximum daily loads are pollution budgets designed to identify necessary reductions of pollutant loads to the impaired waters so that the appropriate water quality standards are met, including designated uses like fishing or swimming and water quality criteria for parameters such as dissolved oxygen and water clarity. The regulations require states to identify water quality limited waters still requiring TMDLs every two years. The lists of waters still needing TMDLs must also include priority rankings and must identify the waters targeted for TMDL development during the next two years (40 CFR § 130.7). Types of impairments may include, for example, impaired primary contact use (e.g., swimming, water skiing), mercury and polychlorinated biphenyls (PCBs) in fish tissue, impaired fish consumption use, low dissolved oxygen, copper, phosphorus, manganese, excessive siltation, physical-habitat alterations, and total suspended solids which impair aquatic life use.

FEMA's implementation of EO 11990 is described in 44 CFR Part 9. Under this regulation, FEMA is required to engage in the 8-step decision-making process to ensure that proposed activities are consistent with EO 11990 and to evaluate the potential effects of an action on wetlands. The 8-step process includes using minimization measures when a project affecting a wetland is the only practicable alternative. The 8-step process for the proposed project is attached to this PEA in Appendix B.

Minimization measures include avoidance techniques such as establishing wetland buffer zones to avoid converting or filling wetlands and obtaining and complying with NPDES permits. Recipients and sub-Recipients are responsible for obtaining any applicable NPDES permits and meeting permit conditions. In addition to complying with 44 CFR Part 9, the Recipient or sub-Recipient must obtain the applicable CWA Section 404 permit prior to the initiation of the project if it will affect jurisdictional wetlands. The Recipient or sub-Recipient must coordinate with USACE to determine whether any of the NWPs or a Regional General Permit apply or whether an Individual Permit is required. Proposed projects that require an Individual Permit will require close coordination between the Recipient or Sub-recipient, FEMA and USACE. The Recipient or sub-Recipient is required to comply with all conditions of the Section 404 general or individual permit, which may include compensation measures, such as wetlands banking, for any loss of wetlands.

6.2.2 Existing Conditions

Wetlands are areas which are inundated or saturated by surface or ground water with a frequency sufficient to support, or that under normal hydrological conditions does or would support, a prevalence of vegetation or aquatic life typically adapted for these soil conditions. Examples of wetlands include swamps, marshes, estuaries, bogs, beaches, wet meadows, sloughs, mud flats, among others.

According to the U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI), most of the work at proposed project sites would be located outside designated wetlands (USFWS 2017). Some of the proposed work may occur near designated wetlands or waters of the US. In addition, the City of Slidell has provided FEMA with GIS data depicting the USFWS-designated wetlands within the City of Slidell (*Figure 18*).

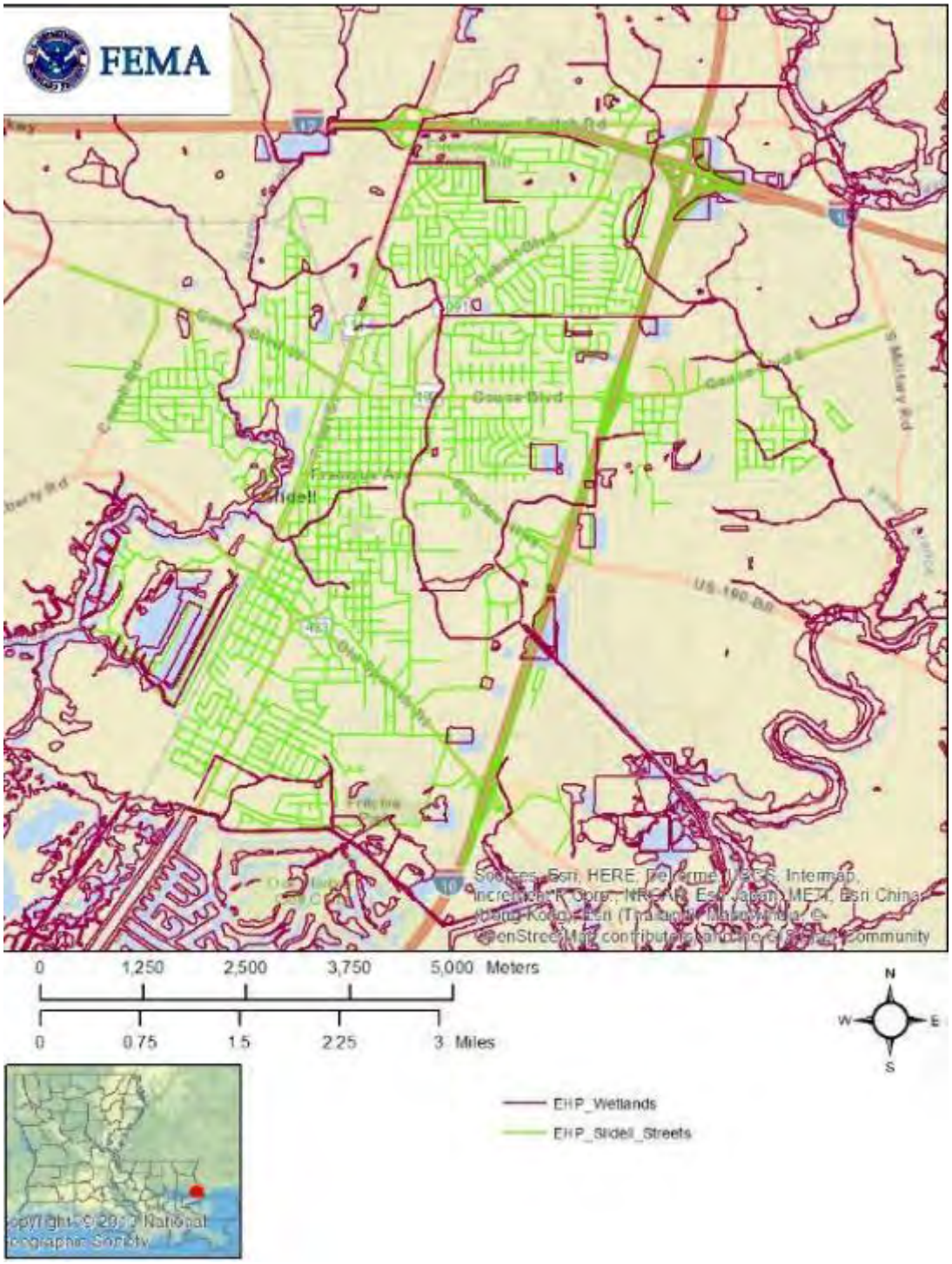

Figure 18 – Map depicting the USFWS designated wetlands within the City of Slidell. (Source: GIS data from the City of Slidell)

The EPA responded to FEMA's 28 September 2016 SOV request on 28 September 2016. 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,* and apply to Alternative 2 and Alternative 3.

> "Based on the information provided, our preliminary review revealed that jurisdictional waters of the U.S. may occur on the proposed site. We recommend the SubRecipient conducts work to determine if the proposed project sites include wetlands or other waters of the U.S. If not, such investigation should be completed in coordination with the New Orleans District Office of the U.S. Army Corps of Engineers. The EPA also recommends all potential impacts to wetlands and other waters of the United States be avoided and minimized to the maximum extent practicable. Compensatory mitigation will be required for impacts to jurisdictional wetlands, as authorized by a Clean Water Act Section 404 permit, to avoid a net loss of wetlands and wetland functions as a result of the proposed work." (Appendix C)

On 28 September 2016, FEMA consulted with the USACE regarding the City of Slidell's initial project proposal, which was intended to be programmatic in nature and involved street and utility work throughout the City with no defined scope of work provided for any of the basins in the City. The USACE indicated their 13 December 2016 response to FEMA's SOV, that "We do not anticipate any adverse impacts to any Corps of Engineers projects. Information and signatures obtained from recent maps, aerial photography, and local soil surveys concerning the proposed project are indicative of the occurrence of waters of the US, and wetlands. Department of the Army (DA) permits are required to the deposition and/or redistribution of dredged or fill material into jurisdictional waters and wetlands.

"This preliminary determination is advisory in nature. If an approved determination is needed, please furnish us with the detailed field data concerning vegetation, soils, and hydrology that we require for all jurisdictional decisions. The fact that a field wetland delineation/determination has not been completed does not alleviate your responsibility to obtain the proper DA permits prior to working in jurisdictional wetlands or waters occurring on this property.

"Off-site locations of activities such as borrow, disposals, haul-and detour-roads and work mobilization site developments may be subject to Department of the Army regulatory requirements and may have an impact on a Department of the Army project." (Appendix C)

The waterways within the City of Slidell fully support the designated use of secondary contact recreation (boating), but do not fully support the designated uses of primary contact recreation (swimming) and fish and wildlife propagation. Low dissolved oxygen and fecal coliform due to sanitary sewer overflows and runoff from urbanized high density areas are the suspected causes of impairment. According to the EPA, the primary aquifer used for drinking water by the City of Slidell is the Ponchatoula aquifer, which occurs at about 1,500 feet below ground surface (EPA 2015)

6.2.3 Environmental Consequences

Alternative 1 – No Action. Implementation of this alternative would have moderate effects on wetlands or other waters of the U.S. Damaged sewer and stormwater drainage infrastructure would remain in a state of disrepair. Leaking sewage could directly pollute stormwater runoff and impact

nearby waters. Sewage discharges from leaks may contain significant loads of a wide variety of pollutants, including bacteria and viruses, oxygen demanding and toxic pollutants, as well as persistent materials such as heavy metals, polycyclic aromatic hydrocarbons (i.e., PAHs), etc. Sewage can infiltrate into stormwater drains through cracks in pipes or faulty joints and have long-term environmental impacts on rivers and streams.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). This majority of the work proposed in this undertaking would not have significant impacts to wetlands or waters of the United States. All work would be conducted within urban, previously disturbed rights-of-way. Repair of damaged sewage and stormwater pipes would reduce releases of sewage into the environment. Stormwater drainage would be improved, which would contribute to reduced sediment transport and flooding.

One type of work included in this undertaking that may potentially impact wetlands and waters of the U.S. would involve bridge removal and replacement in areas over canals, streams, and other navigable waters. Actions that would impact wetlands and waters of the U.S. would require review under several regulatory programs. As noted in Section 5.1.7 the City of Slidell intends to remove two (2) existing vehicle bridges within the Bayou Vincent Basin and replace them with asphalt roadway. There is potential for other similar bridge repair work as part of future work within other basins. *Figures 19 and 20* depict the locations of the bridges discussed in Section 5.1.7 and USFWS-designated wetlands, if any, in the immediate vicinity of the work areas.

Figure 19 - Aerial image depicting the location of the Magnolia Street Bridge. According to the map, no USFWS-designated wetlands are mapped in the immediate area. (Image Source: USFWS Wetlands Mapper)

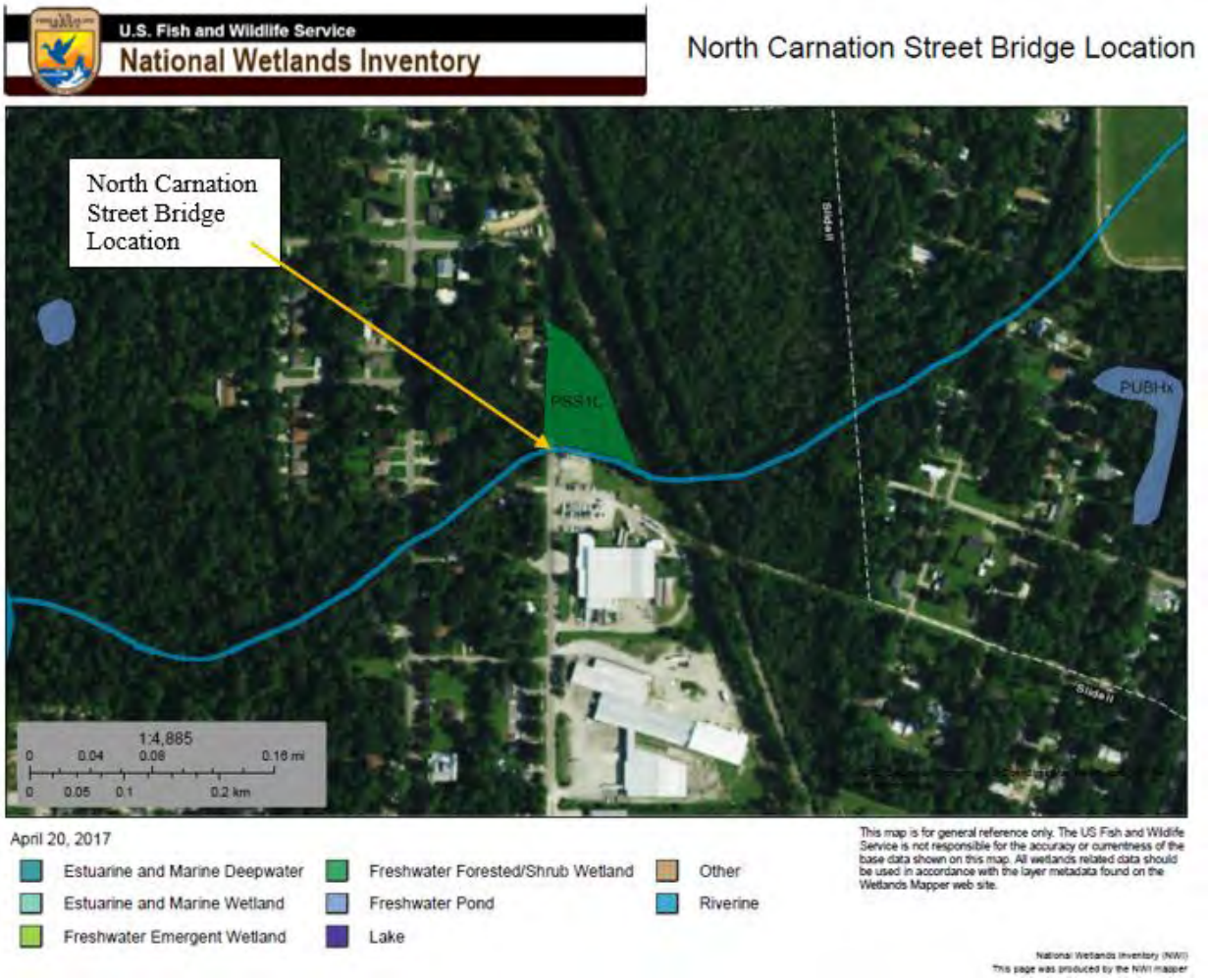

Figure 20 – Aerial image depicting the location of the North Carnation Street Bridge and adjacent USFWS-designated wetlands. Directly beneath the bridge is a tributary of Bayou Vincent, which is mapped as riverine wetland. To the northeast of the bridge is an area mapped as freshwater forested/shrub wetland. (Image Source: USFWS Wetlands Mapper)

During reconstruction there would be the potential to impact surface waters through minor erosion and runoff, and or through accidental spills of fluids used in construction equipment. Storm water runoff could carry sediment offsite into the receiving ditches/culverts, and adjacent canals.

Formal legal protection of jurisdictional wetlands is promulgated through Section 404 of the CWA. A dredge and fill permit for activities in waters of the United States including wetlands from the USACE is required if an action has the potential to adversely affect jurisdictional wetlands. There are several Nationwide Permits (NWP) for activities in waters of the United States that may cover specific aspects of the development of the proposed activities. For example, NWP 3 (Maintenance) may apply to activities related to the repair, rehabilitation, or replacement of an existing structure; NWP 12 (Utility Line Activities) or NWP 14 (Linear Transportation Projects) may apply to the construction of utility lines and access roads for new facilities; NWP 18 (Minor Discharges) or NWP 19 (Minor Dredging) may apply to many sites where water impacts are minimal; NWP 28 (Modifications of Existing Marinas) may apply to activities near tidal waters; and NWP 39

(Commercial and Institutional Developments) may apply to actions involving the expansion or construction of infrastructure facilities.

The NWP program has numerous guidelines and conditions that must be met for an activity to qualify for a permit. NWPs are subject to review by the States under Section 401 of the CWA, as are all aspects of the USACE permitting program. Various USACE Districts also have Regional General Permits that function similarly to NWPs; however, Regional General Permits are typically more specific in the types of actions that they cover and typically necessitate more stringent conditions and reporting requirements. If none of the NWPs apply to the proposed activity and no applicable Regional General Permit exists, then the Recipient or sub-Recipient must acquire an Individual Permit from the USACE. Under section 401 of the CWA, each State has an opportunity to establish specific criteria for water quality protection under this section of this Act. These provisions must be satisfied prior to issuance of permits under Sections 402 and 404 of the CWA.

In response to the amended scope of work provided by the City of Slidell, which included the bridge replacement work detailed in Section 5.1.7, FEMA submitted an updated SOV request to the USACE on 20 April 2017. As of the completion of this draft PEA, USACE had not provided a response to FEMA's SOV request. When the response is received, FEMA will incorporate this information into this PEA.

As future City of Slidell road and utility repair and replacement projects are submitted to FEMA for EHP review, FEMA will evaluate any proposed bridge repair and replacement and consult with the USACE as necessary to determine any potential impacts to wetlands or waters of the U.S. If any potential effects on wetlands or water of the U.S. are found to be significant, an SEA would be prepared for the specific project.

The majority of the work under the Preferred Alternative would occur in previously developed or disturbed areas would not have a significant impact on wetlands. However, areas that have been disturbed by the removal of the existing vegetation are much more susceptible to water erosion during major precipitation events and to wind erosion during dry and windy weather conditions. Both types of erosion can cause adverse impacts on wetlands located down gradient or down wind. Recipients and sub-Recipients are responsible for securing any applicable LPDES permits and meeting permit conditions, which may include developing a SWPPP for the construction activity. The SWPPP would include practices to control soil erosion, sedimentation and water pollution that may affect wetlands, including wetlands adjacent to project work areas. Projects that obtain and comply with the required NPDES permits and SWPPP will not result in significant impacts to wetlands.

Construction activities located in or near a water body may require a RHA Section 10 or a CWA Section 404 permit from the USACE. The permits would identify measures that must be implemented to minimize erosion and runoff, such as the use of silt fencing, rip-rap, and other erosion-prevention methods. The Recipient or sub-Recipient is responsible for acquiring all necessary permits and complying with all mitigation measures identified to ensure no significant impacts.

In order to minimize indirect impacts (erosion, sedimentation, dust and other construction-related disturbances) to the nearby waters of the United States and well defined drainage areas surrounding the site, the contractor should implement Best Management Practices (BMPs) that meet the LDEQ's permitting specifications for storm water discharge regulated under §§ 401 and 402 of the CWA, and include the following into the daily operations of the construction activities: silt

screens, barriers (e.g., hay bales), berms/dikes, and/or fences to be placed where and as needed. Fencing would be placed for marking staging areas to store construction equipment and supplies as well as conduct maintenance/repair operations.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. Impacts to wetlands from complete repairs on a system basis are expected to be similar to those of Alternative 2. This alternative would not have a significant effect on wetlands or other waters of the United States. Work would be conducted within urban, previously disturbed ROWs. Any proposed actions that would impact wetlands would require review under several regulatory programs. Repair of damaged sewage and stormwater pipes would reduce releases of sewage into the environment. Stormwater drainage would be improved, which would contribute to reduced sediment transport and flooding.

During reconstruction there would be the potential to impact surface waters through minor erosion and runoff, and or through accidental spills of fluids used in construction equipment. Storm water runoff could carry sediment offsite into the receiving ditches/culverts, and adjacent drainage canals.

Formal legal protection of jurisdictional wetlands is promulgated through Section 404 of the CWA. A dredge and fill permit for activities in waters of the United States including wetlands from the USACE is required if an action has the potential to adversely affect jurisdictional wetlands. There are several Nationwide Permits (NWP) for activities in waters of the United States that may cover specific aspects of the development of the proposed activities. For example, NWP 3 (Maintenance) may apply to activities related to the repair, rehabilitation, or replacement of an existing structure; NWP 12 (Utility Line Activities) or NWP 14 (Linear Transportation Projects) may apply to the construction of utility lines and access roads for new facilities; NWP 18 (Minor Discharges) or NWP 19 (Minor Dredging) may apply to many sites where water impacts are minimal; NWP 28 (Modifications of Existing Marinas) may apply to activities near tidal waters; and NWP 39 (Commercial and Institutional Developments) may apply to actions involving the expansion or construction of security facilities.

The NWP program has numerous guidelines and conditions that must be met for an activity to qualify for a permit. NWPs are subject to review by the States under Section 401 of the CWA, as are all aspects of the USACE permitting program. Various USACE Districts also have Regional General Permits that function similarly to NWPs; however, Regional General Permits are typically more specific in the types of actions that they cover and typically necessitate more stringent conditions and reporting requirements. If none of the NWPs apply to the proposed activity and no applicable Regional General Permit exists, then the Recipient or sub-Recipient must acquire an Individual Permit from the USACE. Under section 401 of the CWA, each State has an opportunity to establish specific criteria for water quality protection under this section of this Act. These provisions must be satisfied prior to issuance of permits under Sections 402 and 404 of the CWA.

In response to the amended scope of work provided by the City of Slidell, which included the bridge replacement work detailed in Section 5.1.7, FEMA submitted an updated SOV request to the USACE on 20 April 2017. As of the completion of this draft PEA, USACE had not provided a response to FEMA's SOV request. When the response is received, FEMA will incorporate this information into this PEA.

As future City of Slidell road and utility repair and replacement projects are submitted to FEMA for EHP review, FEMA will evaluate any proposed bridge repair and replacement and consult with

the USACE as necessary to determine any potential impacts to wetlands or waters of the U.S. If any potential effects on wetlands or water of the U.S. are found to be significant, an SEA would be prepared for the specific project.

The majority of the work under this alternative would occur in previously developed or disturbed areas would not have a significant impact on wetlands. However, areas that have been disturbed by the removal of the existing vegetation are much more susceptible to water erosion during major precipitation events and to wind erosion during dry and windy weather conditions. Both types of erosion can cause adverse impacts on wetlands located down gradient or down wind. Recipients and sub-Recipients are responsible for securing any applicable NPDES permits and meeting permit conditions, which may include developing a SWPPP for the construction activity. The SWPPP would include practices to control soil erosion, sedimentation and water pollution that may affect wetlands, including wetlands adjacent to project work areas. Projects that obtain and comply with the required NPDES permits and SWPPP will not result in significant impacts to wetlands.

Construction activities located in or near a water body may require a RHA Section 10 or a CWA Section 404 permit from the USACE. The permits would identify measures that must be implemented to minimize erosion and runoff, such as the use of silt fencing, rip-rap, and other erosion-prevention methods. The Recipient or sub-Recipient is responsible for acquiring all necessary permits and complying with all mitigation measures identified to ensure no significant impacts.

In order to minimize indirect impacts (erosion, sedimentation, dust and other construction-related disturbances) to the nearby waters of the United States and well defined drainage areas surrounding the site, the contractor should implement Best Management Practices (BMPs) that meet the LDEQ's permitting specifications for storm water discharge regulated under §§ 401 and 402 of the CWA, and include the following into the daily operations of the construction activities: silt screens, barriers (e.g., hay bales), berms/dikes, and/or fences to be placed where and as needed. Fencing would be placed for marking staging areas to store construction equipment and supplies as well as conduct maintenance/repair operations.

6.3 Hydrology and Floodplains

6.3.1 Regulatory Setting

Executive Order 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., 100-year floodplain) whenever there is a practicable alternative (for "Critical Actions", within the 0.2% annual chance SFHA, i.e., the 500-year floodplain). FEMA uses the National Flood Insurance Program (NFIP) Flood Insurance Rate Maps (FIRMs) to determine the flood hazard zone for the proposed project location. FEMA's regulations for complying with EO 11988 are codified in 44 CFR Part 9, Floodplain Management and Protection of Wetlands.

Section 9.6, 44 CFR, details an eight-step process that decision-makers must use when considering projects either located within the floodplain or with the potential to affect the floodplain. The 8-step process: assesses the action with regard to human susceptibility to flood harm and impacts to wetlands; analyzes principle flood problems, risks from flooding, history of flood loss, and existing flood protection measures; and includes public notice and opportunity for the public to have early and meaningful participation in decision-making and alternative selection. If impacts cannot be

avoided, the 8-step process includes requirements to incorporate measures to minimize and mitigate potential risks from flooding and impacts to wetlands as appropriate.

Under 44 CFR Part 9, FEMA is required to avoid activities in a floodplain unless it is the only practicable alternative. If undertaking a proposed project in the floodplain is the only practicable alternative, then FEMA must minimize the impacts to the floodplain and the impacts from floods to the facility or structure. Minimization techniques apply to the location of structures, equipment and building contents in floodplain areas. This could include elevating facilities or structures above the base flood elevation. Minimization techniques may include flood-proofing structures or facilities. Some of these facilities may be considered "critical actions" under this analysis because the risk of flooding might be too great. In such cases, the base flood elevation or standard for flood-proofing is the 500-year flood event.

6.3.2 Existing Conditions

The City of Slidell is located in St. Tammany Parish, which is located in southeast Louisiana on the Northshore of Lake Pontchartrain. St Tammany Parish consists of approximately 1,124 square miles, of which approximately 846 square miles (approximately 75.3 percent) is land, the remainder, 279 square miles, is open water.

The average elevation of the City of Slidell is currently between 12 feet and 13 feet above sea level, with some portions of the city as high as 24 feet in areas north of Interstate 12 and others as low as 2 feet below sea level in the Eden Isles community. The City's drainage system is divided into thirteen (13) drainage basins (*Figure 21*).

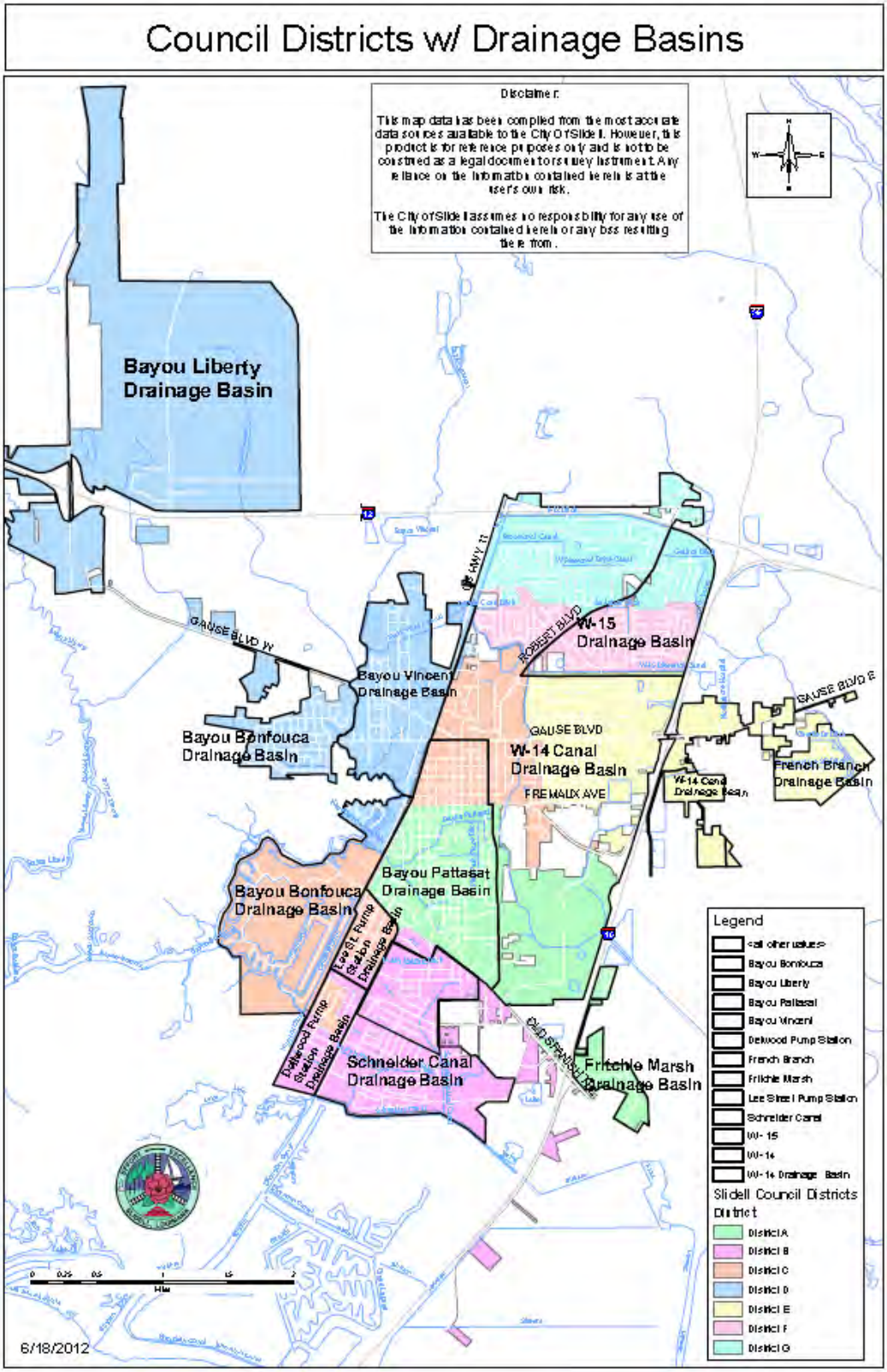

Figure 21 - City of Slidell Drainage Basins (Image provided by the Sub-Recipient)

Urban flooding occurs when rain overwhelms drainage systems and waterways and makes its way into the basements, backyards, and streets of homes, businesses, and other properties. There are several ways in which stormwater can cause the flooding of a property: overflow from rivers and streams, ponding within levee polder areas, sewage pipe backup into buildings, seepage through building walls and floors, and the accumulation of stormwater on property and in public rights-of-way. As the City of Slidell has developed to accommodate increasing population, more impermeable surfaces (roads, roofs, parking lots, driveways, alleys, sidewalks, and patios) have led to reduced infiltration and increased stormwater runoff. Natural drainage systems have been replaced with man-made sewer and stormwater infrastructure. This infrastructure has fallen into disrepair in many places, and increasingly heavy rainfall events are putting additional strain on the deteriorated drainage systems.

The City of Slidell has always faced the risk of flooding from two sources: heavy rains, and hurricane storm surge through Lake Pontchartrain. Hurricane storm surge poses the greatest threat of catastrophic flooding in the City of Slidell. Risk of flood damage has been modulated by several factors: increased structural flood protection in the form of flood gates and levees in Mississippi River communities and Lake Pontchartrain South Shore areas of Louisiana resulting in additional flood water and storm surge impact the Lake Pontchartrain North Shore communities that do not have such flood protection; increased development in low-lying, vulnerable areas; soil subsidence; and coastal erosion. Global sea level rise and the risk of stronger, more frequent hurricanes as a result of global warming may also be contributing to increased risk.

According to the website *Flood Protection for St. Tammany - Flood Plain Changes along the Lake Pontchartrain shoreline,* lower St. Tammany Parish, including the City of Slidell, has no flood protection, which leaves the area vulnerable to storm surge from Lake Pontchartrain. Unlike the City of New Orleans and other Mississippi River communities, there is no extensive levee system that protects Northshore communities from flooding. Historically, and to a lesser extent today, the wetlands located south of the City of Slidell afforded some protection from storm surge; however, due to coastal erosion and construction of the Eden Isles community, which resulted in channeling and loss of natural vegetation, the flood risk reduction once provided by these wetlands has been significantly reduced.

The construction of the extensive levee system along the south shore of Lake Pontchartrain in Orleans and Jefferson Parishes has reduced the risk of flooding in those parishes. Lake Pontchartrain basin drains over 1,000 square miles area through two small opening at the Rigolets Pass and Chef Pass (*Figure 22*). The outflow surge is partially obstructed by U.S. Highway 90 and the CSX railroad tracks as the surge flows out from Lake Pontchartrain to Lake Borgne. As a result of the levees that were built after 1965 in New Orleans East, the floodwaters travel along the levee system paralleling the south lake shore line and exit at the five-mile wide opening by U.S. Highway 11 and the Interstate 10 twin span bridges. This floodwater is forced by wind and surge east and then south as the storm itself pushes inland. The surge then forced by wind and surge height into southern St. Tammany Parish area (Flood Protection, 2010).

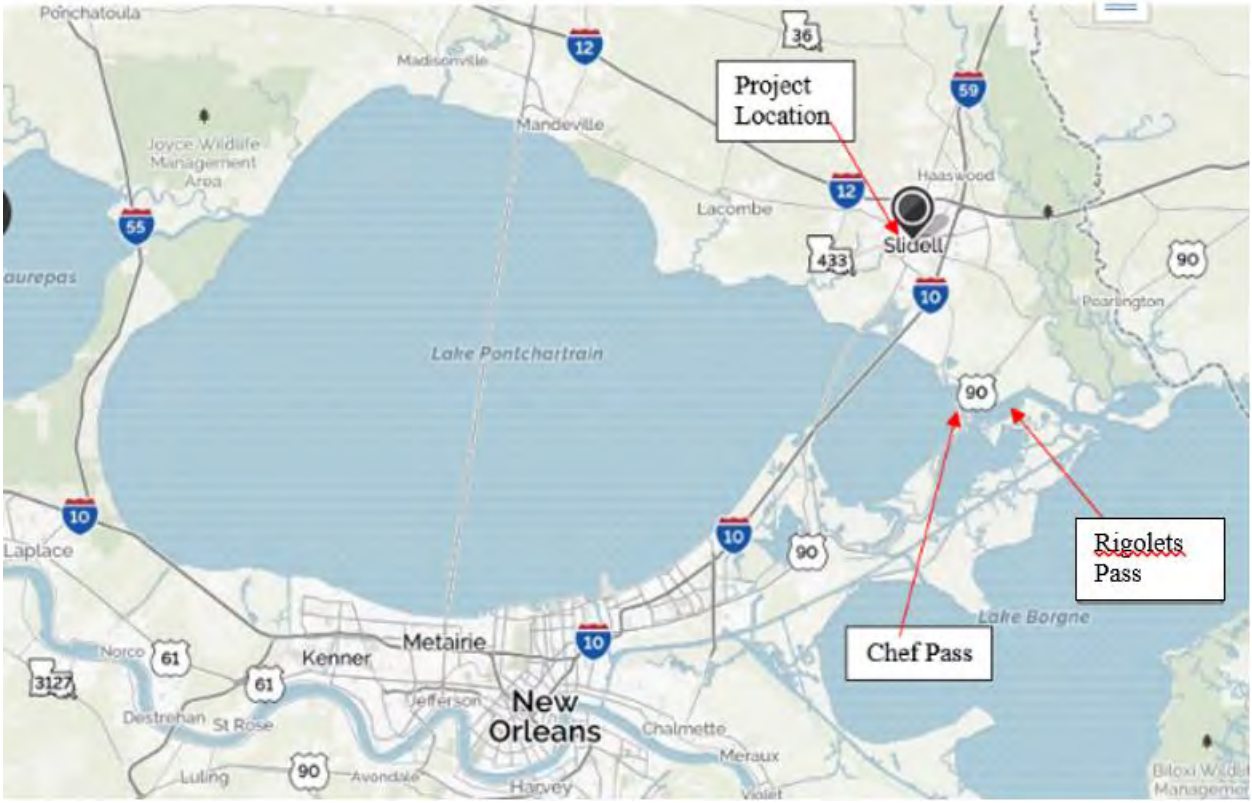

Figure 22 - Map of Lake Pontchartrain and the Rigolets and Chef Passes. (Source: Google Maps)

In July 2005, FEMA began to collect data using state-of-the-art technology to increase the quality, reliability, and availability of flood hazard maps for many of the Louisiana coastal parishes. This was a part of the Flood Map Modernization effort through FEMA's NFIP. These efforts were necessary because the flood hazard and risk information shown on many FIRMs was developed during the 1970s, and the physical terrain had changed significantly since that time, to include significant land subsidence and major wetland loss in some areas. After Hurricanes Katrina and Rita, FEMA expanded the scope of this work to include all of coastal Louisiana. The magnitude of the impacts of Hurricanes Katrina reinforced the urgency to obtain additional flood recovery data for the coastal zones of Louisiana. More detailed analysis was possible because new data obtained after the hurricanes included information on levees and levee systems, new high-water marks, and new hurricane parameters.

During an initial post-hurricane analysis, FEMA determined that the "100-year" or 1-percent-annual-chance storm flood elevations, referred to as base flood elevations (BFEs), on FIRMs for many Louisiana communities, were too low. FEMA created recovery maps showing the extent and magnitude of Hurricanes Katrina's and Rita's surge, as well as information on other storms over the past 25 years. The 2006 advisory flood data shown on the recovery maps for the Louisiana-declared disaster areas show high-water marks surveyed after the storm; flood limits developed from these surveyed points; and Advisory Base Flood Elevations, or ABFEs. The recovery maps and other advisory data were developed to assist parish officials, homeowners, business owners, and other affected citizens with their recovery and rebuilding efforts. St. Tammany Parish residents were not required to use this data in their rebuilding efforts. Based on review of the ABFE panels; however, ABFE data is not available for much of the project area, in

spite of the fact that much of the City of Slidell experienced storm surge from Lake Pontchartrain during Hurricane Katrina.

Following this intensive five-year mapping initiative, FEMA provided updated preliminary flood hazard maps, known as Preliminary Digital Flood Insurance Rate Maps (DFIRMs), to Louisiana's coastal parish communities, including St. Tammany Parish. First released in 2008, these maps were based on the most technically advanced studies ever produced and were subjected to multiple levels of review. The DFIRMs provided communities with a more scientific approach to economic development, hazard mitigation planning, emergency response, and post-flood recovery.

Accordingly, FEMA subsequently revised the preliminary DFIRMS for St. Tammany Parish, including the City of Slidell. These Preliminary DFIRMs were dated 30 April 2008. However, the Revised Preliminary DFIRMS were not adopted by St. Tammany Parish; and the effective FIRM data is the most recent official data available, despite the fact that these FIRMs were produced in 1999. *Figures 23 and 24* depict the effective flood zones for the project areas. According to the FIRMs, the majority of the City of Slidell is located in flood zone AE, with flood elevations ranging from +9 feet to +17 feet above sea level (North American Vertical Datum of 1988). Areas depicted as "AE" flood zones, (the gray areas on the FIRMs), indicate the areas that are located in the 100-year floodplain, areas subject to the 1.0% annual chance flood. The flood elevations depicted on the FIRMs tend to become higher as one moves from south to north within the City of Slidell. The remaining areas are located in flood zone "X", (the white areas of the FIRMs), areas of "minimal flooding".

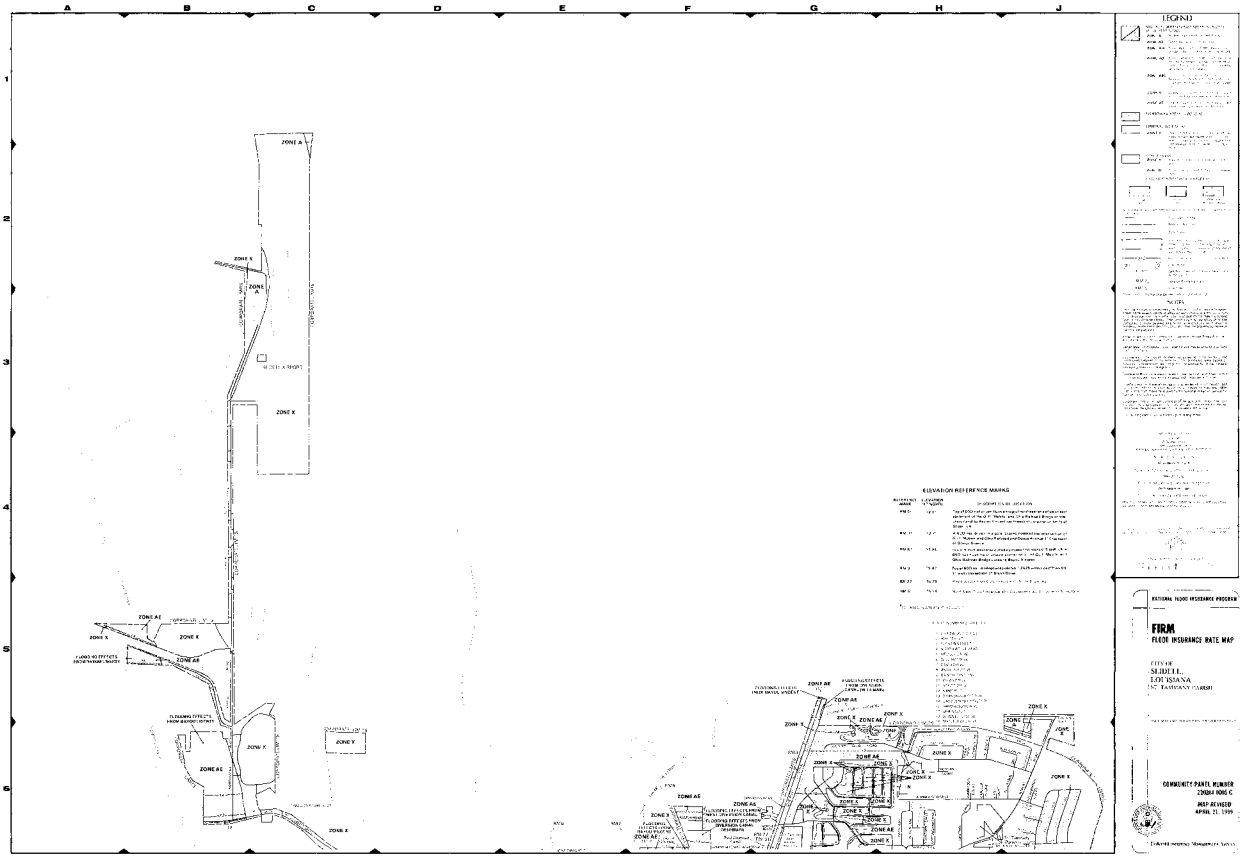

Figure 23 – FIRM Panel 2202040005C, dated April 21, 1999. (Source: FEMA Map Store)

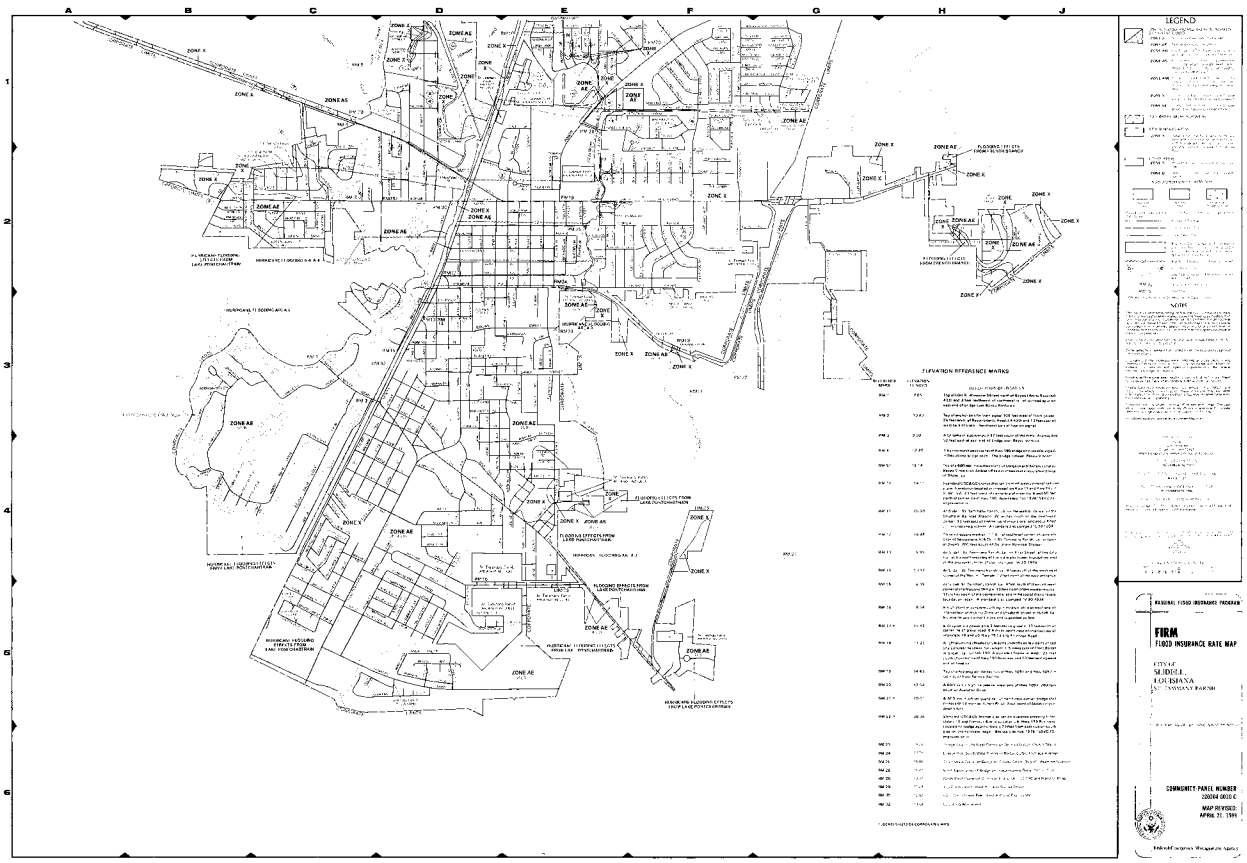

Figure 24 – FIRM Panel 22020400010C, dated April 21, 1999. (Source: FEMA Map Store)

In conjunction with the Louisiana Department of Transportation and Development (LaDOTD), the Louisiana State University (LSU) Agriculture Center created an online tool to study flood and wind hazards and to explore how flood maps would be changing in various parishes throughout Louisiana, including St. Tammany Parish, as a result of FEMA's updates to the existing FIRMs, which incorporated wave height and flood elevation information observed during the Hurricane Katrina and Hurricane Rita events. This tool was intended to help residents of Louisiana learn how the DFIRMs were changing in their parishes and to provide the status of the proposed changes.

While the floodplain data shown in *Figure 25* is the same the flood zone data depicted on the Preliminary DFIRMs created by FEMA for St. Tammany Parish dated 30 April 2008 (discussed above), this map is not an official FEMA DFIRM. The Interactive Mapping Tool is not intended for insurance rating purposes and is intended to provide information only; however, it does depict the flood zones as determined by FEMA on the 2008 Preliminary DFIRMs for the City of Slidell, which incorporates flood elevations experienced during Hurricanes Katrina and Rita. In addition, unlike the FEMA Preliminary DFIRMs for St. Tammany Parish, this website is available to interested members of the general public having internet access for use in viewing the latest flood data for their area and as general guidance for elevation of planned new structures so as to mitigate potential damages from future storms (Louisiana State University 2017).

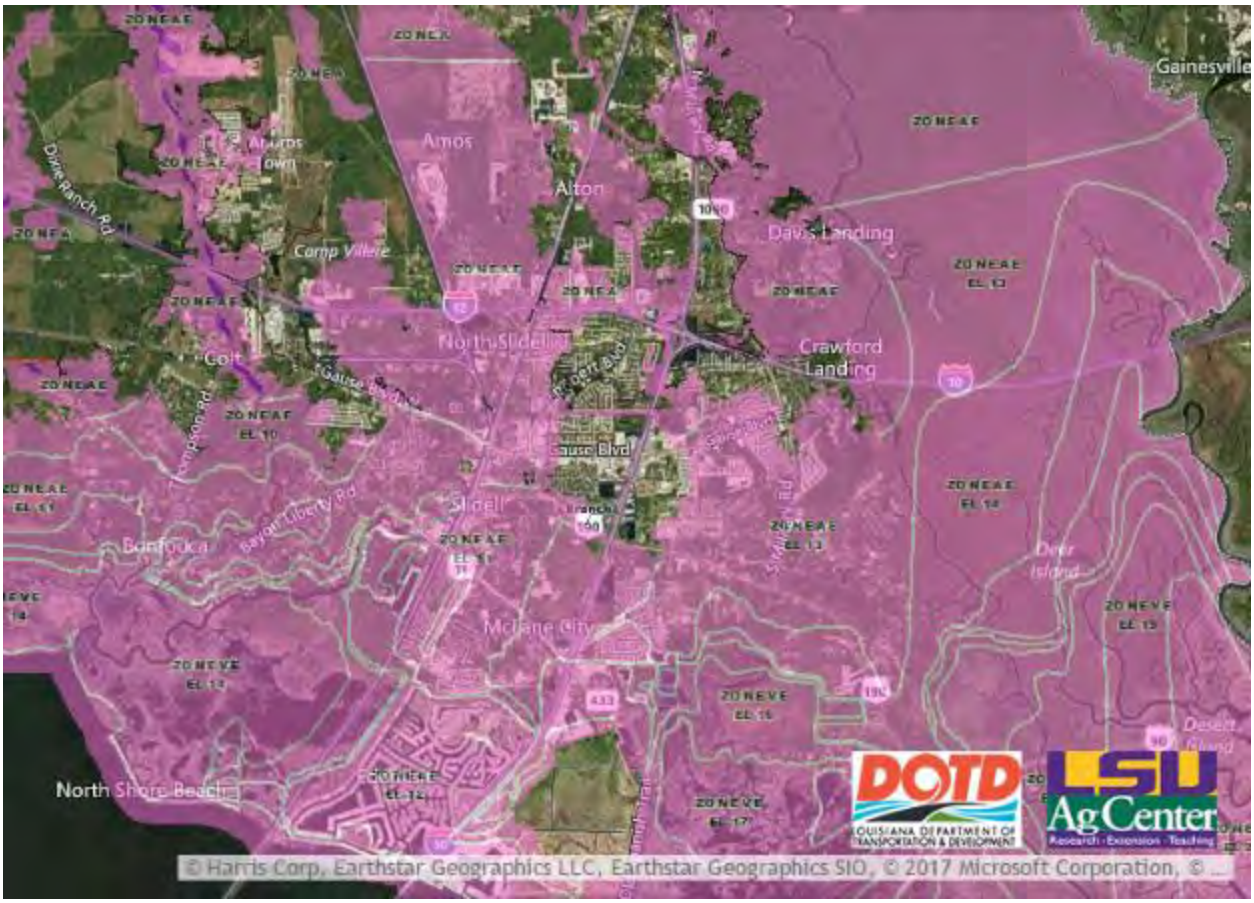

Figure 25 - Flood zones as determined by FEMA for the City of Slidell based on Preliminary DIRMs dated 30 April 2008. The 100-year flood zones are depicted in pink with flood elevations provided. The DFIRMs from which this data was derived were not adopted by St. Tammany Parish. (Image Source: http://maps.lsuagcenter.com/floodmaps/?FIPS=22103)

6.3.3 Environmental Consequences

Alternative 1 – No Action. Under the No Action Alternative, damage sustained as a result of Hurricane Katrina to roads, drainage lines, water lines, and sewer lines within the City of Slidell would not be repaired, replaced, or improved. Storm-related damage would continue to adversely affect the ability of these roads, drain lines, water lines, and sewer lines to function as intended, inhibiting the City's future growth and economic development, accelerating further degradation of the City's transportation network, drainage system, water distribution system, and sewerage collection system, and exposing the public to undo hardship and health risks.

Implementation of this alternative would have adverse effects on floodplains. Damaged sewer and stormwater drainage infrastructure would remain in a state of disrepair. Leaking sewage could directly pollute stormwater runoff and impact nearby waters. Sewage discharges from leaks may contain significant loads of a wide variety of pollutants, including bacteria and viruses, oxygen demanding and toxic pollutants, as well as persistent materials such as heavy metals, polycyclic aromatic hydrocarbons (i.e., PAHs), etc. Sewage can infiltrate into stormwater drains through cracks in pipes or faulty joints and have long-term environmental impacts on rivers and streams.

Stormwater entering the sewage treatment system can cause the sewage system to have too much water and discharge through designed overflow points into waterways and stormwater drains. Sewage overflows can be a major source of pollution, especially within estuarine and enclosed waterways. Unrepaired drainage appurtenances such as culverts and catch basins would continue to operate at reduced capacity and efficiency, which may increase sediment and debris transported in stormwater. Reduced drainage capacity would contribute to increased flooding risk, frequency, and severity.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). Sewer overflows from flooding can overwhelm the capacity of drainage systems, roads, culverts, channels, and detention structures. The comprehensive infrastructure repair and restoration program would restore the roads and utility infrastructure, which would increase the capacity for draining and conveying high stormwater flows and reduce flooding. The repaired, improved, or replaced infrastructure would reduce spills and leakage from the sewer system and reduce human health and ecological impacts.

The infrastructure repair would encourage redevelopment in the base floodplain and stimulate future growth subject to damage in future flooding. Repairs and reconstruction would also increase the useful life of the facilities. The program would maintain and likely expand significant investment in the base floodplain and expose facilities to moderate residual flood hazards, which may increase the need for future disaster assistance. The project would accommodate the existing uses of the floodplain and reinforce existing land use patterns that have developed without reflection on flood hazard and risk minimization. Compliance with floodplain codes and standards and other required treatment measures would increase development costs.

Adverse effects to floodplains during construction could result from temporary service disruptions that would render portions of the system inoperable and contribute to an increase in localized flooding. Poorly maintained construction sites can lead to the release of pollutants to stormwater runoff and increased sedimentation, which would reduce water quality.

Adverse effects would be minimized in accordance with FEMA's minimization standards in 44 CFR 9.11. Treatment measures would be required to reduce adverse impacts below the level of significance. New construction must be compliant with current codes and standards. Per 44 C.F.R. § 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 NFIP. The SubRecipient is required to coordinate with the local floodplain administrator regarding floodplain permit(s) prior to the start of any activities. Coordination pertaining to these activities and SubRecipient compliance with any conditions should be documented and copies forwarded to the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP/Recipient) and FEMA for inclusion in the permanent project files.

FEMA has completed an 8-Step Analysis for this alternative (Appendix B). Therefore, FEMA will carry out, with the SubRecipient's assistance, individual project analysis and 8-Steps for any amendments proposed in SFHAs. This may result in the need to prepare a Tiered Site Specific EA. The preferred alternative as proposed will have negligible effects on the floodplain.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. Sewer overflows from flooding can overwhelm the capacity of drainage systems, roads, culverts, channels, and detention structures. The comprehensive infrastructure repair and restoration program would restore the roads and utility infrastructure, which would increase the capacity for draining and conveying high stormwater flows and reduce flooding. The repaired infrastructure would reduce spills and leakage from the sewer system and reduce human health and ecological impacts.

The infrastructure repair would encourage redevelopment in the base floodplain and stimulate future growth subject to damage in future flooding. Repairs and reconstruction would also increase the useful life of the facilities. The program would maintain and likely expand significant investment in the base floodplain and expose facilities to moderate residual flood hazards, which may increase the need for future disaster assistance. The project would accommodate the existing uses of the floodplain and reinforce existing land use patterns that have developed without reflection on flood hazard and risk minimization. Floodplain development requiring mitigation and minimization treatment measures and compliance with floodplain codes and standards would increase costs.

Adverse effects to floodplains during construction could result from temporary service disruptions that would render portions of the system inoperable and contribute to an increase in localized flooding. Poorly maintained construction sites can lead to the release of pollutants to stormwater runoff and increased sedimentation, which would reduce water quality.

6.4 Water Quality and Resources

6.4.1 Regulatory Setting

Section 401 of the Clean Water Act

Section 401 of the CWA requires state certification of all federal licenses and permits in which there is a "discharge of fill material into navigable waters." The certification process is used to determine whether an activity, as described in the federal license or permit, would impact established site-specific water quality standards. A water quality certification from the issuing state, LDEQ in this case, is required prior to the issuance of the relevant federal license or permit. The most common federal license or permit requiring certification is the U.S. Army Corps of Engineers (USACE) CWA § 404 permit.

Section 402 of the Clean Water Act

The National Pollutant Discharge Elimination System (NPDES) program was created by § 402 of the CWA. This program authorizes the USEPA to issue permits for the point source discharge of pollutants into waters of the U.S. Through a 2004 Memorandum of Agreement, the USEPA delegated its permit program for the state of Louisiana to LDEQ. The ensuing Louisiana Pollutant Discharge Elimination System (LPDES) program authorizes individual permits, general permits, stormwater permits, and pretreatment activities that result in discharges to jurisdictional waters of the state.

With respect to stormwater, municipalities such as the City of Slidell are able to obtain municipal separate storm sewer system (or MS4) permits for their stormwater discharges. According to 40 C.F.R. § 122.26(b)(8), a municipal separate storm sewer is "a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains)" that is owned or operated by a public body and is "[d]esigned or used for collecting or conveying storm water." Pursuant to Title 33.IX § 2511 of the Louisiana Environmental Regulatory Code, individual construction projects may require stormwater pollution prevention plans consistent with the MS4 permit.

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was first passed in 1974 and has been amended twice, the latest instance in 1996. This Act focuses on both above- and below-ground waters designated for public drinking use, both actual and potential, including rivers, reservoirs, lakes, springs, and groundwater wells. It also establishes health-based national standards and testing regimes in order to protect the public from naturally-occurring and human-generated contaminants of drinking water (40 C.F.R. Parts 141-143). Although the SDWA originally focused on treatment as the primary method for providing safe drinking water, the 1996 amendments recognized that other factors are also important, such as protecting water sources, providing funds for water system improvements, and disseminating information to the general public.

Oversight of SDWA rules is usually conducted by states under their own drinking water programs, if a state's standards are at least as stringent as those of the USEPA. The Louisiana Department of Health and Hospitals received primacy to administer the SDWA in Louisiana in 1977, with the exception of the Ground Water Rule and the Revised Total Coliform Rule, which are still overseen by the USEPA (Louisiana Department of Health and Hospitals 2013, USEPA 2004).

Local Regulatory Framework

The Louisiana Department of Environmental Quality requires that Stormwater Pollution Prevention Plans (SWPPPs) be prepared for construction projects involving areas over certain acreages, and provides LDPES General Permits and information and templates for completing these plans on their website.

6.4.2 Existing Conditions

According to the USEPA, the primary aquifer used for drinking water by the City of Slidell is the Ponchatoula aquifer, which occurs at about 1,500 feet below ground surface. According to the SubRecipient, the City of Slidell's drainage system is divided into thirteen (13) drainage basins (*Figure 21*). Drinking water testing and treatment is performed in accordance with the provisions of the SDWA.

Due to the current state of disrepair of the City's drainage, water, and sewerage systems, some of which are over 100 years old, considerable leakage and inefficiencies are occurring. The exact extent of the damage and the remedial measures needed are currently not fully known. As with many other older cities, the City of Slidell loses some of its drinking water through leakage and broken pipes in the distribution system. Damaged sewer lines also may be allowing wastewater

to enter the groundwater table. In addition, blocked storm drainage inlets, catch basins, and storm sewer pipes/culverts may cause manhole overflows and street flooding on occasion.

The current best practices for municipal water/sewer infrastructure includes conformance with the "10 States Standards" (Great Lakes - Upper Mississippi River Board 2014). The elimination of potential cross contamination between leaking sewer and water lines is accomplished in two ways: 1) water lines always are kept under pressure, which prevents the infiltration of outside contaminants and 2) both vertical and horizontal separation between the two (2) systems is mandated during initial installation. Sewer lines should be installed at least three (3) to five (5) feet below water lines and separated horizontally by at least six (6) feet of distance. Due to the high groundwater table in the City of Slidell, the positive effect of line separation would be reduced since liquid leakage from pipes would be able to spread within the zone of saturation. Keeping water lines under pressure is regarded as highly effective in preventing cross contamination, however. During periods when there is a drop in water pressure, either unintentional or during testing events, safety procedures such as "boil water advisories" can be implemented.

Like many locations within the U.S., the City of Slidell still has a number of water lines made of lead. For homes and businesses constructed before 1987, lead plumbing or solder also may exist either within the building itself or in the service connection between the water meter and the structure. As a result, in addition to mandated testing under the provisions of the SDWA, as part of its purification process the City of Slidell treats drinking water with a National Sanitation Foundation-certified additive that helps prevent lead contamination via leaching.

6.4.3 Environmental Consequences

Alternative 1 – No Action. The No Action alternative would leave the water, sanitation, and drainage infrastructure in its current state of disrepair. This disrepair would result in moderate effects to water quality. As a result, water leakage, environmental contamination, and storm sewer overflows would continue.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). Alternative 2, the Preferred Alternative, would consist of required and necessary inspections, testing, and repairs to drainage, water, and sewerage infrastructure. During water and sewer line repairs, short-term service disruptions would occur, but could be minimized where repairs are possible via slip lining instead of excavation/removal of the affected pipe sections. Where excavation is necessary for utility and drainage repairs/improvements to be made, the potential exists for contaminated soil to be exposed or polluted water released. In the case of sewer line replacement, sewage spills could occur during removal of the affected pipe segments. Sewage contains bacteria and other organisms harmful to humans, as well as additional potential health hazards. When sewage spills occur, the contractor would be expected to clean up the spillage and disinfect the area affected by the spill. Any contaminated soil would be disposed of in an appropriate authorized waste disposal facility.

As a result of the proposed work, many beneficial impacts associated with the project would accrue. For example, water line repairs would reduce water wastage and thereby increase the City's surplus water treatment capacity. Repair/replacement of deteriorated sewer lines and closing unknown cross-connections between the sanitary and storm sewer systems would reduce sewer back-ups and result in improved overall environmental quality, including improved aesthetics and minimization of health hazards from untreated wastewater entering surface or

groundwater. Clearing drainage and storm sewer obstructions that cause manhole overflows and cleaning blocked inlets that cause street flooding would improve property access and improve traffic. Upgraded infrastructure would lessen potential strain on the City's other operations and facilities by reducing the need to respond to customers with water outages resulting from pipe breaks and/or localized flooding due to drain impairment.

The Preferred Alternative would minimize the risk of loss to customers of municipal water service due to failing infrastructure and/or future storm or flood events by implementing the coordinated repair and restoration of storm damaged roads, water, and sewerage components. Consequently, Alternative 2 should have a beneficial long-term effect on water quality due to a reduction in the potential for water supply contamination and subsequent boil water advisories.

In its 28 September 2016 response to FEMA's SOV, LDEQ stated it did not object to the project as proposed; however, it provided a number of general comments, which have been incorporated into the Conditions and Mitigation Measures Section of this PEA. Should permits be required from the U.S. Army Corps of Engineers pursuant to § 404 of the Clean Water Act or § 10 of the Rivers and Harbors Act of 1899. The SubRecipient also will be obliged to obtain a water quality certification from LDEQ under § 401 of the Clean Water Act.

Prior to construction activities, at least 48-hours' notice would be given to residents and emergency response agencies in advance of any street closures, anticipated periods of low water pressure, or disruptions in service for other non-SubRecipient-controlled utilities. Coordination with other utility companies would occur at least 90 days prior to construction in order to confirm any required utility relocations. Utility line relocations would be avoided to the extent possible in the interest of reducing project costs, project duration, and service disruptions. Any repaired or replaced water main would be chlorinated and tested to ensure the potable water quality meets or exceeds all applicable local and federal drinking water standards.

Water used for cleaning line blockages and contaminated water from dewatering sewer line repair sites would be collected via vacuum truck where feasible. If necessary, heavy cleaning and bypass pumping operations might be employed to facilitate the flushing and inspection of heavily clogged/blocked line segments; however, contractors would avoid discharging or allowing the conveyance of grey water or potentially contaminated materials into natural water bodies.

Any soil and/or vegetative debris removed during the course of the work would be disposed of at an approved disposal facility. If not feasible or cost effective to load, haul, and dispose of removed debris in one operation, the City could allow a contractor to utilize an approved staging site to decant and temporarily stage solid debris. Stockpiled debris would be subsequently loaded into trucks or containers for transport to the disposal site. Any staged areas would be pre-approved by the City and any necessary permits obtained in advance. Stormwater Control Measures (SCMs) would be employed, if necessary, and could include storm drain system protection, spill prevention and clean-up, employee training, project site housekeeping, and/or temporary erosion controls.

In order to minimize indirect impacts (erosion, sedimentation, dust, and other construction-related disturbances) to waters of the state or well defined drainage areas surrounding the work site, the contractor should implement BMPs that meet LDEQ permitting specifications for stormwater and also include the following into the daily construction routine: silt screens, barriers (e.g., hay bales), berms/dikes, and or fences to be placed as and where needed. Fencing should be placed to mark

staging areas for storage of construction equipment and supplies, as well as for sites where maintenance/repair operations occur.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. Although the scope of work in this alternative is similar to that of the Preferred Alternative, Alternative 3 is a less desirable alternative since the drainage and stormwater improvements potentially would not be made in conjunction with road repairs. Water and sewerage projects would, likewise, potentially not be coordinated.

Ultimately, the social benefits described in the Preferred Alternative would be realized, but over a longer period of time and with less efficiency. These benefits include improved drinking water service, decreased groundwater contamination from leaking sewerage infrastructure, and reduced street flooding.

As with the Preferred Alternative, at least 48-hours' notice would be given to residents and emergency response agencies in advance of any street closures, anticipated periods of low water pressure, or disruptions in service for other non-SubRecipient-controlled utilities. Coordination with other utility companies would occur at least 90 days prior to construction in order to confirm any required utility relocations. Utility line relocations would be avoided to the extent possible in the interest of reducing project costs, project duration, and service disruptions. Any repaired or replaced water main would be chlorinated and tested to ensure the potable water quality meets or exceeds all applicable local and federal drinking water standards.

Water used for cleaning line blockages and contaminated water from dewatering sewer line repair sites would be collected via vacuum truck where feasible. If necessary, heavy cleaning and bypass pumping operations might be employed to facilitate the flushing and inspection of heavily clogged/blocked line segments; however, contractors would avoid discharging or allowing the conveyance of grey water or potentially contaminated materials into natural water bodies.

Any soil and/or vegetative debris removed during the course of the work would be disposed of at an approved disposal facility. If not feasible or cost effective to load, haul, and dispose of removed debris in one operation, the City could allow a contractor to utilize an approved staging site to decant and temporarily stage solid debris. Stockpiled debris would be subsequently loaded into trucks or containers for transport to the disposal site. Any staged areas would be pre-approved by the City and any necessary permits obtained in advance. Stormwater Control Measures (SCMs) would be employed, if necessary, and could include storm drain system protection, spill prevention and clean-up, employee training, project site housekeeping, and/or temporary erosion controls.

In order to minimize indirect impacts (erosion, sedimentation, dust, and other construction-related disturbances) to waters of the state or well defined drainage areas surrounding the work site, the contractor should implement BMPs that meet LDEQ permitting specifications for stormwater and also include the following into the daily construction routine: silt screens, barriers (e.g., hay bales), berms/dikes, and or fences to be placed as and where needed. Fencing should be placed to mark staging areas for storage of construction equipment and supplies, as well as for sites where maintenance/repair operations occur.

6.5 Land Use and Planning

6.5.1 Regulatory Setting

Land use is the way in which, and the purposes for which, people utilize the land and its resources. Land use planning varies depending on land ownership and jurisdictional boundaries. Land use within and in the immediate vicinity of urban areas is generally guided by comprehensive plans that specify the allowable types and locations of present and future land use. In most cases, that comprehensive plan is developed through a public participation process and approved by publicly-elected officials to capture local values and attitudes toward planning and future development. Zoning ordinances and regulations vary throughout the U.S. and are primarily set at the regional, city, county, or local level.

Coastal Zone Management Act of 1972

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. § 1451 et seq.) is administered by the Department of Commerce's Office of Ocean and Coastal Resource Management within the National Oceanic and Atmospheric Administration (NOAA). It applies to all coastal states and to all states that border the Great Lakes. The CZMA was established to help prevent any additional loss of living marine resources, wildlife, and nutrient-enriched areas; alterations in ecological systems; and decreases in undeveloped areas available for public use. The CZMA gives states the authority to determine whether activities of governmental agencies are consistent with federally-approved coastal zone management programs. Each state coastal zone management program must include provisions protecting coastal natural resources, fish, and wildlife; managing development along coastal shorelines; providing public access to the coast for recreational purposes; and incorporating public and local coordination for decision-making in coastal areas. This voluntary federal-state partnership addresses coastal development, water quality, shoreline erosion, public access, protection of natural resources, energy facility siting, and coastal hazards.

The Federal Consistency provision, contained in § 307 of the CZMA, allows affected states to review federal activities to ensure that they are consistent with the state's coastal zone management program. This provision also applies to non-federal programs and activities that use federal funding and that require federal authorization. Any activities that may have an effect on any land or water use or on any natural resources in the coastal zone must conform to the enforceable policies of the approved state coastal zone management program. NOAA's regulations in 15 C.F.R. Part 930 provide the procedures for arriving at or obtaining a consistency determination.

The CZMA requires that coastal states develop a State Coastal Zone Management Plan or program and that any federal agency conducting or supporting activities affecting the coastal zone conduct or support those activities in a manner consistent with the approved state plan or program. To comply with the CZMA, a federal agency must identify activities that would affect the coastal zone, including development projects, and review the state coastal zone management plan to determine whether a proposed activity would be consistent with the plan.

Louisiana State and Local Coastal Resources Management Act of 1978

Pursuant to the CZMA, the State and Local Coastal Resources Management Act of 1978 (R.S. 49:214.21 et seq. Act 1978, No. 361) is the state of Louisiana's legislation creating the Louisiana

Coastal Resources Program (LCRP). The LCRP establishes policy for activities including construction in the coastal zone, defines and updates the coastal zone boundary, and creates regulatory processes. The LCRP is under the authority of the Louisiana Department of Natural Resource (LDNR) Office of Coastal Management (OCM). If a proposed action is within the Coastal Zone boundary, OCM will review the eligibility of the project concurrently with its review by other federal agencies (U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and National Marine Fisheries Service). The mechanism employed to review these projects is the Coastal Use Permit (CUP). Per the CZMA, all proposed federal projects within the coastal zone must undergo a Consistency Determination by OCM for that project's consistency with the state's Coastal Resources Program (i.e., LCRP) (LDNR 2016).

Coastal Barrier Resources Act

The Coastal Barrier Resources Act (CBRA) of 1982 (16 U.S.C. § 3501 et seq.), administered by the U.S. Fish and Wildlife Service (USFWS), was enacted to protect sensitive and vulnerable barrier islands found along the U.S. Atlantic, Gulf, and Great Lakes coastlines. The CBRA established the Coastal Barrier Resources System (CBRS), which is composed of undeveloped coastal barrier islands, including those in the Great Lakes. With limited exceptions, areas contained within a CBRS are ineligible for direct or indirect federal funds that might support or promote coastal development, thereby discouraging development in coastal areas.

Local Regulatory Framework

Land use within the City of Slidell must be consistent with the City of Slidell Ordinance Appendix A – Zoning regulations.

6.5.2 Existing Conditions

The City of Slidell is located in St. Tammany Parish, which is located in southeast Louisiana. St. Tammany Parish is approximately 1,124 square miles, of which approximately 846 square miles (approximately 75.3 percent) is land, the remainder, 279 square miles, is open water. St. Tammany Parish is bordered to the east by the Pearl River, Hancock County, Mississippi, and Pearl River County, Mississippi; to the south by Orleans Parish and Lake Pontchartrain; to the west by Tangipahoa Parish; and to the north by Washington Parish. St. Tammany Parish has approximately 233,740 residents according to 2010 census figures. Major transportation routes within St. Tammany Parish include Interstate Highways 10, 12, and 59; and U.S. Highways 11, 90, and 190. The City of Slidell is comprised of 15.2 square miles, of which 14.8 square miles is land, and 0.35 square miles is open water. The City of Slidell had approximately 27,068 residents in 2010, according to census information.

The City of Slidell is primarily urban, with the exception of some areas of undeveloped forested land located primarily west of US Highway 11. The City of Slidell is located in lower St. Tammany Parish on the Northshore of Lake Pontchartrain, with a subtropical, humid climate typical of coastal regions along the Gulf of Mexico. The average winter temperature is 61°F and the average summer temperature is 90°F. St. Tammany Parish typically receives approximately 63 inches of rainfall annually.

The City of Slidell was established in 1882-1883 and the city's urban footprint has expanded significantly since then. According to the *MySlidell* website, "Slidell, Louisiana was founded during construction of a major new railroad from New Orleans to Meridian, Mississippi, connecting there with Cincinnati, Ohio and eventually with New York, NY. The New Orleans and Northeastern (N.O.N.E.) Railroad established a building camp at first high ground north of Lake Pontchartrain which eventually grew into the city. Slidell was chartered as a town in 1888 by the Louisiana legislature. Sometime prior to Slidell's formal incorporation in 1888, its first streets were laid out in a grid pattern, mostly east of the railroad, running three blocks along the road by four blocks deep.

According to the *MySlidell* website, "In the thirty or so years after its founding, Slidell developed a creosote plant, one of the country's largest brick manufacturing facilities, a large lumber mill and a shipyard. The Slidell shipyard contributed significantly to the national effort in both World Wars. Slidell residents worked in New Orleans ship, tank and airplane construction during World War II. In the 1960's, Slidell began to assume its modern profile as the middle of three local sites in NASA's lunar landing program: the Michoud assembly facility in New Orleans, the computer facility in Slidell, and the Mississippi test facility in Hancock County, Mississippi."

Land use differs from zoning in that it groups land distribution patterns into broad general categories. Zoning, on the other hand, regulates specific activities and functions within a particular land use category. Post-Hurricane Katrina, the general pattern of land use has not changed significantly; however, some properties are now vacant or abandoned.

6.5.3 Environmental Consequences

Alternative 1 – No Action. The "No Action" alternative would leave the existing damaged infrastructure as is and, therefore, would have no effects on land use. Business and resident access to reliable roads, water delivery, and sewerage systems would continue to be sub-standard.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). All areas in the City of Slidell south of Interstate 12 are located within the Louisiana Coastal Zone and are subject to the CZMA regulation.

The Preferred Action Alternative would involve construction in a designated coastal zone; however, this action would have negligible impacts to coastal resources. In accordance with a 2013 LDNR OCM Special Public Notice, the granting of federal financial assistance as defined in 15 C.F.R. § 930.91 is fully consistent with the LCRP; however, consistency with the LCRP does not exempt SubRecipients from the need to obtain a CUP. The City of Slidell is responsible for coordinating with LDNR OCM to obtain any CUP(s) that may be required for this project. The City of Slidell is not located within a CBRS unit; therefore, there would be no effect to coastal barrier resources.

The City of Slidell consulted with the LDNR OCM regarding proposed work within the specific basins covered in this PEA. The City of Slidell has received from the OCM, and forwarded to FEMA, Determinations for the following Slidell Drainage Basins included in the Request for a Consolidated Improved Project and evaluated in this PEA:

- Bayou Pattasat Drainage Basin
- Bayou Vincent Drainage Basin

- Schneider Canal Drainage Basin
- W-14 Drainage Basin

For the above named Slidell Drainage Basins, it has been determined that a portion of the proposed activity (repair/replacement activities located in upland areas, below 5 foot contour) will have no significant impact on coastal waters and a Coastal Use Permit will not be required. Copies of these Determinations are attached to this PEA in Appendix C.

As of this writing, the City is still waiting to receive determinations for:

- Bayou Bonfouca Drainage Basin
- Dellwood Drainage Basin
- Lee Street Drainage Basin

Should work under this alternative become necessary outside of City of Slidell maintained rights-of-way or established servitudes, any necessary rights-of-entry or specialized permits would be obtained by the SubRecipient.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. All areas in the City of Slidell south of Interstate 12 are located within the Louisiana Coastal Zone and are subject to the CZMA regulation.

With respect to land use, Alternative 3 would be functionally equivalent to the Preferred Alternative, although the frequency and duration of service disruptions would likely increase since repairs to utilities and streets would not necessarily be coordinated. This alternative also would involve construction in a designated coastal zone and would require coordination with LDNR OCM for any necessary CUP(s). This action would have negligible impacts to coastal resources. The City of Slidell is not located within a CBRS unit; therefore, there would be no effect to coastal barrier resources.

The City of Slidell consulted with the LDNR OCM regarding proposed work within the specific basins covered in this PEA. The City of Slidell has received from the OCM, and forwarded to FEMA, Determinations for the following Slidell Drainage Basins included in the Request for a Consolidated Improved Project and evaluated in this PEA:

- Bayou Pattasat Drainage Basin
- Bayou Vincent Drainage Basin
- Schneider Canal Drainage Basin
- W-14 Drainage Basin

For the above named Slidell Drainage Basins, it has been determined that a portion of the proposed activity (repair/replacement activities located in upland areas, below 5 foot contour) will have no significant impact on coastal waters and a Coastal Use Permit will not be required. Copies of these Determinations are attached to this PEA in Appendix C.

As of this writing, the City is still waiting to receive determinations for:

- Bayou Bonfouca Drainage Basin
- Dellwood Drainage Basin
- Lee Street Drainage Basin

Should work under this alternative become necessary outside of City of Slidell maintained rights-of-way or established servitudes, any necessary rights-of-entry or specialized permits would be obtained by the SubRecipient.

6.6 Biological Resources

6.6.1 Regulatory Setting

Endangered Species Act

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 US Fish and Wildlife Service (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 C.F.R. § 17.3) (Endangered and Threatened Wildlife and Plants 1975).

Section 7(a)(2) of the ESA requires the lead federal agency to consult with either the USFWS or the NMFS, depending on 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 (BO) 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 PEA 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.

Migratory Bird Treaty Act

Unless otherwise permitted by regulation, the Migratory Bird Treaty Act 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 enforces the provisions of this Act.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA), (16 U.S.C. 661-666c; Act of March 10, 1934, as amended) proposes to assure that fish and wildlife resources receive equal consideration with other values during the planning of water resources development projects. The Act was passed because the goals of water-related projects (e.g., flood control, irrigation, navigation, hydroelectric power) may conflict with the goal of conserving fish and wildlife resources. Conversely, developers can design water development projects to enhance the quality and enjoyment of fish and wildlife resources if such goals are incorporated into project plans.

The Act authorizes the U.S. Secretary of the Interior to provide assistance to and cooperate with federal, state, and public or private agencies and organizations in the development and protection of wildlife resources and habitat; make surveys and investigations of the wildlife in the public domain; and accept donations of land and funds that will further the purposes of the Act.

The FWCA requires federal agencies to consult with the USFWS whenever it plans to conduct, approve, or fund an undertaking involving the impoundment, diversion, deepening, control, or modification of a stream or body of water. The Act promotes conservation of wildlife resources by preventing loss of and damage to such resources and to provide for the development and improvement of wildlife resources in connection with the agency action.

6.6.2 Existing Conditions

The city Slidell is home to a number of animals adapted to urban conditions, including raccoons (*Procyon lotor*), opossums (*Didelphis marsupialis*), nine-banded armadillos (*Dasypus novemcinctus*), coyotes (*Canis latrans*), Norway rats (*Rattus norvegicus*) (Allman 2011), and various species of mice, as well as reptiles such as the green anole (*Anolis carolinensis*) and amphibians such as the green treefrog (*Hyla cinerea*, the State Amphibian of Louisiana) and the Gulf Coast toad (*Bufo valliceps*). A large number of common bird species are also present, including rock pigeons (*Columba livia*), mourning doves (*Zenaidura macroura*), boat-tailed grackles (*Quiscalus major*), ruby-throated hummingbirds (*Archilochus colubris*), and American robins (*Turdus migratoius*).

Based on review of the USFWS's most recent threatened and endangered species list for the State of Louisiana, dated 04 May 2016, one (1) mammal species, the West Indian Manatee; one (1) bird species, the Red-cockaded Woodpecker; one (1) fish species, the Atlantic Sturgeon (a Gulf Sturgeon sub-species); one (1) amphibian species, the Dusky Gopher Frog; two (2) reptile species, the Gopher Tortoise and the Ringed Map Turtle; one (1) mollusk species, the Alabama Heelsplitter Mussel; and one (1) plant species, the Louisiana Quilwort are federally listed as threatened or endangered, or there is critical habitat for the species in St. Tammany Parish (USFWS, May 2016). Brief summaries for these species and their critical habitats are provided below. The proposed project location is also located within the Mississippi Flyway Zone (USFWS, 2016).

Mammals

West Indian Manatee (Trichechus manatus). The West Indian manatee and its subspecies (Florida and Antillean) are federally listed under the ESA as endangered and does have federally designated critical habitat that is located in the southwestern and eastern margins of Florida. The Florida subspecies (*T. m. latirostris)* is known to occur in Lakes Maurepas and Pontchartrain during the summer months, typically June through September, and various waterways within the Lake Pontchartrain Basin including the Amite, Blind, Tchefuncte, and Tickfaw Rivers. The known and historical range of the Florida subspecies extends from Norfolk, Virginia south and westward along the Atlantic seaboard to Beaumont, Texas. In warmer months this subspecies has been observed as far north as Massachusetts (USFWS 2007b). Sightings in Louisiana, representing the western limits of their range in the Gulf of Mexico, are regarded as rare but increasing. The West Indian manatee has been known to occupy near shore marine environments, inshore estuaries and salt marshes and warm freshwater environments including: coastal tidal rivers and streams, mangrove swamps, freshwater springs and backwater bayou areas. Foraging habitat in coastal and riverine habitats include vegetated bottoms and shallow grass beds, with ready access to deep channels. In cooler months manatees will seek warmer waters including anthropogenic induced sources.

Birds

Red-cockaded Woodpecker (Picoides borealis). The Red-cockaded woodpecker is federally listed as an endangered species wherever it is found. Ideal habitat includes pine and pine/hardwood trees greater than or equal to 30 years of age. Critical habitat that the Red-cockaded woodpecker depends on for survival consists of fire-maintained old growth pine savannahs and woodlands that once dominated the southeast United States. These habitats no longer exist, except in a few small patches, due to logging and agriculture.

Fish

Atlantic Gulf Sturgeon (Acipenser oxyrinchus desotoi) (a Gulf Sturgeon sub-species). The Gulf sturgeon is a federally threatened fish species that has federally designated critical habitat within the project area. This fish is a large anadromous species that lives most of its life in estuarine or marine environments. It is known to occur in rivers, estuaries and near shore Gulf waters from Tampa, Florida westward to Lake Pontchartrain, Louisiana (NOAA 2012 and NMFS 2007). Adult Gulf sturgeons migrate during the spring to cool, spring-fed, riverine areas to spawn. These riverine areas in the Pontchartrain basin, currently or historically, include the Tchefuncte River, Tickfaw River, Tangipahoa River, Amite River and the Pearl River including the Middle Pearl River, Bogue Chitto, East Pearl River and West Pearl River segments. Juvenile Gulf sturgeon may remain in these riverine systems for up to three years before migrating to estuarine and/or marine waters as adults. The adults initiate movement up to the rivers between February and April and migrate back out to the Gulf of Mexico between September and November (NOAA 2012).

The critical habitat constituents for the Gulf sturgeon identified by USFWS and NMFS (2003) include:

1. *Abundant prey items within riverine habitats for larval and juvenile life stages, and within estuarine and marine habitats and substrates for juvenile, subadult, and adult life stages;*

2. *Riverine spawning sites with substrates suitable for egg deposition and development, such as limestone outcrops and cut limestone banks, bedrock, large gravel or cobble beds, marl, soapstone or hard clay;*

3. *Riverine aggregation areas, also referred to as resting, holding, and staging areas, used by adult, subadult, and/or juveniles, generally, but not always, located in holes below normal riverbed, depths, believed necessary for minimizing energy expenditures during fresh water residency and possibly for osmoregulatory functions;*

4. *A flow regime (i.e. the magnitude, frequency, duration, seasonality, and rate-of-change of fresh water discharge over time) necessary for normal behavior, growth, and survival of all life stages in the riverine environment, including migration, breeding site selection, courtship, egg fertilization, resting, and staging; and necessary for maintaining spawning sites in suitable condition for egg attachment, egg sheltering, resting, and larvae staging;*

5. *Water quality, including temperature, salinity, pH, hardness, turbidity, oxygen content, and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages;*

6. *Sediment quality, including texture and other chemical characteristics, necessary for normal behavior, growth, and viability of all life stages; and*

7. *Safe and unobstructed migratory pathways necessary for passage within and between riverine, estuarine, and marine habitats (e.g. a river unobstructed by any permanent structure, or a dammed river that still allows for passage).*

Of the critical habitat constituents listed above, list items 5 through 7 are pertinent to the proposed project as it relates to Gulf sturgeon critical habitat.

Amphibians

Dusky Gopher Frog (Rana sevosa). The Dusky gopher frog has a stubby appearance due to its short, plump body, a comparatively large head, and relatively short legs (Conant and Collins 1991). The coloration of its back varies in individual frogs. It ranges from an almost uniform black to a pattern of reddish brown or dark brown spots on a ground color of dark gray or brown (Goin and Netting 1940). Warts densely cover the back. The belly is thickly covered with dark spots and dusky markings from the chin to the mid-body (Goin and Netting 1940, Conant and Collins 1991). Males are distinguished from females by their smaller size, nuptial pad (swollen area that assists grip during breeding) on their thumbs, and paired vocal sacs on either side of the throat (Goin and Netting 1940). The range of the Dusky gopher frog includes those parts of the lower coastal plain extending from

southeastern Louisiana (including three of the "Florida Parishes"), across the southern Mississippi coastal counties, to the Mobile River delta in Alabama. (USFWS, 2015)

Specific critical habitat cited by the U.S. Fish and Wildlife Service for this species includes "[a]s adults, all gopher frogs occupy below-ground habitat within the forested uplands, typically stump holes, small mammal burrows, and when they are available, gopher tortoise burrows." Ponds are required for breeding. Further, the U.S. Fish and Wildlife states "[t]he Service has studied the one Dusky gopher frog population known at the time of listing to determine the habitat attributes essential to the conservation of the species, and determined that the primary constituent elements (PCEs) specific to the Dusky gopher frog are: (1) Ephemeral wetland habitat (PCE 1); (2) upland forested nonbreeding habitat (PCE 2); and (3) upland connectivity habitat (PCE 3)."

This species is federally listed as an endangered species wherever it is found. This species has a status of Critical Habitat (CH) on the Louisiana endangered species list for St. Tammany Parish. According to the Federal Register, dated 12 June 2012, "We, the U.S. Fish and Wildlife Service, designate critical habitat for the Dusky gopher frog under the Endangered Species Act. In previous publications, we used the common name 'Mississippi gopher frog' for this species. We are taking this action to fulfill our obligations under the Act. Land in St. Tammany Parish, Louisiana, and Forrest, Harrison, Jackson, and Perry Counties, Mississippi, is being designated under a court approved settlement agreement to finalize critical habitat for the species. The effect of this regulation is to conserve the habitat upon which Dusky gopher frog depends." Specifically, "Approximately 625 hectares (1,544 acres) are designated as critical habitat in St. Tammany Parish, Louisiana." (Federal Register, 2012). The location(s) of the 1,544 acres are not detailed in the Federal Register; however, based on the USFWS 2015 *Dusky Gopher Frog (Rana servosa) Recovery Plan*, the designated critical habitat within St. Tammany Parish appears to be located well north of the City of Slidell (*Figure 26*) and would not be impacted by the proposed project.

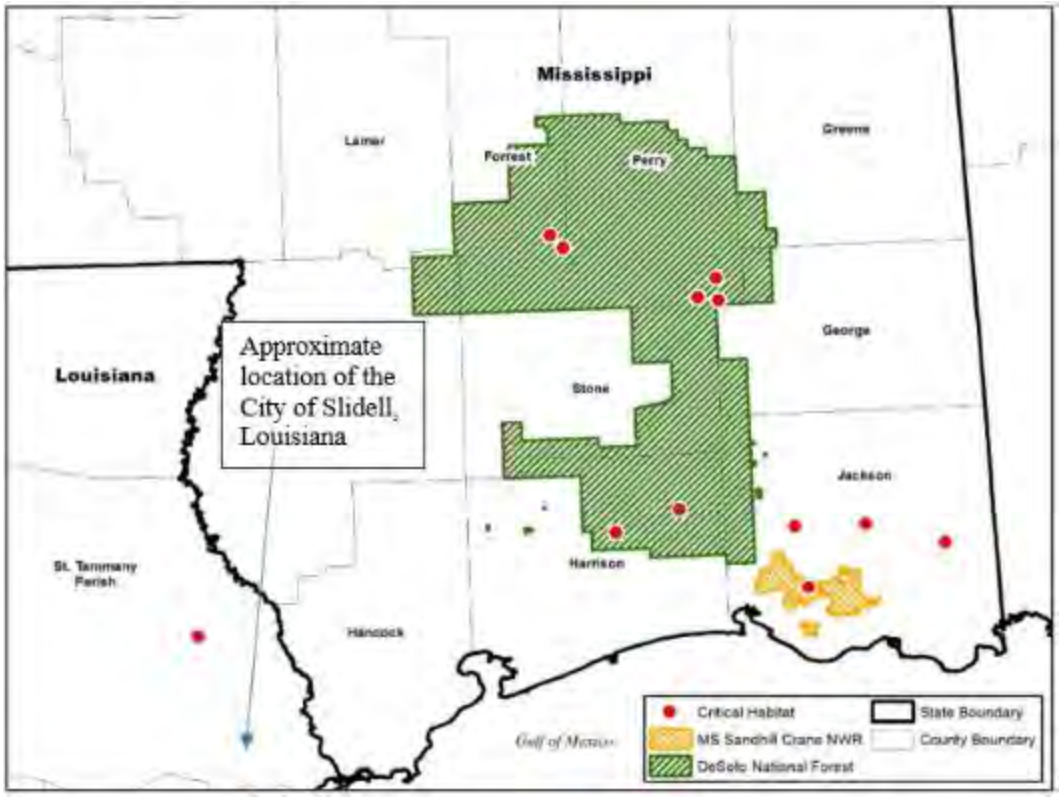

Figure 26 - Critical Habitat Units for the Dusky Gopher Frog (USFWS 2012)

Reptiles

Gopher Tortoise (Gopherus polyphemus). The Gopher tortoise is a large tortoise with a carapace (upper shell) that can range in size from to 15 centimeters to 37 centimeters in length or 5.9 inches to 14.6 inches long. The species is dark-brown to grayish black and is terrestrial with elephantine hind feet, shovel-like forefeet, and a gular projection beneath the head on the yellowish, hingeless plastron (undershell). The male turtle has a greater degree of lower shell concavity, and a longer gular projection; however, the sex of a particular individual at maturity is difficult to determine. This species is federally listed as a threatened species in St. Tammany Parish. Ideal habitat consists of "open" longleaf pine-scrub oak communities.

Ringed Map Turtle (Graptemys oculifera). The Ringed map turtle is a small turtle with a carapace having shields comprised of yellow rings bordered inside and outside with dark olive-brown. The plastron is yellow. The head has a large yellow spot behind each eye and two yellow stripes from the orbit backwards. A characteristic yellow stripe covers the entire yellow jaw. The plastron of males can grow to 10 centimeters in length and in females, the plastron can grow to 18 centimeters. This species is federally listed as a threatened species wherever it is found. In St. Tammany Parish, this species is found in the Bogu Chitto and Pearl Rivers.

Mollusks

Alabama Heelsplitter Mussel (Potamilus inflatus). The Alabama heelsplitter mussel has an oval, compressed to moderately inflated shell. The shell is brown to black and may have green rays in young individuals. This species is federally listed as a threatened species wherever it is found. The species is found in streams.

Plants

Louisiana Quilwort (Isoetes louisianensis). The Louisiana quilwort is a small, semi-aquatic, facultative, (meaning that the plant equally likely to appear in wetland or upland habitats), evergreen plant with spirally-arranged leaves. This species is federally listed as an endangered species wherever it is found. Ideal habitat includes sand and gravel bars on the accreting sides of streams and moist overflow channels within riparian forests.

6.6.3 Environmental Consequences

Alternative 1 – No Action. The "No Action" alternative would entail no undertaking. Therefore, there would be no effect on species federally listed as threatened, endangered species, critical habitat, or migratory birds.

Alternative 2 – (Proposed Action) – Comprehensive Infrastructure Repair and Restoration Program. This alternative entails the repair, replacement, or improvement of storm-damage roads and underground utility lines to pre-storm condition and functionality. Portions of the proposed project area are located in previously disturbed areas with little value to migratory birds, or federally listed threatened/endangered species. FEMA has interpreted § 7(p) of the ESA to mean that restoring any infrastructure damaged or lost due to Hurricane Katrina back to its original footprint does not require ESA consultation (USFWS letter dated September 15, 2005 to FEMA). However, components of this project have the possibility of falling outside of the original footprint. As such, FEMA EHP consulted with the LDWF on 28 September 2016. In a letter dated 21 October 2016, the LDWF indicated that "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 for the specified site within Louisiana's boundaries." In addition, the Louisiana Natural Heritage Program (LNHP) requests that "[if] at any time, Heritage tracked species are encountered within the project area, [the SubRecipient] contact the LNHP Data Manager at 225-765-2643" (Appendix C). FEMA performed an online general project evaluation for potential impacts to endangered species and migratory birds. The resulting list of species (Appendix C), includes some of the species discussed in Section 6.6.2 and indicates that "that potential effects to critical habitat(s) in this location must be analyzed along with the species themselves." No critical habitats were identified in the proposed project area. Therefore, FEMA finds that the proposed scope of work will have no effect on Federal or State trust resources.

All construction activities should avoid areas where threatened/endangered species are known to occur, as well as their critical habits.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. This alternative consists of the completion of repairs to roads and drain lines as

needs arise, allowing each SubRecipient to complete repairs to address current problems as they occur. The locations proposed for infrastructure repair would be within fully developed areas. As such, no effects to biological resources would be anticipated.

In a letter dated 21 October 2016, the LDWF indicated that "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 for the specified site within Louisiana's boundaries." In addition, the Louisiana Natural Heritage Program (LNHP) requests that "[if] at any time, Heritage tracked species are encountered within the project area, [the SubRecipient] contact the LNHP Data Manager at 225-765-2643" (Appendix C). FEMA performed an online general project evaluation for potential impacts to endangered species and migratory birds. The resulting list of species (Appendix C), includes some of the species discussed in Section 6.6.2 and indicates that "that potential effects to critical habitat(s) in this location must be analyzed along with the species themselves." No critical habitats were identified in the proposed project area. Therefore, FEMA finds that the proposed scope of work will have no effect on Federal or State trust resources.

All construction activities should avoid areas where threatened/endangered species are known to occur, as well as their critical habits.

6.7 Air Quality

6.7.1 Regulatory Setting

The Clean Air Act (CAA) of 1970 (42 U.S.C. § 7401 et seq.), including its 1977 and 1990 amendments, is the federal law that regulates air emissions from stationary and mobile sources. This law tasks the United States 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 open air 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 (Pb), nitrogen oxides (NO_x), ozone (O_3), particulate matter (less than 10 micrometers [PM_{10}] and less than 2.5 micrometers [$PM_{2.5}$]), and sulfur dioxide (SO_2).

In addition, the USEPA regulates hazardous air pollutants, such as asbestos, under the "air toxics" provisions of the CAA. Section 112 of the CAA established the National Emission Standards for Hazardous Air Pollutants (NESHAP) and required the USEPA to develop and enforce regulations to protect the public from exposure to airborne contaminants that are known to be hazardous to human health. Major health effects associated with asbestos include lung cancer, mesothelioma, and asbestosis (USEPA 2016a).

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 NAAQS mandates or an approved program for the prevention and mitigation of accidental releases under NESHAP. The State of Louisiana's initial SIP was approved on 5 July 2011, and has been

revised several times since then. The Louisiana Department of Environmental Quality's (LDEQ) NESHAP regulatory program was re-approved by USEPA effective 27 April 2015 (New Source Performance Standards 2015). Louisiana's CAA implementing regulations are codified in Title 33.III of the Louisiana Environmental Regulatory Code.

According to 40 C.F.R. § 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" under NAAQS. In addition, 40 C.F.R. § 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 currently under review in this PEA, 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) NAAQS criteria pollutants (Revisions to the General Conformity Regulations 2010).

6.7.2 Existing Conditions

According to *The Green Book Nonattainment Areas for Criteria Pollutants* (USEPA 2016b), the Parish of St. Tammany is considered to be an "attainment area" for criteria pollutants. Pursuant to 40 C.F.R. § 93.157, "If an action's emissions are below the *de minimis* levels or the action is not located in a nonattainment or maintenance area, a conformity determination is not required" (Revisions to the General Conformity Regulations 2010). In addition, under the exemption provisions of 40 C.F.R. § 93.153(c)(1)(iv), "Routine maintenance and repair activities, including repair and maintenance of administrative sites, roads, trails, and facilities" are considered to be clearly *de minimis*. As a result, no General Conformity determination is required by FEMA for projects it funds within this parish. Road projects under the auspices of the Federal Highway Administration or Federal Transit Administration are subject to Transportation Conformity rules, which do not come into play for FEMA-funded projects.

6.7.3 Environmental Consequences

Alternative 1 – No Action. The "No Action" alternative would involve no project and, therefore, no short- or long-term effects to air quality would occur.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). The Preferred Alternative potentially includes short-term impacts to air quality that are likely to occur during site preparation, excavation, demolition, and construction. Due to the age of some of the utility infrastructure proposed for repair, replacement, or improvement, asbestos-containing materials with friable asbestos may be present in cement-asbestos, or "transite," pipes, and possibly in other materials workers may encounter. Particulate emissions from the generation of fugitive dust during project excavation and construction would be temporarily increased in the immediate vicinity of the project area. Other on-site sources of emissions would include internal combustion engines and heavy construction equipment. These effects would be localized and of short duration. No long-term air quality effects are anticipated.

To reduce potential short-term effects to air quality from construction-related activities, the contractor would be responsible for using BMPs to reduce fugitive dust generation and diesel emissions. For example, the contractor would be required to water down construction areas when necessary to minimize particulate matter and dust. Emissions from the burning of fuel by internal combustion engines (e.g., heavy equipment and earthmoving machinery) could temporarily increase the levels of some of the criteria pollutants, including CO_2, NO_2, O_3, and PM_{10}, and non-criteria pollutants such as volatile organic compounds. To reduce emissions of criteria pollutants, running times for fuel-burning equipment should be kept to a minimum and engines properly maintained. If asbestos is encountered during prosecution of the funded work, coordination with LDEQ would be required as necessary. The City of Slidell would be required to comply with the applicable provisions of 29 C.F.R. Parts 1910 and 1926 (OSHA – Worker Safety).

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. Alternative 3 also potentially includes short-term impacts to air quality from site preparation, excavation, demolition, and construction. As with Alternative 2, due to the age of some of the utility infrastructure proposed for repair, replacement, or improvement, asbestos-containing materials with friable asbestos may be present in cement-asbestos, or "transite," pipes, and possibly in other materials workers may encounter. Particulate emissions from the generation of fugitive dust during project excavation and construction would be temporarily increased in the immediate vicinity of the project area. Other on-site sources of emissions would include internal combustion engines and heavy construction equipment. Although these effects would be localized and of short duration, if all necessary repairs to infrastructure are not completed concurrently at a given location, additional and possibly multiple future construction operations would be necessary, increasing air quality impacts over a longer period. No long-term air quality effects are anticipated.

To reduce potential short-term effects to air quality from construction-related activities, the contractor would be responsible for using BMPs to reduce fugitive dust generation and diesel emissions. For example, the contractor would be required to water down construction areas when necessary to minimize particulate matter and dust. Emissions from the burning of fuel by internal combustion engines (e.g., heavy equipment and earthmoving machinery) could temporarily increase the levels of some of the criteria pollutants, including CO_2, NO_2, O_3, and PM_{10}, and non-criteria pollutants such as volatile organic compounds. To reduce emissions of criteria pollutants, running times for fuel-burning equipment should be kept to a minimum and engines properly maintained. If asbestos is encountered during prosecution of the funded work, coordination with LDEQ would be required as necessary. The City of Slidell would be required to comply with the applicable provisions of 29 C.F.R. Parts 1910 and 1926 (OSHA – Worker Safety).

6.8 Climate Change

6.8.1 Regulatory Setting

E.O. 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, signed on 5 October 2009, directs federal agencies to reduce GHG emissions and address climate change in NEPA analyses. It expands upon the energy reduction and environmental performance requirements of E.O. 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, which it replaces.

A handful of important, non-condensable gases, plus water vapor, significantly contribute to the currently observed warming trend in world climate through the trapping of outbound radiation within the lower atmosphere (troposphere), a phenomenon commonly called the "greenhouse effect." An increase in the atmospheric concentration of these greenhouse gases (GHGs), beginning with the onset of the Industrial Revolution, has resulted in a global temperature increase of approximately 1.5 °F since 1880 (IPCC 2014).

E.O. 13514 identifies numerous energy goals in several areas, including GHG management, management of sustainable buildings and communities, and fleet and transportation management. The GHGs covered by this E.O. are: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), sulfur hexafluoride (SF_6), hydrofluorocarbons (HFCs), and perfluorinated compounds (PFCs). These GHGs have varying heat-trapping abilities and atmospheric lifetimes (U.S. President 2009). In addition, on 23 January 2012, FEMA issued a written statement, FEMA Climate Change Adaptation Policy Statement (2011-OPPA-01), affirming the directive of E.O. 13514 and enacting as policy measures to "integrate climate change adaptation considerations" into its programs and operations (DHS 2012). Recent guidance by CEQ also addresses climate change considerations in NEPA evaluations (CEQ 2014).

E.O. 13653, *Preparing the United States for the Impacts of Climate Change*, was signed by President Obama on 1 November 2013 (U.S. President 2013). This E.O. was issued with the purpose of preparing "the Nation for the impacts of climate change by undertaking actions to enhance climate preparedness and resilience." Its main focus is the fostering of cooperation among the federal government and other groups, including state and local governments, as well as tribal, private-sector, and non-profit entities, in order to achieve the E.O.'s stated purpose. Cooperation is to be facilitated through coordinated planning and the adaptation of federal programs to "help safeguard our economy, infrastructure, environment, and natural resources," in addition to improving climate preparedness and resilience.

One of the specific requirements of E.O. 13653 is that all federal agencies "reform policies and Federal funding programs that may, perhaps unintentionally, increase the vulnerability of natural or built systems, economic sectors, natural resources, or communities to climate change related risks." In response to this directive, FEMA has begun augmenting its flood risk information to reflect potential sea level rise, considering climate change in hazard mitigation planning, and affording Recipients the opportunity to incorporate climate resilience measures in alternate projects (DHS 2013, 2014).

6.8.2 Existing Conditions

Due to the nature of the sites to be impacted by proposed project activities (i.e., developed rights-of-way or servitudes), little vegetation is likely present and most areas would lack vegetation entirely. Areas with sparse or no vegetation, including existing paved sidewalks and streets, produce negligible GHG emissions, if any, but do not make a positive contribution to the removal of GHGs. As part of their photosynthetic process, all plants remove CO_2 from the atmosphere during daylight hours. Trees, in particular, provide an important climate function by removing, or sequestering, CO_2 from the atmosphere in their woody tissue for long durations.

Cities along the coast, such as Slidell, are at increased risk for the negative effects of climate change. Areas outside the flood/hurricane protection levee system will be most vulnerable to sea level rise and increasingly intense storms due to warming of the waters of the Gulf of Mexico. In addition, warmer air temperatures will allow mosquitoes and other disease- carrying organisms to move into the southern U.S. from more tropical regions, potentially increasing the risk for diseases such as dengue fever, yellow fever, and malaria.

6.8.3 Environmental Consequences

Alternative 1 – No Action

The "No Action" alternative would involve no project and, therefore, short- or long-term effects to GHG emissions would not occur.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative)

The Preferred Alternative includes short-term GHG emissions that are likely to occur during site preparation and construction. On-site sources of these construction-related emissions would consist primarily of internal combustion engines from vehicles and heavy non-road equipment. The effects would be localized and of short duration, however, and could be reduced by keeping running times for fuel-burning equipment to a minimum and properly maintaining their engines. In addition, because trees provide an important climate function by removing CO_2 from the atmosphere, trees potentially could be planted at nearby locations as a mitigation measure.

In addition, in order to mitigate emissions from paving activities, the choice of asphalt for paved surfaces would result in the generation of only one-quarter (¼) of the GHG emissions expected for a comparable section of concrete pavement. Considering long-term maintenance requirements, over a 50-year life-cycle, asphalt pavement generates approximately one-third (⅓) of the GHG emissions of reinforced concrete (Asphalt Pavement Alliance 2010, Chehovits and Galehouse 2010). If no changes are made to the current type of road surface, post-construction GHG emissions would not change appreciably from the present situation. With either material used, simply reducing traffic congestion and commute times through better roads would decrease traffic-related GHG emissions.

The GHGs, CH_4 and N_2O, are produced from the anaerobic decomposition of organic waste, such as sewage. Emissions of these two (2) constituents are known to occur from underground sewer pipes (Liu et al. 2015). As a result, repair or replacement of deteriorated sewer lines with a better-sealed sanitary sewerage system, as well as closing unknown cross-connections between the sanitary and storm sewer systems and clearing line obstructions that cause overflows will likely result in a beneficial effect to GHG emissions. In addition, any nutrient-rich wastewater currently leaking into the groundwater (Guillot 2015) and subsequently making its way to surface drainage features would be greatly reduced or eliminated, thereby reducing phytoplankton and algal blooms and the resulting GHG production from decomposing plant matter.

Finally, in keeping with E.O. 13653's mandate to "prepare the Nation for the impacts of climate change by undertaking actions to enhance climate preparedness and resilience," the proposed project would occur primarily within an area surrounded by hurricane protection and river levees.

Although no coastal site is immune to the impacts of severe storms, the levee-protected location chosen for the Preferred Alternative could possibly make it more resistant to future climate change impacts, such as sea level rise.

Alternative 3 – Complete Repairs on a System Basis

This alternative would include short-term increases in GHG emissions, especially CO_2, from the burning of fossil fuels (diesel) by internal combustion engines during site preparation and construction. Under this alternative, GHG emissions and reductions would be similar to those of Alternative 2; however, the timing of these emissions and reductions would be quite different if all of the necessary repairs to infrastructure are not completed concurrently at a given location. In such a scenario, additional and possibly multiple future construction operations would be necessary, increasing GHG emissions over a longer period. In addition, the reductions that might be achieved through repaired infrastructure would be delayed, since repairs to roads, sewer lines, and storm drains would not necessarily occur at the same time.

6.9 Noise

6.9.1 Regulatory Setting

Noise is commonly defined as unwanted or unwelcome sound and most commonly measured in decibels (dBA) on the A-weighted scale (i.e., the scale most similar to the range of sounds that the human ear can hear). The Day-Night Average Sound Level (DNL) is an average measure of sound. The DNL descriptor is accepted by federal agencies as a standard for estimating sound impacts and establishing guidelines for compatible land uses. 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 dBA DNL are "normally unacceptable" for noise-sensitive land uses including residences, schools, or hospitals (USEPA 1974). The Noise Control Act, however, only charges implementation of noise standards to those federal agencies that operate noise-producing facilities or equipment.

The City of Slidell Noise Ordinance (Chapter 13. Environment § 13.1 Noise) places restrictions on any source of sound exceeding the maximum permissible sound level based on the time of day and the zoning district within which the sound is emitted. A number of exemptions exist for certain types of activities, however. In accordance with the City's Noise Ordinance § 13.1, variances may be granted "for short duration activities" and those activities "where the benefit to the community is greater than the adverse effect of the noise" being emitted. Construction and/or demolition activities shall not begin before 7:00 a.m. or continue after 6:00 p.m. in areas zoned as residential districts, or within 300 feet of such residential districts. Mufflers on construction equipment shall be maintained" (Slidell 2016b)

6.9.2 Existing Conditions

The geographic area under consideration in this PEA is primarily urban and encompasses the majority of the city including all of the zoning districts as defined by the City of Slidell Zoning Ordinance (Appendix A of the City of Slidell Ordinances), but most work would be performed in

residential districts. Ambient noise levels are expected to be generally elevated when compared to rural and suburban communities. Secondary streets and main roads within the project area are predominantly concrete and asphalt and overlay a basic grid that is typical of American urban development. The City of Slidell's main roads are characterized by a landscaped "neutral ground" or median, of varying widths, that runs down the center of the street with subsurface sanitary sewer and water systems located within existing rights of way.

6.9.3 Environmental Consequences

Alternative 1 – No Action. Under the "No Action" alternative there would be no short- or long-term effects to noise levels because no construction would occur.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). Construction activities would result in short-term increases in noise during the reconstruction/reconfiguration period. Equipment and machinery utilized on the project sites would be expected to meet all local, state, and federal noise regulations. Repair, replacement, and improvement activities located in residential zones, or within 300 feet of such residential districts shall not begin before 7:00 a.m. or continue after 6:00 p.m. Due to the temporary nature of road construction activities and the City of Slidell Noise Ordinance, noise would not exceed the maximum permissible sound level based on the time of day and the zoning district within which the sound is emitted, and long term noise effects would not occur.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. Construction would be similar to those described under Alternative 2. Equipment and machinery utilized on the project site would be expected to meet all local, state, and federal noise regulations. Repair, replacement, and improvement activities located residential zones, or within 300 feet of such residential districts shall not begin before 7:00 a.m. or continue after 6:00 p.m. Due to the temporary nature of road construction activities and the City of Slidell Noise Ordinance, noise would not exceed the maximum permissible sound level based on the time of day and the zoning district within which the sound is emitted, and long term noise effects would not occur.

6.10 Traffic

6.10.1 Regulatory Setting

Roads play a major role in the management of traffic, particularly in densely-populated urban areas such as the City of Slidell. At the state level, the LaDOTD is responsible for maintaining public transportation, state highways, interstate highways under state jurisdiction, and bridges located within the state of Louisiana. These duties include the planning, design, and building of new highways in addition to the maintenance and upgrading of current highways. Roads not part of any highway system usually fall under the jurisdiction of, and are maintained by, applicable local government entities; however, the LaDOTD is responsible for assuring that all local agency federal-aid projects comply with all applicable federal and state requirements (LaDOTD 2016).

At the local level, the City of Slidell Department of Public Works (DPW), in coordination with the City Planning Commission, as responsible for City of Slidell streets and sidewalk maintenance

and repair. The City of Slidell Code of Ordinances Chapter 25 Streets, Sidewalks, and Other Places, requires that "All work shall be planned and supervised by a registered engineer, whose plans and supervision shall be approved by the mayor and city council and/or city engineer. All phases of construction will be subject to the city engineer's inspection, and no paving slab will be poured without prior notification to him or his authorized representative. No work shall be done within the street right of way without prior approval of the city." (Slidell 2016e)

Amenities, such as sidewalks, bike lanes, bike racks, crosswalks, traffic calming measures, street and sidewalk lighting; targeted pedestrian and bicycle safety improvements; access improvements must be in compliance with the Americans with Disabilities Act (ADA). By providing and encouraging alternative pedestrian- and bicycle-friendly modes of transportation, as well as mass transit, traffic congestion potentially can be reduced.

Although not required by Ordinance, trucks exceeding five (5) tons, such as those transporting materials to and from project sites, should utilize established truck routes or the shortest practical route between their point of origin or destination and the nearest designated truck route.

According to the Ordinance, "Traffic control barriers and flagpoles shall be allowed on city-owned street rights-of-way, only after meeting all conditions set forth in this division; and such encroachments shall not apply to utility easements." In addition, "Proposed barrier designs shall be submitted to the city's department of engineering for review and approval prior to installation or construction. The chief of staff, the city engineer, or his designee, shall inspect the completed installation and shall have authority for final approval."

6.10.2 Existing Conditions

Prior to Hurricane Katrina, many of the city streets were in need of repair due age, use by high-weight vehicles, high volumes of vehicular traffic, and normal wear and tear. The storm only exacerbated the situation. To date, many of the City's roadways had not yet been repaired and are still in poor condition. In addition, many sidewalks were found to be in need of upkeep and lacked ADA ramps, crosswalks, and crossing signals.

Residents of the City of Slidell would benefit from better maintained roads, since the condition of many streets limit their use for relief of traffic congestion. Residents could also see a benefit from the associated improvements related to vehicular, pedestrian, and bicycle safety through repairs or improvements to signage, markings, or road resurfacing.

6.10.3 Environmental Consequences

Alternative 1 – No Action. Implementation of the "No Action" alternative would have no effect on current traffic patterns as no construction would occur. Traffic congestion would not be relieved because necessary road repairs and improvements would not be performed.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). One of the goals of the Preferred Alternative is to coordinate improvements to drainage and stormwater management systems with road repairs in order to increase efficiency, limit infrastructure costs, and preserve roadway quality and operations. As a result, work executed under the Preferred Alternative would be performed in coordination with other existing capital

improvement programs in such a way as to create minor work-related effects to traffic flow. Even so, a temporary increase in construction-related traffic during infrastructure repairs and improvements would be expected. Local residents and school children may be inconvenienced while the work is ongoing. In addition, there may be minor economic impacts to affected businesses due to difficulties in accessing these establishments; however, access to private property is required throughout construction. Signage advising customers how to access businesses would be provided, as necessary. Per standard DPW procedure, anticipated construction-related impacts to property access and arrangements to mitigate these impacts would be explained to residents and business owners prior to the start of construction in a pre-construction community meeting. A DPW point of contact would be identified for residents and business owners to call at any time during construction in order to resolve access-related issues.

While projects are ongoing, sidewalks, bike lanes, and other paths of travel would be kept in clean and passable condition, free of debris and hazardous conditions. Temporary bridges over demolished sections of sidewalks and temporary pavement, fill, and/or plates over excavated areas may be necessary, however. Garbage collection and mail service would have access provided on a continuous basis during project implementation. School bus and public transportation routes and pick-up locations would be established on a temporary basis in the event that these locations are impacted during construction. Fire hydrants, fire stations, fire escapes, and other public-safety related infrastructure would not be blocked or interfered with wherever possible.

Once complete, the various individual projects would result in improved road passability, greater safety, and reduced traffic congestion. Additionally, a Comprehensive Infrastructure Repair and Restoration Program should yield increased pedestrian safety through the installation of ADA accessible ramps and improved markings/signage at crossings. The proposed repairs and improvements would provide increased accessibility for the various local residential, religious, educational, medical, and recreational facilities in the area. Emergency public services also would have more efficient routes to use in the performance of their various duties.

Prior to the beginning of construction, notice of at least 48 hours would be given to residents and emergency response agencies in the event of upcoming street closures. During actual construction, at least one vehicle lane would always remain open, where possible. Temporary approaches to and crossings of intersecting streets and sidewalks would be provided for and kept in good condition wherever practical. Depending on the specific project location, various possibilities for detours and other traffic accommodations also would be available. During project implementation, the contractor would be expected to take all reasonable precautions to control site access. All activities would be conducted in a safe manner in accordance with OSHA work zone traffic safety requirements. The contractor would post appropriate signage and fencing to minimize foreseeable potential public safety concerns. Truck and equipment routes would be kept free of construction debris.

In addition, the contractor would be responsible for handling all traffic control and warning in accordance with the Manual of Uniform Traffic Control Devices, including placing signs and signals in advance of construction activities in order to alert pedestrians and motorists of the upcoming work and traffic pattern changes (e.g., detours or lanes dedicated for construction equipment egress). There may be times when certain streets would be closed to all but local traffic

and rerouting of through traffic to alternate roads might become necessary. The contractor would be expected to provide a traffic control schedule prior to commencing construction.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. Under Alternative 3, a temporary increase in construction-related traffic during repair work also would be anticipated. BMPs, conditions, and access accommodations for private property would be similar to those described in the Preferred Alternative above. Since road and utility repairs would not necessarily be done concurrently, traffic and access disruptions could occur on several occasions within a given area. Once repairs and/or improvements have been completed, traffic would be expected to return to normal, with benefits similar to those of the Preferred Alternative.

Prior to the beginning of construction, notice of at least 48 hours would be given to residents and emergency response agencies in the event of upcoming street closures. During actual construction, at least one vehicle lane would always remain open where possible. Temporary approaches to and crossings of intersecting streets and sidewalks would be provided for and kept in good condition wherever practical. Depending on the specific project location, various possibilities for detours and other traffic accommodations also would be available. During project implementation, the contractor would be expected to take all reasonable precautions to control site access. All activities would be conducted in a safe manner in accordance with OSHA work zone traffic safety requirements. The contractor would post appropriate signage and fencing to minimize foreseeable potential public safety concerns. Truck and equipment routes would be kept free of construction debris.

In addition, the contractor would be responsible for handling all traffic control and warning in accordance with the Manual of Uniform Traffic Control Devices, including placing signs and signals in advance of construction activities in order to alert pedestrians and motorists of the upcoming work and traffic pattern changes (e.g., detours or lanes dedicated for construction equipment egress). There may be times when certain streets would be closed to all but local traffic and rerouting of through traffic to alternate roads might become necessary. The contractor would be expected to provide a traffic control schedule prior to commencing construction.

6.11 Environmental Justice

6.11.1 Regulatory Setting

Executive Order (E.O.) 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations - was issued by President Clinton in 1994. Its purpose is to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities.

The E.O. directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law. The order also directs each agency to develop a strategy for implementing environmental justice. The order is also intended to promote nondiscrimination in federal programs that affect human health and the environment, as well as

provide minority and low-income communities' access to public information and public participation.

Title VI of the Civil Rights Act of 1964 declares it to be the policy of the United States that discrimination on the ground of race, color, or national origin shall not occur in connection with programs and activities receiving federal financial assistance. It is FEMA's policy to ensure that the civil rights of all persons receiving services or benefits from agency programs and activities are protected. No person shall, on the grounds of race, color, national origin, sex, religion, age, disability, English proficiency or economic status, be denied the benefits of, be deprived of participation in, or be discriminated against in any program or activity receiving financial assistance from FEMA. In particular, all personnel carrying out federal major disaster or emergency assistance functions, including the distribution of supplies, the processing of the applications, and other relief and assistance activities, shall perform their work in an equitable and impartial manner without discrimination. It is Agency policy to prohibit such discrimination in any programmatic guideline, procedure, or other directives. These prohibitions extend to all entities receiving federal financial assistance from the Agency, including state and local governments, Indian tribal governments, educational institutions, and any organization of any type obtaining benefits through the PA Program. FEMA's Title 44 CFR, Parts 7.11 through 7.16, outlines the Agency procedures for voluntary compliance, enforcement action, and processing complaints of discrimination in FEMA's federally assisted programs. Procedures for processing complaints of discrimination on the basis of disability in federally conducted programs can be found in Title 44 CFR, Part 16.170.

This PEA analyzes the alternatives provided to determine that all persons are provided the same degree of protection from environmental and health hazards, as well as equal access to the decision-making process involved in determining a healthy environment for all communities.

6.11.2 Existing Conditions

Socioeconomic and demographic data for the project area (City of Slidell, St. Tammany Parish, LA) was reviewed to determine if the proposed action would have a disproportionate adverse impact on minority or low-income persons. According to the U.S. Census, the population of the City of Slidell in 2010 was 17.0% African American; 76.0% White; 6.3% Hispanic, and 1.6% Asian. It should be noted that persons of Hispanic or Latino origin may also self-identify as White or Black; hence the numbers total greater than 100%. The median household income for the City of Slidell in 2005 inflation-adjusted dollars was $56,732, and 11.6% of families earned below the poverty level (USDOC 2014). The primary employment sectors in the City of Slidell education, service and health care; retail trades; professional, scientific, management, administrative, and waste management; construction; and the arts, entertainment, accommodation, and food service. The current unemployment rate among civilian noninstitutionalized adults in the City of Slidell was 6.6%, which is above the national average of 5.8% (BLS 2016). The City of Slidell is comprised of five (5) zip codes; however, the U.S. Census website only provides zip code-specific demographic information for three (3) of these zip codes: 70458, 70460, and 70461. Because the scope of work evaluated encompasses a vast amount of area within the City of Slidell, demographic data for these three zip codes within the project area is provided in Table 2 below:

Table 2: U.S. Census Socioeconomic/Demographic Data by City of Slidell Zip Codes

Zip Code	U.S. Census Data
70458	According to the U.S. Census, the population of 70458 is: 13.5% African American; 80.6% White; 5.3% Hispanic, and 1.6% Asian. Within 70458, 10.9% of persons earn below the poverty level.
70460	According to the U.S. Census, the population of 70460 is: 27.7% African American; 64.9% White; 5.8% Hispanic, and 0.9% Asian. Within 70460, 15.6% of persons earn below the poverty level.
70461	According to the U.S. Census, the population of 70461 is: 19.0% African American; 74.1% White; 4.9% Hispanic, and 2.6% Asian. Within 70461, 15.6% of persons earn below the poverty level.

6.11.3 Environmental Consequences

Alternative 1 – No Action Alternative. Under the No Action Alternative, the SubRecipient would not repair, replace, or improve any damaged roads, drain lines, water lines, and sewer lines. The no action alternative would deprive Slidell's communities of needed repairs, which could potentially harm communities. Impaired roads, pipes, and sewer lines could damage personal property as well as pose significant health concerns to those affected communities. Low income and minority communities could be especially impacted, as their ability to absorb the financial strain of damaged property and health repercussions would be limited. As a result, there could be disproportionately high adverse effects on low-income or minority populations.

Alternative 2 - Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). The SubRecipient would repair, replace, or improve roads, drain lines, water lines, and sewer lines to their pre-disaster condition and functionality. This alternative offers a comprehensive approach to infrastructure repair that would reduce the time required for completing repair/replacement work as well as provide more resilient infrastructure for future storm events (i.e. upgrades to codes and standards, green infrastructure, and drainage mitigation). This restoration program would be parish-wide and based on storm damage. A functioning road system is of upmost importance to minority and low-income residents; as it allows access to schools, basic social services, health services, and job opportunities outside of the immediate neighborhood. Access to safe water and sanitation is essential for health, security, livelihood, and quality of life. Therefore, many minority communities would likely see direct benefits with improved roads, water, and sewer line infrastructure.

No homes or businesses would be relocated, the proposed work would not result in any additional demands on local police, fire, or emergency personnel, and would provide an expected increase in local employment and income. In addition, as much of the repair, improvement, or replace work is being performed in a residential area, construction activities would occur during the daytime hours to reduce disruption to residents. Expansive Public Notice to those affected communities has been and would continue to be provided. A comprehensive repair, replacement, and improvement approach would benefit the entire City of Slidell community as a whole. As a result, there would be no disproportionate adverse human health, economic, or social effects on minority or low-income populations.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. The SubRecipient would repair, replace, and improve eligible roads back to their original configuration utilizing a block-by-block approach. This block-by-block approach would increase the time spent on repairs, as there would be increased administrative and logistical concerns. Developing a prioritization construction schedule that determined which neighborhoods

were repaired first, could lead to concerns regarding fairness and equitable treatment of those neighborhood impacted. Mitigation opportunities would not be available, as roads would return to their exact pre-disaster condition and location. Pre-Katrina flooding and road damage could be expected, as drainage mitigation opportunities would not be utilized. Low income and minority communities could be impacted, as their ability to absorb the financial strain of damaged property from flooding and poor road conditions as well as health repercussions would be limited. However, benefits to the community would exist as no homes or businesses would be relocated, no additional demand on local police, fire, or emergency personnel would be required, and would provide an expected increase in local employment and income. Roads would be repaired to their pre-storm condition, providing a positive benefit for the entire Slidell community. As a result, there would be no disproportionate adverse human health, economic, or social effects on minority or low-income populations.

6.12 Human Health and Safety

6.12.1 Regulatory Setting

The NEPA process provides an opportunity to improve safety for new roadway and public utility projects. The process should:

- Include a safety analysis commensurate with the complexity of the project as part of the review process;
- Utilize the best available safety data specific to the project location in the review process;
- Involve safety analysis using the best available information and tools;
- Promote dialogue with the general public and key stakeholders about the safety aspects of the project;
- Address potential safety issues associated with construction; and
- Incorporate innovative educational and enforcement techniques to address issues.

Safety considerations can arise in many stages of the NEPA process. Safety concerns are a significant part of the impetus for the transportation and utility project under review (the project purpose and need). The existing storm damaged roads, water lines, sewer lines, and drainage appurtenances operate at a reduced capacity and efficiency. Leaking sewers increase adverse effects to public health through direct contact with sewage and cross contamination of sewage with leaking water supply lines. Water supply systems with insufficient pressure risk infectious outbreaks due to inadequate conditions for residual water treatment (the antimicrobial water treatment remaining effective at the end user). Adequate water supply pressure is critical to the functioning of the fire hydrant system. Insufficient fire hydrant pressure during a disaster response would impede firefighting and exacerbate the disaster conditions. Unrepaired roads contribute to accidents, vehicle damage, and increased traffic. During disasters, damaged roads and increased traffic can slow evacuation routes and delay response activities. Damaged drainage lines and catch basins can reduce system capacity and increase the frequency and severity of flooding.

The Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) provides for uniform design and setup of work zones, and includes guidance for the development of temporary traffic control plans that determine the flow of traffic through work zones. (FHWA 2012). The federal Occupational Safety and Health Administration (OSHA)

regulations (29 CFR, Subpart 0) address operations of vehicles and equipment within off-highway job sites not open to public traffic. However Subpart O is not exhaustive in its coverage of machinery types, or safety equipment, nor does it address work practices, traffic control plans, or shift work. Flagging and signaling practices are discussed in general terms in Subpart G, which covers signs, signals, and barricades.

6.12.2 Existing Conditions

Roadway construction workers routinely work in proximity to construction vehicles and motor vehicle traffic and face the risk of death or serious injury from passing motorists, construction vehicles and equipment. Flaggers and other workers on foot are exposed to the risk of being struck by traffic vehicles or construction equipment if they are not visible and protected from motorists or equipment operators. Workers who operate construction vehicles or equipment risk injury due to overturn, electrocution, collision, or being caught in running equipment. Construction workers, regardless of their assigned task, often work in conditions of low lighting, low visibility, and inclement weather, and may work in congested areas, with exposure to high traffic volume and speed. Open trenches present fall and engulfment hazards to site workers and pedestrian traffic. Furthermore, pedestrians and bicyclists must negotiate adjacent roads and sidewalks during construction and require special consideration during safety planning and decision-making.

Construction activities frequently involve the use of hazardous materials such as fuels, oils, solvents, cleaners, and degreasers. Additional safety concerns include, among other things, the use of torches for cutting and welding, sanding and abrading activities, and open excavations. Workers may be exposed to environmental contamination beneath roadways when roadways are impacted by historical construction, land use, or waste management practices. Unanticipated conditions could exist whereby workers could be exposed to hazardous substances, such as from an underground storage tank leak. Furthermore, workers exposed to human waste or sewage are at increased risk from disease.

Utility components may contain asbestos or lead, which could present a risk to workers and nearby populations from dust and fume inhalation. Excavation, filling, saw-cutting, jack-hammering, and paving activities have the potential for the generation of large quantities of dust and asphalt emissions. Impacts would be especially adverse for sensitive subpopulations such as hospital patients, the elderly, and infirm. Heavy equipment operation may generate noise that could adversely impact hearing and contribute to an unsafe environment. Construction rights-of-way may contain other utilities such as electrical transmission lines, gas lines, telecommunications, or petroleum pipelines, which increases risk of injury from inadvertent contact with utility lines. Fire and explosion can result from gas leaks, with especially severe risk if gas from a damaged pipe enters and accumulates in a nearby structure.

6.12.3 Environmental Consequences

Alternative 1 – No Action. Implementation of the "No Action" alternative would have negligible effects to current human health and safety as no construction would occur. The damaged infrastructure would not be repaired, which would result in continued operation in a diminished state. Roadways in disrepair would contribute to vehicle damage, accidents, and increased traffic congestion.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). Overall the completion of this alternative will increase public health and safety by repairing the damaged roads, sewers, and water lines. This alternative would increase the reliability of the water supply, eliminate sewage releases, and repair damaged roads and appurtenances. The repairs, replacements, or improvements would result in beneficial effects to human health, safer roads, improved fire protection, and potential flood reduction.

The repairs, improvements, and replacements would be built in accordance with applicable and relevant building codes and standards. Projects would be completed in compliance with federal, state, and local rules and regulations for safety and health, and will thereby, mitigate safety risks. Best management practices would be required to be incorporated into all work practices during construction to minimize risk and improve safety. Individual projects reviewed under this PEA will be analyzed for any special safety concerns.

Project activities would include safety-related elements or mitigation strategies to address negative safety-related consequences. Construction projects provide an opportunity to incorporate proven safety countermeasures, such as exclusive pedestrian signal phasing at areas with high concentrations of pedestrians, median islands, refuge areas, barriers, or traffic calming to slow vehicles.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. Overall the completion of this alternative would increase public health and safety by repairing the damaged roads, sewers, and water lines. This alternative would increase the reliability of the water supply, eliminate sewage releases, and repair damaged roads and appurtenances. The repairs, replacements, or improvements would result in beneficial effects to human health, safer roads, improved fire protection, and potential flood reduction.

The repairs and replacements would be built in accordance with applicable and relevant building codes and standards. Projects would be completed in compliance with federal, state, and local rules and regulations for safety and health, and will thereby, mitigate safety risks. Best management practices would be required to be incorporated into all work practices during construction to minimize risk and improve safety. Individual projects reviewed under this PEA will be analyzed for any special safety concerns.

Project activities would include safety-related elements or mitigation strategies to address negative safety-related consequences. Construction projects provide an opportunity to incorporate proven safety countermeasures, such as exclusive pedestrian signal phasing at areas with high concentrations of pedestrians, median islands, refuge areas, barriers, or traffic calming to slow vehicles.

6.13 Hazardous Materials

6.13.1 Regulatory Setting

Hazardous materials and wastes are regulated in the United States under a variety of Federal and State laws. Federal laws and implementing regulations governing the management, storage, and disposal of hazardous materials and wastes include the Resource Conservation and Recovery Act (RCRA) the Comprehensive Environmental Response, Compensation, and Liability Act

(CERCLA), the Toxic Substances Control Act (TSCA), and the CAA. The purpose of these laws and regulations is to protect human health and the environment.

The RCRA is the Federal law that regulates the management of solid and hazardous wastes. While USEPA is the agency responsible for implementing this law, this responsibility is often delegated to the states, which is the case in Louisiana. The RCRA also sets forth a framework for the management of non-hazardous wastes, including the environmental problems that can result from improperly disposed nonhazardous solid wastes and leaking underground tanks that store petroleum and hazardous substances. The law focuses only on active and proposed facilities and does not address abandoned or historical sites.

The CERCLA governs the process of identifying and prioritizing the cleanup of abandoned sites contaminated by the release of hazardous substances. The USEPA was given power by Congress to seek out those parties responsible for any release and ensure their cooperation in the cleanup. For contaminated sites that do not meet the definition of a Superfund site, many states, including Louisiana, have developed laws and regulations that require investigation and cleanup. The LDEQ Brownfields Initiative and Voluntary Remediation Program spells out these requirements.

The Small Business Liability Relief and Revitalization Act (the Brownfield Amendments) clarified CERCLA liability provisions for potential property owners. If the potential property owners meet the specific provisions of the act, including an adequate inquiry on past uses of the property, the landowner will be able to assert the innocent landowner defense, contiguous property exemption, and bona fide prospective purchaser exemption to CERCLA liability. The USEPA has published the final "all appropriate inquiries" rule (40 C.F.R. 312.10) that establishes the criteria for conducting Environmental Site Assessments on properties considered for acquisition. This would apply to proposed activities which may require land acquisition for the establishment of new rights-of-way.

The TSCA provides the authority to the USEPA to administer programs covering the production, importation, use, and disposal of specific chemicals including PCBs, asbestos, radon and lead-based paint. The provisions of TSCA that are likely to be applicable to the actions described in this PEA concern materials or items that may contain asbestos (piping materials) and lead (piping or lead-based paint).

Section 112 of the CAA requires the USEPA to develop National Emission Standards for Hazardous Air Pollutants (NESHAPs). Because air emissions from lead and asbestos (potentially present in utility piping) present a human health risk they are considered hazardous air pollutants. Asbestos and lead management is regulated by the LDEQ.

6.13.2 Existing Conditions

Hazardous substances are defined as any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that pose a substantial present or potential hazard to human health and the environment. Improper management and disposal of hazardous substances can lead to contamination of groundwater and surface water, including drinking water supplies, and soils. Evaluations of hazardous substances and wastes must consider whether any hazardous material will be generated by the proposed activity and whether a hazardous material already exists at the

site or in the general vicinity of the site that could adversely impact the community or site workers. Existing hazardous materials and waste concerns could impact future use of a site.

Transit projects may encounter hazardous materials during construction, especially if a project is built on a brownfield or a previously disturbed site. Hazardous material is a generic term for anything which is toxic to humans or the environment. It includes dangerous waste, problem waste, petroleum products, and other hazardous substances. Materials that may constitute a hazardous waste include petroleum products, pesticides, organic compounds, heavy metals, or other compounds injurious to human health and the environment. The nature and extent of hazardous contamination can vary widely. Early detection, evaluation, and remediation of hazardous waste are essential to minimize project delays and to protect the environment.

The following construction concerns are associated with areas of soil and/or groundwater contamination and/or building/structure demolition:

- Asbestos;
- Lead-based paint;
- Health and safety of workers encountering contaminated material;
- Special handling and disposal requirements for contaminated material and a corresponding cost increase;
- Inability to reuse contaminated soil as fill in other areas of the project.

There are no USEPA-designated Brownfield sites or LDEQ-designated Voluntary Remediation sites located in the City of Slidell.

There are two USEPA National Priorities List (NPL), also known as "Superfund", sites located within the City of Slidell, including the Bayou Bonfouca Superfund Site and the Southern Shipbuilding Superfund Site. The discussion below provides the history and current status of these sites.

Bayou Bonfouca Superfund Site

The Bayou Bonfouca (American Creosote) site covers 55 acres in Slidell, Louisiana. American Creosote Works, Inc., a manufacturer of wood preservatives, operated on the site for about 100 years. In 1970, after creosote spilled from tanks during a fire, the site was abandoned. The creosote spill, as well as pre-environmental regulation standard plant operation practices and methods of waste disposal, significantly contaminated sediments in Bayou Bonfouca and the surrounding area.

In July 2016, the USEPA performed a five-year follow-on review of the site. According to the report produced by the USEPA, the site's current mitigation efforts consist of remedial actions including groundwater extraction and on-site treatment and the capping of waste material remaining on site. A portion of the site is currently being used by the City of Slidell DPW and a portion is being used by the City of Slidell Parks and Recreation Department for the Heritage Park, which is a public park with pavilions, accessible walking trails, a boat ramp, and views of Bayou Bonfouca. There are no known exposures to contaminated sediment, soil, or groundwater. Current institutional controls restrict altering elements of the remedy and disturbing or removing soil or groundwater on the site parcel.

Based on results of the current and previous five-year reports, the remedial actions discussed above are considered by the USEPA to be "short-term protective" only. Additional actions will be required for the remedy to be protective over the long-term.

Groundwater in the immediate vicinity of the site occurs in a shallow, perched water table aquifer in surficial sediments (2 to 9 feet thick), which is recharged through infiltration from rainfall. In addition, there are four (4) other zones of permanent, relatively shallow, groundwater beneath the site, known as units: 1) The upper cohesive unit (to about 24 feet below ground surface [bgs], 2) a shallow artesian aquifer unit (from 24 feet bgs to 34 feet bgs onsite and 15 feet bgs to 25 feet bgs offsite), 3) the lower cohesive unit (8 feet bgs to 28 feet bgs), which is an aquitard, meaning it restricts vertical groundwater flow and contaminant transport, and 4) the deep artesian aquifer unit (more than 10 feet thick). According to the USEPA report, creosote contamination occurs almost exclusively in Unit 2; however to date, groundwater cleanup goals have not been met and are unlikely to be met in the near future, despite having an ongoing groundwater remedy in place. The USEPA is coordinating with their internal Office of Superfund Remediation and Technology Innovation to perform a remedy optimization to assess the effectiveness of the current groundwater remedy and identify a potential USEPA exit strategy for the site.

Although groundwater contamination remains under residential properties on the west side of the bayou, these residences are connected to a municipal supply of drinking water. According to the USEPA, the primary aquifer used for drinking water by the City of Slidell is the Ponchatoula aquifer, which occurs at about 1,500 feet below ground surface. Therefore, the drinking water supplied to the City of Slidell residents is not impacted by the Bayou Bonfouca Superfund site. No institutional control is currently in place to restrict the use of groundwater in areas where groundwater contamination remains in place.

According to the USEPA, there is a pipeline that lies within the Bayou Bonfouca site and runs from the southern part of the Site boundary and crosses to the opposite side of Bayou Bonfouca. There are four (4) separate groundwater contamination plumes associated with this Site. Two (2) of the plumes are located within the Bayou Bonfouca Superfund Site footprint. In addition, there are two (2) additional offsite plumes located south of the Site footprint. One of these plumes is located on the opposite side of Bayou Bonfouca. Monthly sampling of the groundwater is conducted from both onsite and offsite monitoring wells for contaminants of concern. The following contaminants were detected in the monitoring wells in recent ground sampling events: Acenaphthene, Bis(2-ethylexyl)phthalate, Di-n-butylphthalate, Fluorene, Naphthalene, and Phenanthrene (USEPA 2016c). In addition, semi-volatile compound analysis of the groundwater on a quarterly basis for four (4) specific monitoring wells.

Southern Shipbuilding Superfund Site

The Southern Shipbuilding Inc. site covers 54 acres in Slidell, Louisiana. Barge/ship manufacturing and repair activities were conducted at the site from 1918 to August 1993. Canulette Shipbuilding owned the site from 1919 until 1954, when it was sold to J&S Shipbuilding. The site was then sold to the current owner, Southern Shipbuilding Corporation, in 1957. Gas-freeing and barge cleaning operations were conducted at the site from 1919 to 1971 and wastes were disposed of in two surface impoundments (designated as the North and South Impoundments). A third smaller overflow

impoundment is located between the North and South Impoundments and was created from a topographic low spot that continually received waste from a leaking pipe connecting the two main impoundments. As the effluent rose in the South Impoundment, it was channeled through an overflow pipe into a series of seven (7) baffle ponds that allowed for gravity filtration of wastes until the effluent from the seventh baffle pond discharged into Bayou Bonfouca.

In 1992, after a failure of the levees around the sludge pits which resulted in the release of 325,000 gallons of hazardous material into Bayou Bonfouca, the U.S. Coast Guard investigated a citizen complaint and confirmed that oily material from the north sludge pit on the site was seeping into Bayou Bonfouca. The failed levees were repaired using sand bags. After a joint inspection of the site levees around the sludge pits, the USEPA, LDEQ, and the USACE determined that potential catastrophic levee failure was imminent, which posed a substantial threat to human health and the environment.

Soils on the site were determined to be contaminated with PAHs, polychlorinated biphenyls (PCBs), lead, arsenic, and asbestos-containing materials. According to the 2015 report produced by the USEPA, the site's remedy consists of long-term remedial actions, including excavation of contaminated soil and sediment incineration of a portion of the excavated material, and disposal of the incinerator ash and excavated soil on the site beneath a two (2)-foot thick clay cap. According to the USEPA, incineration of 67,000 cubic yards of contaminated soils and sludge and capping the landfill eliminated the potential for human or ecological exposure. The USEPA installed an 18-inch clay later overlain by gravel underwater in the graving dock to prevent ecological receptors from being exposed to the remaining contaminated sediments that could not be excavated.

Although this site was deleted from the NPL in 1998, the EPA continues to perform follow-on inspections of the site. The site remains eligible for remedial action, should it become necessary to protect human health or the immediate sensitive environments of Bayou Bonfouca. In March 2015, the USEPA performed a five-year review of the site. To date, institutional controls have not been established at the site to permanently protect the cap, prevent excavation into any remaining subsurface contamination, and prohibit or restrict residential use on areas of the site that are not suitable for unrestricted use.

Surface water is the major remaining potential human exposure pathway of concern. Chemical analysis of sediments in bayou indicated the presence of numerous polynuclear aromatic hydrocarbons (PAHs). Bayou Bonfouca is a fishery and is used for recreational activities. There are numerous contiguous wetland areas and numerous sensitive environments along the banks of Bayou Bonfouca and downstream waterways, which provide habitat for several formerly threatened or endangered species, including bald eagles, peregrine falcons, brown pelicans, and the Gulf sturgeon, which is currently listed as a threatened species in Louisiana and in St. Tammany Parish in particular.

Hurricane Katrina severely impacted the area in 2005, but did not appear to have significantly affected the protectiveness of the USEPA site remedy. Parts of the fence were damaged by Hurricane Katrina and other weather events. In addition, the USEPA noted eroded areas on the protective cap. During interviews conducted by the USEPA, the City of Slidell indicated that it has staff on this site on a daily basis, and performs property maintenance on a monthly basis.

> The site is currently approximately 50 percent densely forested land, primarily along Canulette Road. The remainder of the site is cleared and sparsely developed with several small structures, remnants of previous structures, and an access road. The USEPA's anticipated future land use for the site is industrial use. The cleanup levels selected in the sites decision documents remain protective for industrial use, with the exception of 1µg/kg soil cleanup level for dioxin, which is slightly above USEPA's acceptable risk range for industrial use. The City of Slidell has expressed interest in knowing what type of development would be appropriate for the site, given the environmental constraints. The site is currently zoned "M-2, Light Industrial", which is a zoning class that allows residential uses. Hence, re-zoning of the site would need be investigated prior to any future development (USEPA 2015).

Figures 27, 28, and 29 depict the location of the two (2) Superfund sites located in Slidell, LA. Based on information provided by the City of Slidell, although portions of the Bayou Pattasat Basin, the Bayou Vincent Basin, and the W-14 Basin are adjacent to the Bayou Bonfouca Superfund Site, none of the currently proposed project work in these basins would occur within the footprint of either the Bayou Bonfouca Superfund site or the Southern Shipbuilding Superfund site. The Dellwood Basin and Lee Street Basin are not located near either of the Superfund sites. Therefore, the proposed construction work within the Bayou Pattasat Basin, the Bayou Vincent Basin, the W-14 Canal Basin, Dellwood Basin, or Lee Street Basin should not impact or be impacted by the Superfund sites (*Figure 27*).

The Bayou Bonfouca Basin, as depicted in the preliminary (50 percent) construction drawings, contains the Southern Shipbuilding Superfund site and contains a small portion of the Bayou Bonfouca Superfund site. Based on review of these drawings, it does not appear that any of the proposed work would occur within either Superfund site; however, work is planned on Canulette Road, which is adjacent to the Southern Shipbuilding Superfund site, and point repairs are indicated in several areas near the Bayou Bonfouca Superfund site. As construction plans for the Bayou Bonfouca Basin are developed beyond the preliminary design stage, FEMA will review these drawings carefully in order to assess whether the proposed work would impact or be impacted by either of the Superfund sites (*Figure 27*).

Figure 27 – Aerial view depicting the proposed project footprints and the Bayou Bonfouca and the Southern Shipbuilding Superfund site footprints. The Superfund site footprints are depicted in red. (Image Source – Google 2017)

Based on GIS information provided by the City of Slidell for the overall project, it appears that although work may occur on streets adjacent to the Bayou Bonfouca and the Southern Shipbuilding Superfund sites, none of the proposed road or utility work in any of the proposed project work would occur within the footprint of either the Bayou Bonfouca Superfund site or the Southern Shipbuilding Superfund site (*Figures 28 and 29*). However, after review of future or amended submissions of proposed road and utility work from the Slidell, should FEMA determine that either of these Superfund sites would impact a proposed undertaking, or if either of the Superfund sites would be impacted by any proposed undertaking, FEMA will consult the appropriate agencies and prepare an SEA to properly evaluate potential environmental issues that may result from the proposed undertaking.

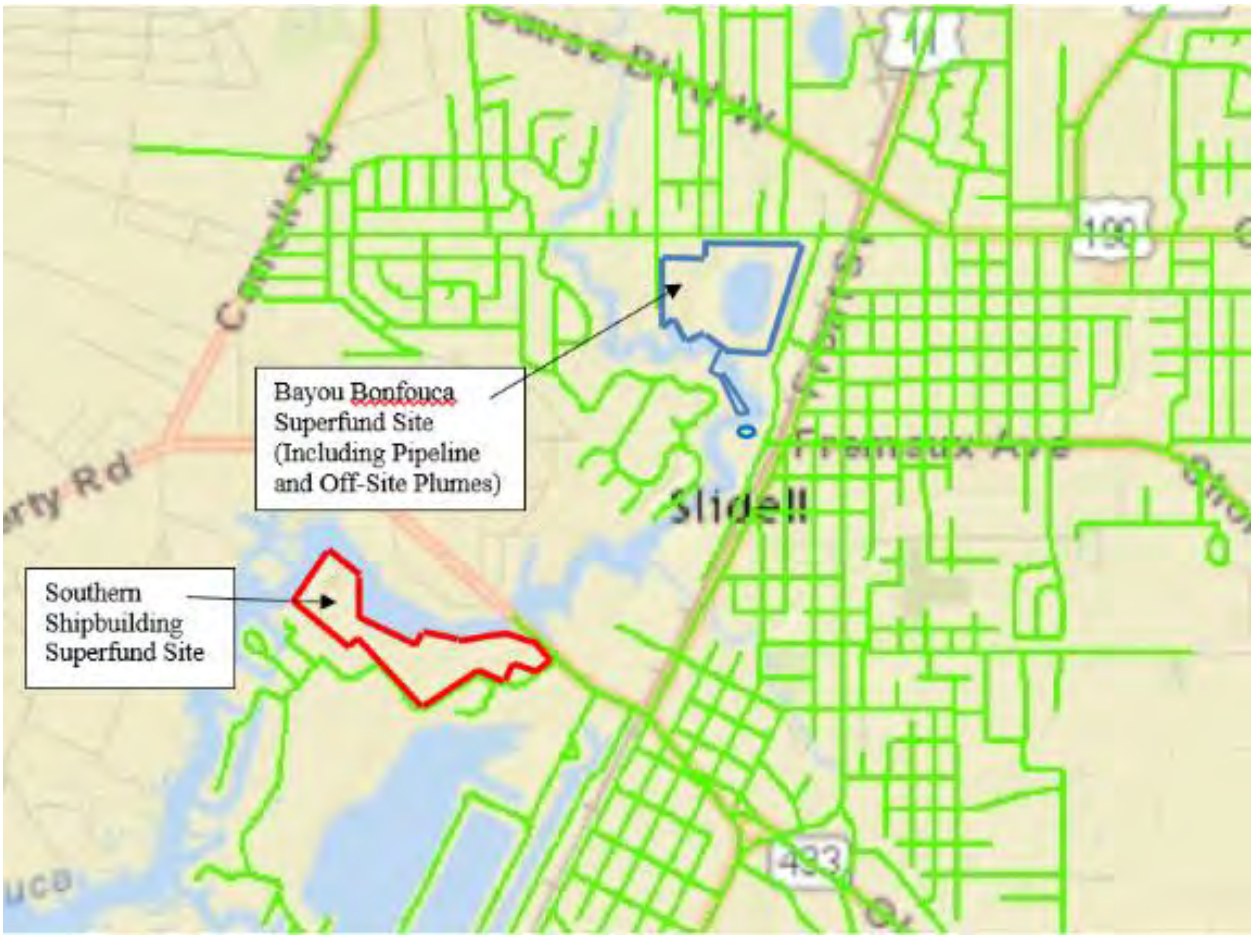

Figure 28 - Location of Bayou Bonfouca Superfund Site and Southern Shipbuilding Superfund Site in relation to the city streets that may be impacted by the proposed project. (Source: GIS data provided by the City of Slidell)

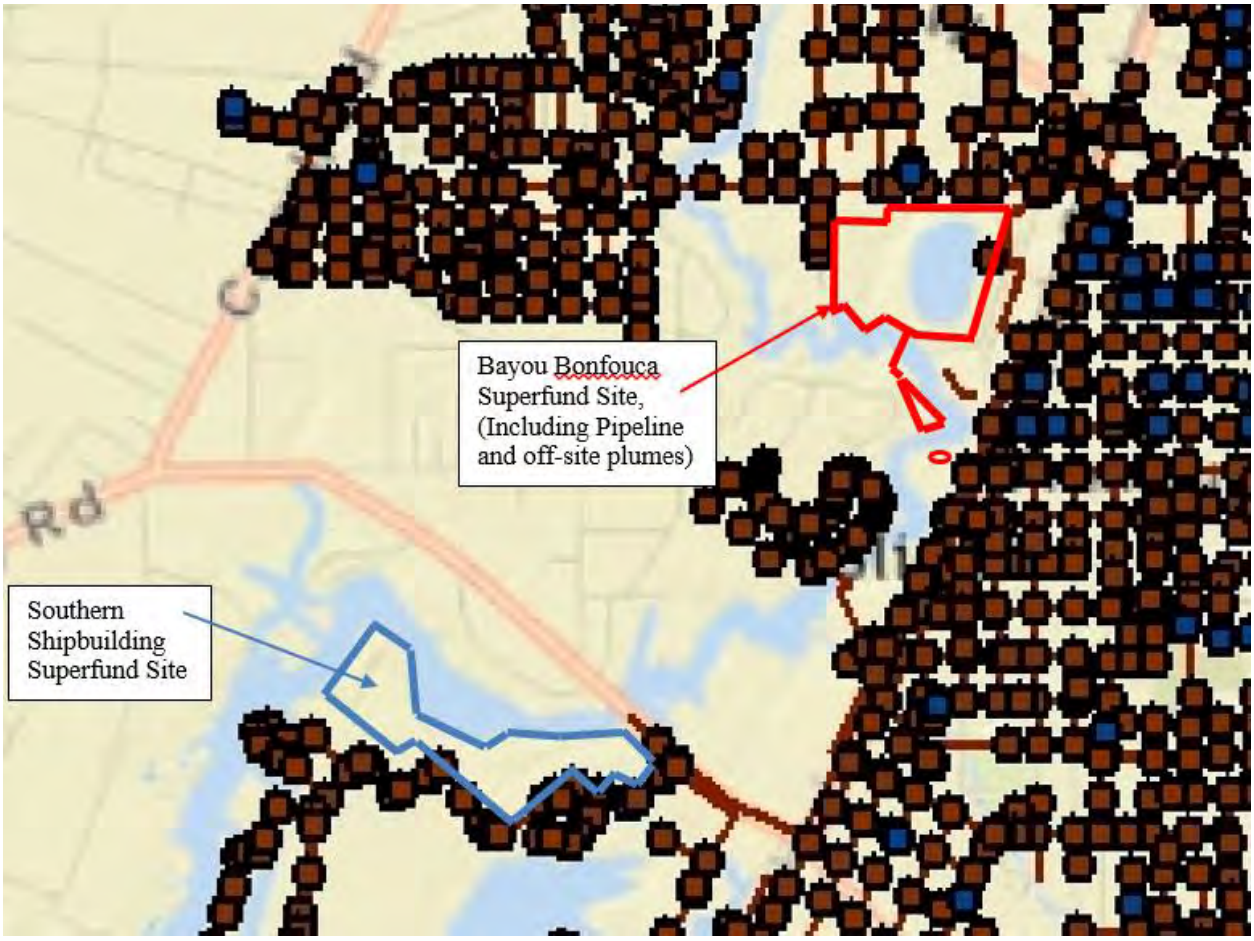

Figure 29 - Location of Bayou Bonfouca Superfund Site and Southern Shipbuilding Superfund Site in relation to the city sewer infrastructure that may be impacted by the proposed project. (Source: GIS data provided by the City of Slidell)

6.13.3 Environmental Consequences

Alternative 1 – No Action. Implementation of the No Action Alternative would not disturb any hazardous materials or create potential hazards to human health related to hazardous material because no construction would occur.

Alternative 2 – Comprehensive Infrastructure Repair and Restoration Program (Preferred Alternative). During specific project final design, additional information will be known about specific activities and associated rights-of-way. At that time, further investigation will be necessary to assess the potential for the presence of hazardous materials and characterize the extent and quantity of hazardous material that may be impacted by the project. The hazardous material investigations will address their nature and extent, adverse impacts, and mitigating measures to protect site workers and the nearby community.

Under the Preferred Alternative, the proposed facility improvements and new construction at the project sites could disturb subsurface hazardous materials or increase potential hazards to human

health. The sites could be adjacent to hazardous or solid waste facilities. If hazardous materials are unexpectedly encountered in the project area during the construction activities, appropriate measures for the proper assessment, remediation, management and disposal of the contamination must be initiated in accordance with applicable federal, state, and local regulations. The contractor is required to take appropriate actions to prevent, minimize, and control the spill of hazardous materials at the proposed site.

Additionally, facilities must immediately report accidental releases of EHS chemicals and "hazardous substances" in quantities greater than corresponding Reportable Quantities defined in CERCLA to State and local officials. This information must be made available to the public. Facilities manufacturing, processing, or storing designated hazardous chemicals must make Safety Data Sheets (SDSs) describing the properties and health effects of these chemicals available to State and local officials and local fire departments. Facilities must also report, to State and local officials and local fire departments, inventories of all onsite chemicals for which SDSs exist. This information must be made available to the public.

An asbestos survey and a lead/lead-based paint survey would be conducted where piping demolition is required. If the analytical results indicate asbestos, lead piping, or lead-based paint is present, proper measures will be incorporated in the design documents and implemented during construction activities to minimize worker and public exposure to asbestos and lead and to ensure that demolition materials are handled and disposed of in accordance with applicable regulations. If analytical results indicate any materials contain asbestos, a comprehensive Asbestos Operations and Maintenance Plan would be developed in accordance with applicable regulations. This plan would address worker training, as well as safety measures to be taken when disturbing asbestos-containing materials, and during abatement activities. Work would be undertaken in accordance with applicable federal, state and local requirements.

As plans for road and utility projects are developed beyond the preliminary stage and submitted by the City of Slidell to FEMA for evaluation, FEMA will evaluate each proposed scope of work for the potential to impact or be impacted by either the Bayou Bonfouca or the Southern Shipbuilding Superfund sites. Should any future proposed undertaking be found to have potential to impact or be impacted by either of these sites, FEMA will prepare an SEA to properly evaluate potential environmental issues that may result from the proposed undertaking.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. The impacts of completing repairs on a system wide basis would be similar to the impacts of the Comprehensive Infrastructure Repair and Restoration Program. During specific project final design, additional information would be known about specific activities and associated rights-of-way. At that time, further investigation will be necessary to assess the potential for the presence of hazardous materials and characterize the extent and quantity of hazardous material that may be impacted by the project. The hazardous material investigations would address their nature and extent, adverse impacts, and mitigating measures to protect site workers and the nearby community.

Under this Alternative, the proposed infrastructure repairs could disturb subsurface hazardous materials or increase potential hazards to human health. The sites could be adjacent to hazardous material or solid waste facilities. If hazardous materials are unexpectedly encountered in the

project area during the construction activities, appropriate measures for the proper assessment, remediation, management and disposal of the contamination must be initiated in accordance with applicable federal, state, and local regulations. The contractor would be required to take appropriate actions to prevent, minimize, and control the spill of hazardous materials at the proposed site. See Conditions.

Additionally, facilities must immediately report accidental releases of EHS chemicals and "hazardous substances" in quantities greater than corresponding Reportable Quantities defined in CERCLA to State and local officials. This information must be made available to the public. Facilities manufacturing, processing, or storing designated hazardous chemicals must make SDSs describing the properties and health effects of these chemicals available to State and local officials and local fire departments. Facilities must also report, to State and local officials and local fire departments, inventories of all onsite chemicals for which SDSs exist. This information must be made available to the public.

An asbestos survey and a lead/lead-based paint survey would be conducted where piping demolition is required. If the analytical results indicate asbestos, lead piping, or lead-based paint is present, proper measures will be incorporated in the design documents and implemented during construction activities to minimize worker and public exposure to asbestos and lead and to ensure that demolition materials are handled and disposed of in accordance with applicable regulations. If analytical results indicate any materials contain asbestos, a comprehensive Asbestos Operations and Maintenance Plan would be developed in accordance with applicable regulations. This Plan would address worker training, as well as safety measures to be taken when disturbing asbestos-containing materials, and during abatement activities. Work would be undertaken in accordance with applicable federal, state and local requirements.

As plans for road and utility projects are developed beyond the preliminary stage and submitted by the City of Slidell to FEMA for evaluation, FEMA will evaluate each proposed scope of work for the potential to impact or be impacted by either the Bayou Bonfouca or the Southern Shipbuilding Superfund sites. Should any future proposed undertaking be found to have potential to impact or be impacted by either of these sites, FEMA will prepare an SEA to properly evaluate potential environmental issues that may result from the proposed undertaking.

6.14 Cultural Resources

6.14.1 Regulatory Setting

The consideration of impacts to historic and cultural resources is mandated under § 101(b)(4) of NEPA as implemented by 40 C.F.R. Parts 1501-1508. NEPA calls for the consideration of a broad range of historic and cultural resources, including American Indian Cultural Sites. Compliance with Section 106 of the National Historic Preservation Act (NHPA) is also mandated, but takes a more narrow focus on historic properties, while requiring federal agencies to allow the Advisory Council on Historic Preservation an opportunity to comment. As an additional consideration, it is the policy of the federal government to consult with Indian Tribal Governments on a Government-to-Government basis as required in E.O. 13175 (U.S. President 2000). Given these various mandates, FEMA has chosen to address potential impacts to historic properties through the "Section 106 consultation process" of NHPA as implemented through 36 C.F.R. 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, the Governor's Office Of Homeland Security and Emergency Preparedness, and Participating Tribes* dated 21December 2016 (2016 Statewide PA). This 2016 Statewide PA was created to streamline the Section 106 review process, and may be reviewed at https://www.fema.gov/media-library/assets/documents/128322. The "Section 106 process" outlined in the 2016 Statewide PA provides a streamlined review of project scope when it meets certain pre-defined actions identified as Programmatic Allowances. Where the work does not meet these pre-defined actions, the "Section 106 process" in the 2016 Statewide PA requires FEMA to identify 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 SHPO, Tribes, and other consulting parties. Below is a consideration of various alternatives and their effects on historic properties.

6.14.2 Existing Conditions

The city has a rich history of development associated with the lumber, brick and railroad industry. The City of Slidell started around 1882 as a building camp for the New Orleans and Northeastern Railroad that ran from New Orleans, Louisiana to Meridian, Mississippi and then connected to Cincinnati, Ohio and on to New York, New York. The first streets were laid out in a grid pattern east of the rail lines for five blocks and were four blocks deep. Slidell was officially incorporated in 1888. In a span of about thirty years after becoming a city, many industries were developed in the area including: a creosote plant, a large lumber mill, a shipyard, and one of the nation's largest brick manufacturing operations. The Slidell shipyard was utilized in the construction of ships during both WWI and WWII.

The City of Slidell has a total of seven standing structures located within the city limits that are listed in the National Register of Historic Places (NRHP). Five of these resources are historic residences. These include: the Francois Cousin House (1790), the Albert Salmen House (1890), The Salmen House (1895), the Fritz Salmen House (1900), and the Camp Salmen House (1830). The other two buildings listed in the NRHP are the Slidell Railroad Depot (1913) and the Arcade Theater (1927). There are no listed National Register of Historic Places Historic Districts located in the vicinity of the City of Slidell. However, the city does have a certified local government Main Street Community that encompasses most of the historically developed downtown area as well as a Cultural District that promotes community revitalization based on cultural activity through tax incentives.

The City of Slidell's cultural resources are not limited to just buildings. Due to the location of the city on the north shore of Lake Pontchartrain, the area was settled by Native Americans for centuries before the city was ever founded due to the abundance of wildlife found in the surrounding rivers and bayous as well as the lake. The evidence of the prehistoric occupation can be seen in several place names found in the area such as Bayou Bonfouca, the Bogue Falaya River and Tchefuncte River among others. There are several recorded archaeological sites, both prehistoric and historic, that are within the city limits. These include the following sites: 16ST228,

16ST205, 16ST152, and 16ST225. Site 16ST152 has been determined eligible for listing on the National Register.

Construction of new streets and infrastructure is not covered under this PEA. Should FEMA receive funding requests for any new roads or utility corridors, a stand-alone EA would be prepared for the specific proposed work and FEMA EHP will initiate a new review of the work under the 2016 Statewide PA. The proposed actions are limited to the existing roadways, and potential foreseeable effects to historic properties include: damage, alteration, or removal of historic streetscape features and materials that contribute to the historic significance and character of the city's historic resources. These features may include, but are not limited to: alignment and configuration of streets, sidewalks and neutral grounds; trees or other landscaping elements; paving and curbing materials, streetcar tracks, streetlights, street name tiles, or other street furniture. Unrecorded archaeological deposits may be destroyed in certain areas of the city where the street grid has been re-aligned through time. Indirect effects to surrounding historic properties could potentially result from vibration created through prolonged construction activity.

While these are foreseeable effects, FEMA has not made a Finding of Effect. FEMA will do this as individual amendments to the project are developed and submitted to FEMA EHP for review, unless work described in an individual amendment is included in the Programmatic Allowances listed in the 2016 Statewide PA.

6.14.3 Environmental Consequences

Alternative 1 – No Action. Implementation of the No Action Alternative would not affect historic properties because no construction would occur.

Alternative 2 (Preferred Alternative) – Comprehensive Infrastructure Repair and Restoration Program. The preferred action alternative would utilize FEMA-provided PA funding to repair, replace, or improve storm-damaged roads and underground utility lines to pre-storm condition and functionality throughout much of the City of Slidell. Comprehensive infrastructure repair and restoration projects would consist of one or more of the following project elements: drainage system damage assessment, underground utility line point repair or replacement, incidental repairs, minor rehabilitation, major rehabilitation and full roadway reconstruction. Pertaining to the Preferred Alternative proposed by the City of Slidell, FEMA notified the SHPO and affected tribes (ACTT, CNO, CT, JBCI, MBCI, and TBTL) on November 17, 2016 of FEMA's intent to conduct review on amendments as they are developed and provided to FEMA by the subrecipient, pursuant to 36 CFR 800.4(b) (2), phased identification and evaluation. Copies of these notification letters are attached to this PEA in Appendix C. No responses were received. FEMA will complete the "Section 106 process" of each individual amendment (incremental SOW amendments) by following the 2016 Statewide PA. The subrecipient must comply with the NHPA conditions set forth in this PEA.

FEMA EHP will review each of the six Basin amendments as individual 'Undertakings' under the terms of the 2016 Statewide PA through a phased process, conducting identification and evaluation efforts, and assessing effects as each individual amendment is identified by the subrecipient. Compliance for individual amendments will not be complete until FEMA concludes the review set

out in the 2016 Statewide PA or any subsequent Agreement. This approach is specifically provided for in this document.

Based on review of the construction drawings provided as of this writing to FEMA by the City of Slidell, FEMA HP staff provides the following *preliminary* historic preservation determinations for the following six (6) Basins:

Bayou Pattasat Basin: Based on review of the available 90 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

Bayou Vincent Basin: Based on review of the available 90 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b), Tier II, Section C (2)(a, c, and e), and Tier II, Section C (3)(b) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

W-14 Canal Basin: Based on review of the available 90 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

Bayou Bonfouca: Based on review of the available 50 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

Dellwood Basin: Based on review of the available 50 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

Lee Street Basin: Based on review of the available 50 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

As the construction plans for each Basin are further developed, FEMA EHP staff will conduct a final review and prepare the appropriate tiered EHP documentation for each Basin based on criteria in Table 1. Should work under this alternative become necessary outside of City of Slidell

maintained rights-of-way or established servitudes, any necessary rights-of-entry, FEMA EHP will complete the "Section 106 process" by following the 2016 Statewide PA.

Alternative 3 – Complete Repairs on a System Basis to Pre-Disaster Condition without any Improvements. This alternative consists of the completion of repairs to roads and drain lines by the City's Department of Public Works (DPW) separate and independent of repairs to water and sewer lines by the separate divisions of the City's Department of Public Utilities (DPU), allowing each subrecipient to complete repairs according the their own priorities.

Pertaining to the original programmatic scope of work proposed by the City of Slidell, FEMA notified the SHPO and affected tribes (ACTT, CNO, CT, JBCI, MBCI, and TBTL) on November 17, 2016 of FEMA's intent to conduct review on amendments as they are developed and provided to FEMA by the subrecipient, pursuant to 36 CFR 800.4(b) (2), phased identification and evaluation. Copies of these notification letters are attached to this PEA in Appendix C. No responses were received. FEMA will complete the "Section 106 process" of each individual amendment (incremental SOW amendments) by following the 2016 Statewide PA. The subrecipient must comply with the NHPA conditions set forth in this PEA.

The NHPA Review program for this alternative would be the same as that identified for Alternative 2 (Preferred Alternative). However, it would likely be complicated by duplicative reviews and approval stages making the over-all approval timeframe longer than that anticipated for Alternative 2. Also, historic properties, if they exist, may be subjected to an additional risk of damage in locations where redundant construction activities occur.

Based on review of the construction drawings provided as of this writing to FEMA by the City of Slidell, FEMA HP staff provided the following *preliminary* historic preservation determinations for the following six (6) Basins.

Bayou Pattasat Basin: Based on review of the available 90 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

Bayou Vincent Basin: Based on review of the available 90 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b), Tier II, Section C (2)(a, c, and e), and Tier II, Section C (3)(b) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

W-14 Canal Basin: Based on review of the available 90 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

Bayou Bonfouca: Based on review of the available 50 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is

not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

Dellwood Basin: Based on review of the available 50 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

Lee Street Basin: Based on review of the available 50 percent drawings, the scope of work meets the criteria in the Programmatic Allowances, Tier II, Section C (1)(a and b) and Tier II, Section C (2)(a, c, and e) of the 2016 Statewide PA. In accordance with the 2016 Statewide PA, FEMA is not required to determine the NRHP eligibility of properties where work performed is included in the Programmatic Allowances.

As the construction plans for each Basin are further developed, FEMA EHP staff will conduct a final review and prepare the appropriate tiered EHP documentation for each Basin based on criteria in Table 1. Similar to Alternative 2, should work under this alternative become necessary outside of City of Slidell maintained rights-of-way or established servitudes, any necessary rights-of-entry, FEMA EHP will complete the "Section 106 process" by following the 2016 Statewide PA.

7.0 CUMULATIVE IMPACTS

The Council on Environmental Quality's (CEQ) regulations state that cumulative impacts represent 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 C.F.R. Part 1508.7).

In its comprehensive guidance on cumulative impacts analysis under NEPA, the CEQ notes that: "[t]he 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" (CEQ, 1997). The term "similar actions" may be defined as "reasonably foreseeable or proposed agency actions [with] similarities that provide a basis for evaluating the environmental consequences together, such as common timing or geography" (40 C.F.R. Part 1508.25[a][3]; see also 40 C.F.R. Parts 1508.25[a][2] and [c]).

Not all potential issues identified during cumulative effects scoping need be included in a EA. 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 lists seven (7) basic questions, 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 actions 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 (CEQ, 1997).

It is normally insufficient when analyzing the contribution of a proposed action to cumulative effects to merely analyze effects within the immediate area of the proposed action (CEQ, 1997, pg. 12). Geographic boundaries should be expanded for cumulative effects analysis, and conducted on the scale of human communities, landscapes, watersheds, or air sheds. 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 cumulative effects analysis 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 analysis of cumulative effects will, in most instances, be a larger geographic area occupied by resources outside of the project impact zone.

In accordance with NEPA, and to the extent reasonable and practicable, this PEA considered the combined effects of the Proposed Action Alternative, as well as other actions undertaken by FEMA and other public and private entities that also affect environmental resources the proposed action would affect, and that occur within the considered geographic area and temporal frame(s).

Specifically, a range of past, present, and reasonably foreseeable actions undertaken by FEMA within the designated geographic boundary area were reviewed: (1) for similarities such as scope

of work, common timing, and geography; (2) to determine environmental effects similar to those of the proposed action, if any; and (3) to identify the potential for cumulative impacts. As part of the cumulative effects analysis, FEMA also reviewed known past, present, and reasonably foreseeable projects of Federal resource agencies and other parties within the designated geographic boundary. These reviews were performed in order to assess past proposed actions, as well as the effects of completed and ongoing actions in order to determine whether the incremental impacts of the current proposed action, when combined with the effects of other past, present, and reasonably foreseeable future projects, are cumulatively considerable or significant.

The proposed project is located in the City of Slidell, St. Tammany Parish and covers the zip codes of 70458, 70460 and 70461. FEMA EHP chose the boundaries of the City of Slidell as an appropriate boundary for a cumulative impact analysis of the proposed actions and alternatives. In addition, FEMA EHP included all FEMA-funded EAs within a 5 mile radius of the approximate center of the Slidell boundaries. Project with obligated funds under $55,000 and/or Category A (Debris Removal), Category Z (State Management), contents only projects were culled from the data set. Temporal parameters were FEMA disasters from Hurricane Katrina (DR-1603) through November 2016.

Based on the above criteria, within the City of Slidell over 171 FEMA-funded protective measures, mitigation, and repair projects have occurred, are occurring, or are reasonably foreseen to occur (developed with enough specificity to provide useful information to a decision maker and the interested public) to buildings, roads and bridges, recreational and educational facilities, public utilities, waterways, and more. Of these, 166 were Public Assistance project sites, and 5 were HMGP project sites, totaling over $137 million (Table 3, *Figure 30*). One hundred thirty-nine (78%) of Public Assistance projects had a projected closeout year of 2010 or earlier. Specific project types funded within study area were:

Table 3: FEMA-funded Project Sites by Program Type and Amount (within City of Slidell)

FEMA-funded Project Sites (2005-2016)	Total	1603	4080	Cleared with EA	Pre-2010 Closeout Year (PA only)
Hazard Mitigation ($88,257,948)					
HMGP - Flood Control	2	2	0	2	n/a
HMGP - Pilot Reconstruction	1	1	0	1	n/a
HMGP - Stormwater Management	2	2	0	0	n/a
HMGP - Totals	**5**	**5**	**0**	**3**	
Public Assistance ($49,462,294)					
PA - B - Protective Measures	24	19	5	0	19 (11%)
PA - C - Roads & Bridges	6	6	0	0	6 (3%)
PA - D - Water Control Facilities	2	2	0	0	2 (1%)
PA - E - Public Buildings	126	108	18	1	104 (60%)
PA - F - Public Utilities	1	1	0	0	1 (n/a)
PA - G - Recreational or Other	7	7	0	0	7 (4%)
PA - Totals	**166**	**143**	**23**	**1**	**139 (83%)**
Total - All Programs ($137,720,242)	**171**	**148**	**23**	**4**	**139 (81%)**

[1] Disaster 1603 - Hurricane Katrina, 08/29/2005; 05/04/2011; Disaster 4080 - Hurricane Isaac, 08/26/2012.

All FEMA funded actions are subject to various levels of environmental review as a requirement for the receipt of Federal funding. A SubRecipient's failure to comply with any required

environmental permitting or other condition is a serious violation which can result in the loss of Federal assistance, including funding. Since 2005, ten (10) project sites within the 5 mile radius have required an Environmental Assessment. Four of these fell within the boundaries of the City of Slidell. All were Hurricane Katrina (DR-1603) projects.

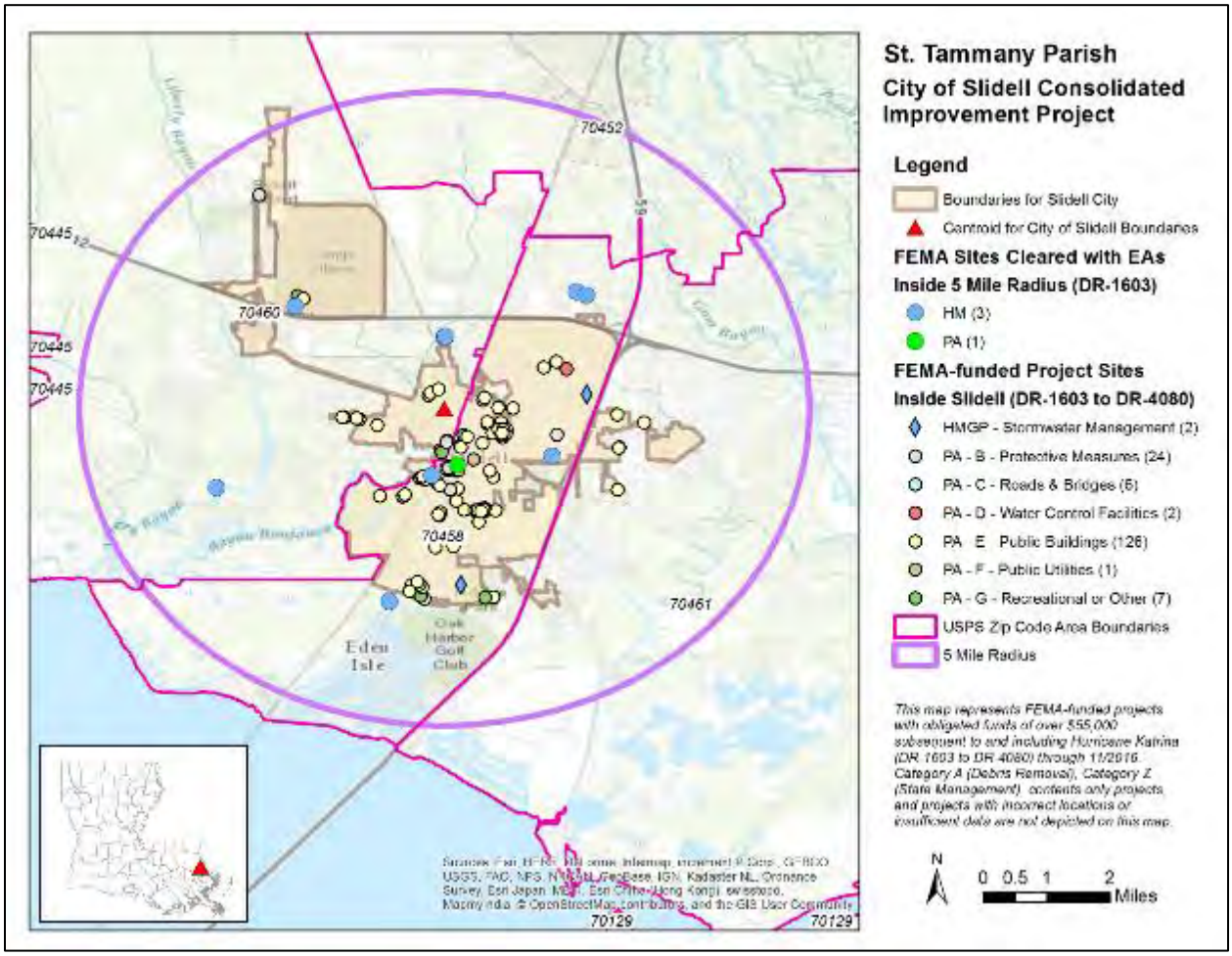

Figure 30 - Map depicting FEMA-funded project sites within the City of Slidell.

Table 4: Projects that May Have the Potential to Contribute to Cumulative Impacts

Lead Agency	Project Name / Status	Status	Location	Description	Cumulative Impacts
FEMA	Little Bayou Castine Drainage Improvements	FEMA EA completed.	Roughly bounded by LA Highway 1088 at the northeastern most extent (30.381012, -90.037005), Soult Street to the east (30.377061, -90.032340), Labarre Street to the south (30.367871, -90.046376), and Garon Drive to the west (30.376006, -90.041906) in Mandeville, St. Tammany Parish, Louisiana.	The project includes expanding the capacity of undersized culverts and ditches within the project area as well as constructing a 5-acre detention pond and broad-crested weir that will temporarily store storm runoff and help to regulate the release of excess water back into the watershed, thereby decreasing repetitive flood damage. Additionally, channel improvements are proposed for the upper stretch of Little Bayou Castine and Woodlawn Subdivision Ditch.	Less than significant.
USACE	Southeast Louisiana Urban Flood Control Project (SELA), St. Tammany Parish, W-14 Canal Basin Canal Drainage Improvements	Projected for after 2017 or later.	Portion of W-14 Canal Basin Main Diversion Canal drainage basin that lies within the City of Slidell. Part of 3-parish project (Orleans, Jefferson, St. Tammany)	The project includes improving approximately 4.1 miles of the existing W-14 Canal by widening the existing canal and lowering its existing invert elevation to improve flood flow capacity, excavating two new detention ponds with overflow weirs, expanding an existing pond, installing culverts, replacing three bridges, and constructing a new pump station.	Less than significant.

Lead Agency	Project Name / Status	Status	Location	Description	Cumulative Impacts
Coastal Protection Restoration Authority (CPRA)	Slidell Ring Levee	Design in progress, year of projected construction not yet determined.	City of Slidell	Construction of a ring levee to an elevation of 16.0 feet around Slidell for hurricane storm surge risk reduction. Project features include approximately 20,000 feet of earthen levee and 16,000 feet of concrete T-wall.	Less than significant
Coastal Protection Restoration Authority (CPRA)	New Orleans Landbridge to Interstate 59 north of Slidell	Unknown.	New Orleans Landbridge to Interstate 59 north of Slidell	Planning, engineering and design to construct a levee to an elevation of 24.5 feet across the mouth of Lake Pontchartrain from the New Orleans Landbridge to Interstate 59 north of Slidell for hurricane storm surge risk reduction.	Less than significant
Louisiana Coastal Wetlands Conservation and Restoration Task Force	Pontchartrain Basin (area where Bayou Bonfouca and Lake Pontchartrain connect)	Unknown.	Pontchartrain Basin (area where Bayou Bonfouca and Lake Pontchartrain connect)	The primary goal of the project is to create 533 acres and nourish 42 acres of low salinity brackish marsh in open water areas adjacent to Bayou Bonfouca with sediment pumped from Lake Pontchartrain.	No impacts

As identified in Table 4, the cumulative effect of these present, past, and reasonably foreseeable future actions is not anticipated to result in a significant impact to any resource. Each of the projects either aims to restore or improve the function of pre-existing infrastructure within an urban setting or proposes redevelopment consistent with current zoning requirements, with minimal impacts to the natural and human environment.

8.0 EVALUATION

FEMA's experience is that road repair projects would have minimal adverse cumulative impacts. Implementing best management practices (BMP) which are incorporated into this document are expected to limit both individual and cumulative impacts. Mitigation measures to reduce impacts are addressed in each affected environment section and the project conditions section. These facilities will be constructed in localized areas, and the construction impacts is typically short-term and temporary for each individual site. However, site and project-specific information will be needed for all projects to appropriately take into consideration the potential for cumulative impacts on the various resource areas discussed in this PEA. FEMA will take cumulative impacts into account when evaluating whether the particular action fits within this PEA. FEMA will prepare RECs for each individual or group of actions and will take into account the unique project and site conditions. In doing this evaluation, FEMA will take a hard look at cumulative impacts when the road project is likely to produce moderate effects (as defined in the affected environment section) on a particular resource or area of concern. In some circumstances, this evaluation may indicate the need for the preparation of a tiered SEA even when the tiered SEA is not triggered by the thresholds established in Table 1. FEMA will also take a hard look at cumulative impacts whenever a tiered SEA is triggered under this PEA in accordance with the thresholds established in Table 1.

9.0 CONDITIONS AND MITIGATION MEASURES

FEMA requires that the SubRecipient take the following measures to the extent practicable and applicable to avoid or further minimize impacts to the quality of the human environment. The general mitigation measures outlined in this section may be superseded by higher or more stringent standards required by the particular federal, or territory, tribe, or local government agency issuing a permit, license, or approval for the project.

- Follow applicable state, territory, tribal, and local permitting requirements for construction.
- Fugitive dust from earth moving activities, storage piles, disturbed surface areas, unpaved areas and other construction related activities will be controlled using one or more of the following measures: watering, coverings, wind fencing, covering of haul beds, wheel washers, vegetation, restricted site access, and/or street sweeping.
- Enclose or water down exposed dirt storage piles.
- Minimize the disturbed area and preserve vegetation to the maximum extent possible.
- Maintain topsoil whenever possible.
- Phase construction activities to the extent possible.
- The contractor shall prepare and maintain a Storm Water Pollution Prevention Plan (SWPPP), which describes in specific details the Contractor's program to prevent contamination of the storm water collection system for this project. Contractors will be required to take every reasonable precaution to prevent fuels, oils, asphalts, concrete, chemical, and other harmful materials from entering the drainage system and/or ground water table. Storm Water Control Measures (SCMs) may include storm drain system protection, spill prevention and clean-up, employee training, project site housekeeping, and temporary erosion controls. Residue from dust collectors, concrete mixers, vehicles wash racks, an entrance/exits debris will be disposed of in an approved disposal facility.
- Establish stabilized construction entrances/exits (e.g. large crushed rocks, stone pads, steel wash racks, hose-down systems, and pads).
- Work will primarily be performed between 7:00am and 5:00pm, Monday through Friday. SubRecipient should limit construction activities, including operation of heavy machinery, to normal business hours (M-F 7am-5pm). Contractors will be required to conform to noise level restrictions as established in Section 13.1 of the City of Slidell Ordinance (50-75 dBA, depending on the zoning of the area). All construction machinery and vehicles shall be equipped with practical sound muffling devices and operated in a manner to cause the least noise, consistent with efficient performance of work. Activities near noise and vibration sensitive areas such as churches, hospitals, and schools will be minimized as much as practically possible.
- Ensure adequate maintenance of equipment, including proper engine maintenance, adequate tire inflation, and proper maintenance of pollution control devices.

- Existing trees and other vegetation within the construction area that may be impacted within the public right of way will be protected on a location-by-location basis. Protective measures may include fencing and signage. Any trimming, root pruning, or removal of any tree or stump within the public right of way due to construction will be minimized as much as possible and be conducted under the supervision of a licensed arborist. Any trees removed from the construction site within the public right of way will be relocated if possible to an area in close proximity to the project site. Trenching within the critical root zone of a tree of a tree will not be permitted on tree roots or within the canopy limits. Existing vegetation or cover disturbed by construction activities will be seeded and fertilized.

- At least 48 hour notice will be given in advance of any street closures and anticipated areas of low water pressure to residents and emergency response agencies.

- The SubRecipient is responsible for acquiring any Section 401/404 Clean Water Act (CWA) permits and/or Section 10 permits under the Rivers and Harbors Act. When these permits are required, SubRecipient must maintain documentation of compliance with applicable Nationwide Permit (NWP), exemption from requirements, or obtain individual permits from U.S. Army Corps of Engineers prior to construction, unless exempt by the NWP from pre-construction notification. The SubRecipient shall comply with all conditions of the required permit. 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 Louisiana Natural Heritage Program (LNHP) requests that if at any time, Heritage tracked species are encountered within the project area, the SubRecipient contact the LNHP Data Manager at 225-765-2643.

- Care should be taken to ensure that any potentially hazardous or toxic materials used for, generated, or encountered during pressure washing, cleaning, or any other construction activities, do not impact groundwater, waterways, wetlands, or nearby stormwater conveyance systems. Potentially hazardous and toxic wastes generated or encountered during these processes should be isolated, contained, and disposed of in an approved manner. This condition includes petroleum products and by-products use in machinery and equipment. The SubRecipient shall be responsible for complying with all relative rules of the Clean Water Act (CWA). No activity performed should have any impact on waters of the state.

- Appropriate measures for the proper assessment, remediation, management, and disposal of any contamination discovered in the course of construction activities must be initiated in accordance with applicable federal, state, and local regulations. The contractor is required to take appropriate actions to prevent, minimize, and control the spill of hazardous materials at the proposed site.

- Contractor and/or sub-contractors must properly handle, package, transport and dispose of hazardous materials and/or waste in accordance with all local, state, and federal regulations, laws, and ordinances, including all Occupational Safety and Health

Administration worker exposure regulations covered within 29 C.F.R. Parts 1910 and 1926.

- A spill prevention and emergency response plan (SPERP) will be required for all construction contractor groups. The SPERP will need to identify at a minimum: emergency contact numbers for local, state and federal environmental and public health agencies, material safety data sheets (MSDS) for all hazardous substances, hazardous material inventory, spill prevention plan, spill response plan/emergency response plan, spill response equipment (e.g. absorbent pads, disposal containers) and reporting requirements.

- If any asbestos containing materials (ACM) and/or other hazardous materials are found during remediation or repair/replacement activities, the SubRecipient shall comply with all federal, state, and local abatement and disposal requirements under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Louisiana Administrative Code 33:III 5151. Demolition activities related to possible asbestos-containing materials (PACM) must be inspected for ACM/PACM where it is safe to do so. Should ACM be present, the SubRecipient is responsible for ensuring proper disposal in accordance with the previously referenced administrative orders. Regardless of the asbestos content, the SubRecipient is responsible for ensuring that all renovation or demolition activities are coordinated with the LDEQ to the extent required prior to initiating work. All documentation pertaining to these activities and SubRecipient compliance with any conditions should be forwarded to the state and FEMA for inclusion in the permanent project files.

- Unusable equipment, debris, and material shall be disposed of in an approved manner and location. The SubRecipient must 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.

- Contractors will be responsible for maintaining, securing, and protecting any staging area, containers, or bins set up for construction purposes. The storage of any equipment or materials will not be permitted immediately adjacent to canals or other water bodies, trees, transportation or utility servitudes, or private property without prior approval from the respective owner or regulatory agency. The contractors will be responsible to ensure all equipment arriving at or departing from the construction limits remains clean and to take any necessary measures to ensure foreign materials or debris is not tracked or deposited on opened streets or outside the construction site limits. The contractor will also be required to store and handle any fuels or other hazardous material in accordance with OSHA requirements, and ensure any such materials required at a construction site be adequately secured and protected at all times.

- In order to minimize indirect impacts (erosion, sedimentation, dust, and other construction-related disturbances) to nearby waters of the U.S. and surrounding drainage areas, the contractor must ensure compliance with all local, state, and federal requirements related to sediment control, disposal of solid waste, control and containment of spills, and discharge of surface runoff and stormwater from the site. All documentation pertaining to these

activities and Subrecipient compliance with any conditions should be forwarded to LA GOHSEP and FEMA for inclusion in the permanent project files.

- The Subrecipient shall 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 and executive order 11990.

- The Louisiana Department of Natural Resources (LDNR) requires that a complete Coastal Use Permit (CUP) Application package (Joint Application Form, location maps, project illustration plats with plan and cross section views, etc.) along with the appropriate application fee, be submitted to their office prior to construction. The Subrecipient is responsible for coordinating with and obtaining any required CUPs or other authorizations from the LDNR OCM's Permits and Mitigation Division prior to initiating work. The Subrecipient must comply with all conditions of the required permits. All documentation pertaining to these activities and Subrecipient compliance with any conditions should be forwarded to the state and FEMA for inclusion in the permanent project files.

- The EPA recommends the Subrecipient conducts work to determine if the proposed project sites include wetlands or other waters of the U.S. If not, such investigation should be completed in coordination with the New Orleans District Office of the U.S. Army Corps of Engineers. The EPA also recommends all potential impacts to wetlands and other waters of the United States be avoided and minimized to the maximum extent practicable. Compensatory mitigation will be required for impacts to jurisdictional wetlands, as authorized by a Clean Water Act Section 404 permit, to avoid a net loss of wetlands and wetland functions as a result of the proposed work.

- Coordination with the appropriate local levee district(s) and USACE would be required for work within 1,500 feet of Mississippi River levees and/or within 300 feet of hurricane protection levees. CNO and SWBNO are responsible for obtaining any required permits from these districts and following any conditions imposed.

- Avoid engaging in construction activities within 660 feet of a bald or golden eagle nest during nesting and fledging where there is no visual buffer or 330 feet where there is a visual buffer, as nesting eagles are quite sensitive to human activities during these times.

- No project may 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 NFIP. FEMA PA-funded projects carried out in the floodplain must be coordinated with the local floodplain administrator for a floodplain development permit prior to the undertaking, and the action must be carried out in compliance with relevant, applicable, and required local codes and standards and thereby, will reduce the risk of future flood loss, minimize the impacts of floods on safety, health, and welfare, and preserve and possibly restore beneficial floodplain values as required by E.O. 11988. Coordination pertaining to these activities and SubRecipient compliance with any conditions should be documented and copies forwarded to the Louisiana Governor's Office of Homeland

Security and Emergency Preparedness (GOHSEP) and FEMA for inclusion in the permanent project files.

- Adverse effects must be minimized in accordance with FEMA's minimization standards in 44 C.F.R. § 9.11. Treatment measures would be required to reduce adverse impacts below the level of significance.

- Louisiana law (Part VII of Chapter 8 of Title 40, and the sections as R.S. 40:1749.11 to 40:1749.26) requires excavators and demolishers to call a regional notification center prior to beginning work. Prior to any excavation or demolition, each excavator or demolisher, including cable television owners or operators, shall serve telephonic notice of the intent to excavate or demolish to the regional notification center serving the area in which the proposed excavation or demolition is to take place. Such notice shall be given to the notification center at least 96 hours, but not more than 120 hours (excluding weekends and holidays) prior to the commencement of any excavation or demolition activity. See entire laws at www.laonecall.com or call 1-800-272-3020 for more information.

- This project involves the modification of a public structure that may contain surfaces coated with lead-based paint. The Subrecipient is responsible complying with all local, state, and federal laws and ensuring that project activities are coordinated with the Louisiana Department of Environmental Quality for abatement activities.

- The SubRecipient is responsible for obtaining and/or complying with all federal, state and local permits, ordinances and/or requirements for the collection, handling, storage, transportation and disposal of any medical, hazardous, biological, radiological, pharmaceutical or toxic related waste or debris. The SubRecipient shall handle, manage, and dispose of damaged materials and equipment that may be hazardous waste, universal waste, and hazardous materials in accordance with the requirements of local, state, and federal regulations.

- 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.

- All waste is to be transported by an entity maintaining a current "waste hauler permit" specifically for the waste being transported, as required by Louisiana Department of Transportation and Development (DOTD), LDEQ, and other regulations.

- Disposal of demolition debris must be in accordance with all federal, state, and local laws, regulations, and rules. Prior to disposal, the SubRecipient must identify and provide to FEMA and GOHSEP the waste disposal site, including the complete name, location, telephone number, and contact person of the facility. Due to the presence of the Agriculture Street Landfill Superfund site and the potentially hazardous nature of material to be removed from the site, all construction and demolition debris must be disposed in a Type I Industrial Landfill. The disposal facility must be permitted by the State of Louisiana Department of Environmental Quality Permit Support Division to receive Regulated Asbestos Containing Material. Waste must be packaged, labeled, manifested, and transported in accordance with LDEQ regulations and requirements. Further, the

SubRecipient must comply with Best Management Practices for Demolition, Construction, and Renovation Sites under Five Acres.

- Contractors will be responsible for maintaining, securing, and protecting any staging area, containers, or bins set up for construction purposes. The storage of any equipment or materials will not be permitted immediately adjacent to canals or other water bodies, trees, transportation or utility servitudes, or private property without prior approval from the respective owner or regulatory agency. The contractors will be responsible to ensure all equipment arriving at or departing from the construction limits remains clean and to take any necessary measures to ensure foreign materials or debris is not tracked or deposited on opened streets or outside the construction site limits. The contractor will also be required to store and handle any fuels or other hazardous material in accordance with OSHA requirements, and ensure any such materials required at a construction site be adequately secured and protected at all times. Contractor and/or Subcontractors will properly handle, package, transport and dispose of hazardous materials and/or waste in accordance with all local, state and federal regulations, laws and ordinances including all OSHA worker exposure regulations covered within 29 CFR 1910 and 1926.

- To minimize worker and public health and safety risks from project construction and closure, all construction and closure work must be done using qualified personnel trained on the proper use of construction equipment, including all appropriate safety precautions. Additionally, all activities must be conducted in a safe manner in accordance with the standards specified in OSHA regulations.

- Appropriate signage and barriers shall be in place prior to construction activities in order to alert pedestrians and motorists of project activities and traffic pattern changes. The contractor will implement traffic control measures, as necessary. This shall include SubRecipient 24-hour emergency contact information.

- SubRecipient is responsible for maintaining construction site perimeter fencing where possible.

- The SubRecipient and its contractor(s) must take all reasonable precautions to control construction site access during project implementation, including posting appropriate signage and fencing, where possible, to minimize foreseeable potential public safety concerns. All activities shall be conducted in a safe manner in accordance with OSHA work zone traffic safety requirements. Truck and equipment routes must be kept free of construction debris.

- The SubRecipient and its contractor(s) are responsible for implementing all traffic control and warning in accordance with the Manual of Uniform Traffic Control Devices, including placing signs and signals in advance of construction activities in order to alert pedestrians and motorists of the upcoming work and traffic pattern changes.

- SubRecipient will perform all Treatment Measures identified by FEMA in consultation with SHPO and other consulting parties through the Section 106 review to offset any adverse effects.

- 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.

- SubRecipient must provide a written Scope of Work to FEMA for individual amendments that includes a description of the proposed work including duration of construction activities, extent of ground disturbance, and proposed actions to monitor and minimize damage to surrounding structures, trees, vegetation, sidewalks, and curbs.

- SubRecipient will modify the Scope of Work in response to conditions recommended by FEMA to avoid adverse effects to historic properties. SubRecipient will explain to FEMA in writing why any such modifications are not feasible and include a description of any other feasible alternatives that may avoid the adverse effect.

- SubRecipient will implement an **Inadvertent Discovery and Unexpected Effects Clause** to account for unanticipated discoveries and unexpected effects. It shall read: If during the course of work, archaeological artifacts (prehistoric or historic) are discovered or unexpected effects to historic properties, including architecture, architectural elements, and/or archaeology, are identified, the SubRecipient shall stop work in the general vicinity of the discovery or unexpected effect and take all reasonable measures to avoid or minimize harm to the finds or affected property. The SubRecipient will ensure that the discovery or unexpected effects are secured and stabilized, as necessary, and access to the area is restricted. The SubRecipient shall inform their Public Assistance (PA) contacts at FEMA, who will in turn contact FEMA Historic Preservation (HP) staff. The SubRecipient will not proceed with work until FEMA HP completes consultation with the SHPO, and others, as appropriate.

- SubRecipient will implement a **Louisiana Unmarked Human Burial Sites Preservation Act** discovery provision, as well. It shall read: If human bone or unmarked grave(s) are present within the project area, compliance with the Louisiana Unmarked Human Burial Sites Preservation Act (R.S. 8:671 et seq.) is required. The SubRecipient shall notify the law enforcement agency of the jurisdiction where the remains are located within twenty-four hours of the discovery. The SubRecipient shall also notify FEMA and the Louisiana Division of Archaeology at 225-342-8170 within seventy-two hours of the discovery.

- SubReceipient will complete all Treatment Measures identified through the Section 106 review process to offset any adverse effects, if identified by FEMA and consulting parties.

General comments/conditions provided by LDEQ:

- 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.

- All precautions should be observed to protect the groundwater of the region.

- 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.

- 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.

- 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.

10.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

10.1 City of Slidell and FEMA Public Involvement

According a NOLA.com story entitled "*Slidell meeting to reveal plans for $60 million in FEMA projects*", (http://www.nola.com/politics/index.ssf/2017/05/slidell_meeting_to_reveal_plan.html) which was published on 17 May 2017, the City of Slidell announced on 9 May 2017 that a town hall meeting was scheduled for 16 June 2017 from 6:30 pm to 8:30 pm at the Slidell Municipal Auditorium. The purpose of this meeting was to give the community an opportunity to review plans for how the City of Slidell plans to use the $60 million it is receiving from FEMA to complete road and utility repairs required as result of damages from Hurricane Katrina in 2005. In addition, residents had an opportunity to talk with project engineers and review the design plans for the Consolidated Infrastructure Project. According to Slidell Council Chairman Jay Newcomb, the City of Slidell Council expressed its "wholehearted support" for the Consolidated Improved Project and the scheduling of a town hall meeting to seek public input. A copy of the City of Slidell town hall meeting notice is attached to this PEA in Appendix D.

According to the Slidell City Council Meeting Minutes for the Council meeting held on 9 May 2017, the City of Slidell Council stated that "As advertised, a public hearing was held on R17-10, a resolution in support of the City's application to FEMA for a Consolidated Improved Project." Tony Brocato, Jr. of Stuart Consulting Group appeared before the Council to provide a brief update and to seek the Council's support for the City to move forward with the Consolidated Improved Project. In the summer of 2016, the City of Slidell formally requested that FEMA consolidate the nine (9) exisiting infrastructure PWs into one project. Doing this would eliminate a huge administrative burden for the City as well as allow for the City to make additional repairs. Also, last year the City received their final obligation from FEMA bringing the total obligated for infrastructure repairs to $78,000,000. Of that $78,000,000, the City just recently completed the $5.4 million dollar Schneider Infrastructure Project. The remainder of the projects are in the design phase. Three of these projects are 90 percent complete and the balance of the projects are 50 percent plus complete. It was further stated that " About three months ago, Stuart Consulting Group submitted design drawings to FEMA EHP because, as part of the approval process, FEMA EHP [is required] to conduct a review to ensure the protection and enhancement of environmental, historic, and cultural resources are maintained. After the City receives the approval from FEMA EHP, the final step will be for FEMA to approve the final project. The [selected construction contractors] anticipate starting construction [in the fall of 2017] on a couple of these projects with a large majority of the scope of work being completed in mid to late 2018 and the balance being completed in early 2019." A copy of the City of Slidell 9 May 2017 Meeting Minutes is attached to this PEA in Appendix D. The discussion pertaining to the proposed project evaluated in this PEA begins on page 6 of the Meeting Minutes.

An article from the 17 June 2017 edition of the New Orleans Advocate entitled "*Slidell residents get preview of FEMA-funded street, utility repairs",* which may be viewed at http://www.theadvocate.com/new_orleans/news/communities/st_tammany/article_f725f70a-5377-11e7-9f0c-c3de6bd54cb1.html, and a copy of which is attached to this PEA in Appendix D, confirmed that the planned joint town hall public meeting hosted by the City

of Slidell and FEMA did in fact take place as scheduled. In addition, engineers from the four engineering firms that have been contracted to design the proposed work were in attendance to answer resident questions. Based on this article, there were no objections from the residents of the City of Slidell to the proposed project. The article mentioned six (6) of the nine (9) proposed drainage basins where repair work is planned, including the Schneider Canal Basin, the Dellwood Basin, the Bayou Bonfouca Basin, the W-14 Canal Basin, the Bayou Pattasat Basin, and the Lee Street Basin. The article also described previous FEMA-funded street, utility, and underground drainage work in Schneider Canal Basin that began in March 2016, which was funded separately and is evaluated in this PEA. That work is almost completed; however, additional work in the Schneider Canal Basin is planned as part of the work evaluated in this PEA and subsequent tiered EHP documentation as additional construction information is received from the City of Slidell.

To fulfill its public involvement requirements under NEPA, FEMA has invited the public to comment on the proposed action during a thirty (30) day comment period, which will begin on July 17, 2017 and conclude on August 16, 2017. This public notice will run for three (3) days as follows. The public notice is being published in the Times-Picayune, the journal of record for Orleans Parish, on Wednesday, July 19, 2017, Friday, July 21, 2017, and Sunday, July 23. This public notice is also being published in The Advocate-New Orleans Edition on Monday, July 17, 2017, Tuesday, July 18, 2017, and Wednesday, July 19, 2017; and in The St. Tammany Farmer on Thursday, July 20, 2017 and Thursday, July 27, 2017. A copy of FEMA's Public Notice for this PEA is attached in Appendix E. The documents also can be downloaded from FEMA's website at https://www.fema.gov/media-library/search/ADD. Written comments on the Notification or related matters can be faxed to FEMA's Louisiana Recovery Office at (225) 267-2962 or emailed to: fema-noma@dhs.gov; or mailed to FEMA Louisiana Recovery Office, Attn: FEMA EHP, 1500 Main Street, Baton Rouge, Louisiana 70802. Comments also may be e-mailed to fema-noma@dhs.gov or faxed to (225) 346-5848. Verbal comments will be accepted or recorded at 504-491-0399. If no substantive comments are received, the draft PEA and associated FONSI will become final.

The Draft PEA and Draft FONSI will be available for review at the following location:

> St. Tammany Parish Library, Slidell Branch, 555 Robert Blvd., Slidell, LA., 70458 (hours of operation are 9:00 a.m. to 8:00 p.m., Monday-Thursday, 9:00 a.m. to 5:00 p.m. Friday and Saturday).

10.2 Agency Coordination

FEMA is the lead federal agency for the NEPA compliance process for this PA Project. It is the responsibility of the lead agency to conduct the preparation and review of NEPA documents in a way that is responsive to the needs of the Parish communities while meeting the spirit and intent of NEPA and complying with all NEPA provisions. As part of the development of early interagency coordination related to the proposed action, state and federal resource protection agencies were contacted and FEMA distributed an informal scoping notification through a Solicitation of Views.

These resource agencies include the Louisiana State Historical Preservation Officer, U.S. Fish and Wildlife Service, the Governor's Office of Homeland Security and Emergency Preparedness, Louisiana Department of Environmental Quality, Louisiana Department of Wildlife and Fisheries, U.S. Environmental Protection Agency, Louisiana Department of Natural Resources, and the U.S. Army Corps of Engineers.

FEMA has received no objections to the project as proposed subsequent to these notifications. Comments and conditions received from the agencies have been incorporated into this Environmental Assessment (Appendix C).

In accordance with applicable local, state, and federal regulations, the SubRecipient would be responsible for acquiring any necessary permits prior to commencing construction at the proposed project site.

11.0 LIST OF PREPARERS

Jerame Cramer, Environmental Liaison Officer, Federal Emergency Management Agency, Louisiana Recovery Office

Tiffany Spann-Winfield, Deputy Environmental Liaison Officer, Federal Emergency Management Agency, Louisiana Recovery Office

Kathryn Wollan, Lead Historic Preservation Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Laurel Rohrer, Environmental Specialist (Contractor), Federal Emergency Management Agency, Louisiana Recovery Office

Brandon Badinger, Historic Preservation Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Alice-Anne Krishnan, Environmental/Historic Preservation Specialist, Federal Emergency Management Agency, Louisiana Recovery Office

Richard Williamson, Archaeologist, Federal Emergency Management Agency, Louisiana Recovery Office

Cornelia Wyma, Environmental/Historic Preservation Specialist (Contractor), Federal Emergency Management Agency, Louisiana Recovery Office

12.0 REFERENCES

All South Consulting Engineers, L.L.C. 12 April 2017. City of Slidell Bayou Vincent Infrastructure Repairs City Project Number 951-6 St Tammany Parish, Louisiana. Project Construction Drawings – 90% Design Development Submittal.

All South Consulting Engineers, L.L.C. 3 April 2017. City of Slidell W-14 Infrastructure Repairs City Project Number 951-7 St Tammany Parish, Louisiana. Project Construction Drawings – 90% Design Development Submittal.

Asphalt Pavement Alliance. 2010. *Carbon footprint: How does asphalt stack up?*; available from http://www.asphaltroads.org/assets/_control/content/files/carbon_footprint_web.pdf; Internet; accessed 17 March 2016.

Chehovits, Jim, and Larry Galehouse. 2010. Energy usage and greenhouse gas emissions of pavement preservation processes for asphalt concrete pavements. In *Compendium of papers from the first international conference on pavement preservation in Newport Beach, California, 13-15 November 2010*, by the California Department of Transportation, Federal Highway Administration, and Foundation for Pavement Preservation, 27-42. Berkeley, CA: University of California, Institute of Transportation Studies; available from https://www.pavementpreservation.org/icpp/paper/65_2010.pdf; Internet; accessed 17 March 2016.

Comprehensive Environmental Response, Compensation, and Liability Act. Statutes at large. 1980. Vol. 94, secs. 101-308, 2767; as amended through 31 December 2002; available from: http://www.epw.senate.gov/cercla.pdf; Internet; accessed 9 May 2016.

Council on Environmental Quality. n.d. *Regulations (Standards-40 CFR)*; available from http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr1508_main_02.tpl; Internet; accessed 12 May 2016.

Council on Environmental Quality. 2014a. Final guidance for effective use of programmatic NEPA reviews. Memo by Michael Boots. Washington, DC; available from https://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/programmatic-reviews; Internet; accessed 13 May 2016.

Council on Environmental Quality. 2014b. Revised draft guidance for federal departments and agencies on consideration of greenhouse gas emissions and the effects of climate change in NEPA reviews. *Federal Register* 79 (24 December): 77802-77831; available from http://www.gpo.gov/fdsys/pkg/FR-2014-12-24/pdf/2014-30035.pdf; Internet; accessed 31 March 2016.

CDM Smith. May 2017. City of Slidell Bayou Bonfouca Basin Infrastructure Repairs. City Project No: 951-1. Project Construction Drawings – 50% Design Development Submittal.

CDM Smith. May 2017. City of Slidell Dellwood Basin Infrastructure Repairs. City Project No: 951-1. Project Construction Drawings – 50% Design Development Submittal.

Digital Engineering. April 2017. Infrastructure Repairs in the Bayou Pattasat Basin City of Slidell, Louisiana. City of Slidell Project No: 951-5. Project Construction Drawings – 90% Design Development Submittal.

Dodd, C. K. 1988. Synopsis of the biological data on the loggerhead sea turtle: *Caretta caretta* (Linnaeus, 1758). Biological Report 88 (14). U.S. Department of the Interior, Fish and Wildlife Service. Washington, D.C.

Elliott-Smith, E. and S. M. Haig. 2004. Piping Plover (*Charadrius melodus*): The birds of North America online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; available from http://bna.birds.cornell.edu/bna/species/002; Internet; accessed 13 May 2016.

Endangered and Threatened Species; Determination of Nine Distinct Population Segments of Loggerhead Sea Turtles as Endangered or Threatened. 2011. 50 C.F.R. Parts 17, 223, and 224. *Federal Register* 76 (22 September): 58868-58952; available from https://www.fws.gov/northflorida/SeaTurtles/2010%20Loggerhead%20DPS/20110922_fr76-58868.pdf; Internet; accessed 13 May 2016.

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Gulf Sturgeon. 2003. 50 C.F.R. Parts 17 and 226. *Federal Register* 68 (19 March): 13370-13495; available from https://www.gpo.gov/fdsys/pkg/FR-2003-03-19/pdf/03-5208.pdf; Internet; accessed 13 May 2016.

Federal Register. June 12, 2012. Citation page 77 FR 35117 35161. Available at https://www.gpo.gov/fdsys/pkg/FR-2012-06-12/pdf/2012-13488.pdf. Internet, accessed 15 September 2016.

Flood Disaster Protection Act of 1973. Statutes at large. 1973. Vol. 87, secs. 2-208, 975; available from https://www.gpo.gov/fdsys/pkg/STATUTE-87/pdf/STATUTE-87-Pg975.pdf; Internet; accessed 24 March 2016.

Floodplain Management and Protection of Wetlands. 1980. 44 C.F.R. Part 9. *Federal Register* 45 (9 September): 59526 ff. Amended 2009. *Federal Register* 74 (3 April): 15328-15357; available from http://www.gpo.gov/fdsys/pkg/FR-2009-04-03/pdf/E9-6920.pdf; Internet; accessed 13 May 2016.

Flood Protection for St. Tammany - Flood Plain Changes along the Lake Pontchartrain shoreline. 2010. http://www.floodprotectionforsttammany.com/ Internet, access 22 September 2016.

Google Maps. Map of Slidell, Louisiana. https://www.google.com/maps/place/Slidell,+LA/@30.2875198,-89.8505277,12z/data=!3m1!4b1!4m5!3m4!1s0x889de403063fa11d:0x76eeb923fdb4b9f3!8m2!3d30.2751945!4d-89.7811745 Internet accessed 16 September 2016.

Great Lakes - Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers. 2014. 10 states standards; available from http://10statesstandards.com/; Internet; accessed 6 April 2016.

Intergovernmental Panel on Climate Change. 2014. *Climate Change 2014: Synthesis Report. Summary for Policymakers.* Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. Geneva: IPCC; available from https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf; Internet; accessed 4 May 2016.

Liu, Yiwen, Bing-Jie Ni, Keshab R. Sharma, and Zhiguo Yuan. 2015. Methane emission from sewers. *Science of the Total Environment*; 524-25: 40-51.

Louisiana Department of Environmental Quality. 2016. http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/LPDESPermits/StormwaterInformation.aspx Internet, accessed 22 September 2016.

Louisiana Department of Health and Hospitals. 2013. Louisiana standards for Water Works Construction, Operation and Maintenance Committee. Office of Public Health; available from http://new.dhh.louisiana.gov/assets/oph/Center-EH/WaterCommittee/08212013/LouisianaStandards_8-21-13_handout_JTL.pdf; Internet; accessed 5 April 2016.

Louisiana Department of Natural Resources. 2013. Special Public Notice - Revised procedures for the review of federal financial assistance awards for consistency with the Louisiana Coastal Resources Program. http://dnr.louisiana.gov/assets/OCM/Interagency/Consistency/PN_WebAdvo.pdf; Internet; accessed 31 March 2016.

Louisiana Department of Natural Resources. 2016. Permits/Mitigation Division; available from http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=90&pnid=0&nid=189; Internet; accessed 25 March 2016.

Louisiana Department of Transportation and Development. 2016. LaDOTD website; available from http://wwwsp.dotd.la.gov/Pages/default.aspx; Internet; accessed 1 April 2016.

Louisiana Division of Archaeology. 2016. *Home* page; available from http://www.crt.state.la.us/cultural-development/archaeology/index/; Internet; accessed 7 April 2016.

Louisiana Geological Survey. 2008. Generalized Geology of Louisiana. http://www.lgs.lsu.edu/deploy/uploads/gengeotext.pdf Internet: accessed 16 September 2016.

Louisiana State University (LSU) Agriculture Center and the Louisiana Department of Transportation and Development (LaDOTD). Louisiana's Flood Maps - Online Interactive Tool. 2017. Internet; http://maps.lsuagcenter.com/floodmaps/?FIPS=22103; accessed 4/20/17.

MySlidell website. 2016. http://myslidell.com/public-works/public-operations/resources-downloads/ Internet; accessed 15 September 2016.

NOLA.com. 2017. *Slidell meeting to reveal plans for $60 million in FEMA projects*. Internet; http://www.nola.com/politics/index.ssf/2017/05/slidell_meeting_to_reveal_plan.html; access 11 May 2017.

Richard C. Lambert Consultants, LLC. April 2017. City of Slidell Lee Street Drainage Basin Infrastructure Repairs St. Tammany Parish. Project Construction Drawings – 50% Design Development Submittal.

Seaturtle.org. 1998. NOAA nabs turtle killer. *Marine Turtle Newsletter*; 83: 19-23; available from http://www.seaturtle.org/mtn/archives/mtn83/mtn83p19.shtml; Internet; accessed 13 May 2016.

Shaver, D. J., B. A. Schroeder, R. A. Byles, P. M. Burchfield, J. Peña, R. Marquez, and H. J. Martinez. 2005. Movements and home ranges of adult male Kemp's ridley sea turtles

(*Lepidochelys kempii*) in the Gulf of Mexico investigated by satellite telemetry. *Chelonian Conservation and Biology*; 4(4): 817-827; available from http://www.sefsc.noaa.gov/turtles/PR_Shaver_etal_2005_ChelonianConservBiol.pdf; Internet; accessed 13 May 2016.

Slidell, City of. 2016a. Code of Ordinances – Appendix A Zoning. https://www.municode.com/library/la/slidell/codes/code_of_ordinances?nodeId=PTIICOOR_APXAZO Internet, accessed 21 September 2016.

Slidell, City of. 2016b. Code of Ordinances – Chapter 13 Environment. https://www.municode.com/library/la/slidell/codes/code_of_ordinances?nodeId=PTIICOOR_CH13EN Internet, accessed 21 September 2016.

Slidell, City of. 2016c. Code of Ordinances – Chapter 15 Floods. https://www.municode.com/library/la/slidell/codes/code_of_ordinances?nodeId=PTIICOOR_CH15FL Internet, access 21 September 2016.

Slidell, City of. 2016d. Code of Ordinances – Chapter 28 –Utilities. https://www.municode.com/library/la/slidell/codes/code_of_ordinances?nodeId=PTIICOOR_CH28UT Internet, accessed 22 September 2016

Slidell, City of. 2016e. Code of Ordinances – Chapter 25 Streets, Sidewalks, and Other Public Places. https://www.municode.com/library/la/slidell/codes/code_of_ordinances?nodeId=PTIICOOR_CH25STSIOTPUPL Internet, accessed 22 September 2016

Smith, Steven, Philip G. Rivet, Kathleen M. Byrd, and Nancy W. Hawkins. 1983. *Louisiana's Comprehensive Archaeological Plan*. Published by the State of Louisiana, Department of Culture Recreation and Tourism, Office of Cultural Development, Development, Division of Archaeology.

Soluent. *Natural Hazards Mitigation Plan – 2009 Update St. Tammany Parish. 2009.* http://www.stpgov.org/files/Homeland%20Security/Hazard_Mitigation_Plan.pdf Internet, accessed on 16 September 2016.

Superfund Amendments and Reauthorization Act. Statutes at large. 1986. Vol. 100, secs. 1-531, 1613; available from http://www.gpo.gov/fdsys/pkg/STATUTE-100/pdf/STATUTE-100-Pg1613.pdf; Internet; accessed 29 May 2015.

U.S. Department of Agriculture. 2016a. *National soil survey handbook, title 430-VI*. Natural Resources Conservation Service; available from http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/nedc/training/soil/?cid=nrcs142p2_054242; Internet; accessed 31 March 2016.

U.S. Department of Agriculture. 2016b. Web Soil Survey. Natural Resources Conservation Service; available from http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx; Internet; accessed 31 March 2016.

U.S. Department of Agriculture. 1990. Soil Survey of St. Tammany Parish. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/louisiana/st_tammanyLA1990/sttammanyLA1990.pdf

U.S. Department of Commerce. 2010. American FactFinder: Slidell city, Louisiana. U.S. Census Bureau; available from http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml; Internet; accessed 22 September 2016.

U.S. Department of Commerce. 2014. American Community Survey: Slidell city, Louisiana, U.S. Census Bureau; available from https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2014/; Internet; accessed 1April 2016.

U.S Department of Fish and Wildlife. 2015. *Dusky Gopher Frog (Rana servosa) Recovery Plan*. Accessed online. Internet available at: https://ecos.fws.gov/docs/recovery_plan/2015_07_16_Final%20RP_R_sevosa_08212015%20(1).pdf

U.S Department of Fish and Wildlife. 2016. ECOS Environmental Online System. Available from https://ecos.fws.gov/ecp0/reports/species-listed-by-state-report?state=LA&status=listed

U.S Department of Fish and Wildlife. 1985. Recovery Plan for the Red-cockaded Woodpecker (Picoides borealis), Second Edition. Accessed online. Internet available at http://ecos.fws.gov/docs/recovery_plan/030320_2.pdf

U.S. Department of Homeland Security. August 2009. *Programmatic Agreement Among the Federal Emergency Management Agency, the Louisiana State Historic Preservation Officer, the Louisiana Governor's Office of Homeland Security and Emergency Preparedness, the Alabama-Coushatta Tribe of Texas, the Caddo Nation, the Chitimacha Tribe of Louisiana, the Choctaw Nation of Oklahoma, the Coushatta Tribe of Louisiana, the Jena Band of Choctaw Indians, the Mississippi Band of Choctaw Indians, the Quapaw Tribe of Oklahoma, the Seminole Nation of Oklahoma, the Seminole Tribe of Florida, the Tunica-Biloxi Tribe of Louisiana, and the Advisory Council on Historic Preservation.* Available at http://www.achp.gov/docs/fema_pa/LA%20PA%20executed.pdf; Internet; accessed 13 May 2017

U.S. Department of Homeland Security. 2012. *FEMA climate change adaptation policy statement*. Federal Emergency Management Agency; available from: http://www.fema.gov/media-library-data/20130726-1919-25045-3330/508_climate_change_policy_statement.pdf; Internet; accessed 31 March 2016.

U.S. Department of Homeland Security. 2013. DHS climate action plan; available from http://www.dhs.gov/sites/default/files/publications/DHS%20Climate%20Action%20Plan_0.pdf; Internet, accessed 31 March 2016.

U.S. Department of Homeland Security. 2014a. DHS climate action plan - Addendum; available from http://www.dhs.gov/sites/default/files/publications/Climate%20Action%20Plan%20Addendum%20June%202014%20%28508%20Compliant%29_0.pdf; Internet, accessed 31 March 2016.

U.S. Department of Homeland Security. 2014c. Hurricane Katrina Surge Inundation and Advisory Base Flood Elevation maps; available at: https://www.fema.gov/hurricane-katrina-flood-recovery-1; Inter-net; accessed 13 May 2016.

U.S. Department of Homeland Security. 2016. *Programmatic Agreement among the Federal Emergency Management Agency (FEMA), the Louisiana State Historic Preservation Officer (SHPO), the Governor's Office Of Homeland Security and Emergency Preparedness (GOHSEP), and Participating Tribes (December 2016)*; available at: https://www.fema.gov/media-library/assets/documents/128322 ; Internet; accessed 13 May 2017.

U.S. Department of Homeland Security. 2017. FEMA Map Store. FIRMs for the City of Slidell, LA., dated 21 April 1999; https://msc.fema.gov/portal/availabilitySearch?addcommunity=220204&communityName=SLIDELL, CITY OF#searchresultsanchor; accessed 17 April 2017.

U.S. Department of Labor. 2015. Labor force statistics from the current population survey. U.S. Bureau of Labor Statistics; available from http://www.bls.gov/cps/cps_htgm.htm; Internet; accessed 15 September 2016.

U.S. Department of the Interior. 2016. National Wetlands Inventory wetland mapper. U.S. Fish and Wildlife Service; available from U.S. Fish and Wildlife Service National Wetlands Inventory Mapper; Internet; accessed19 April 2017.

U.S. Environmental Protection Agency. 2004. *Understanding the Safe Drinking Water Act*; available from https://www.epa.gov/sites/production/files/2015-04/documents/epa816f04030.pdf; Internet; accessed 4 April 2016.

U.S. Environmental Protection Agency. 2009. *State of the groundwater report*. Region 6 Ground Water Center; available from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.207.3976&rep=rep1&type=pdf; Internet; accessed 5 April 2016.

U.S. Environmental Protection Agency. 2016a. Asbestos NESHAP; available from http://www.epa.gov/asbestos/asbestos-neshap; Internet; accessed 24 March 2016.

U.S. Environmental Protection Agency. 2016b. *The Green Book nonattainment areas for criteria pollutants*; available from https://www3.epa.gov/airquality/greenbk/; Internet; accessed 24 March 2016.

U.S. Environmental Protection Agency. 2016c. *Fifth Five-Year Review Report for Bayou Bonfouca Superfund Site Slidell, St. Tammany Parish, Louisiana*; accessed online at the LDEQ EDMS site on 15 September 2016.

U.S. Environmental Protection Agency. 2015. *Five-Year Review Report for Southern Shipbuilding Superfund Site St. Tammany Parish, Louisiana*; accessed online at the LDEQ EDMS site on 15 September 2016.

U.S. Environmental Protection Agency. *1995. Record of Decision – Bayou Bonfouca*; available from: https://nepis.epa.gov/Exe/ZyNET.exe/9100GOED.txt?ZyActionD=ZyDocument&Client=EPA&Index=2011%20Thru%202015%7C1995%20Thru%201999%7C1981%20Thru%201985%7C2006%20Thru%202010%7C1991%20Thru%201994%7C1976%20Thru%201980%7C2000%20Thru%202005%7C1986%20Thru%201990%7CPrior%20to%201976%7CHardcopy%20Publications&Docs=&Query=%28consent%20decree%29%20OR%20FNAME%3D%229100GOED.txt%22%20AND%20FNAME%3D%229100GOED.txt%22&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=

&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C95THRU99%5CTXT%5C00000026%5C9100GOED.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=15&FuzzyDegree=0&ImageQuality=r85g16/r85g16/x150y150g16/i500&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=3; Accessed online at the on 15 September 2016.

U.S. Environmental Protection Agency. 1997. *Record of Decision – Southern Shipbuilding*; available from: https://nepis.epa.gov/Exe/ZyNET.exe/P1002MH1.txt?ZyActionD=ZyDocument&Client=EPA&Index=2011%20Thru%202015%7C1995%20Thru%201999%7C1981%20Thru%201985%7C2006%20Thru%202010%7C1991%20Thru%201994%7C1976%20Thru%201980%7C2000%20Thru%202005%7C1986%20Thru%201990%7CPrior%20to%201976%7CHardcopy%20Publications&Docs=&Query=Bayou%20bonfouca&Time=&EndTime=&SearchMethod=2&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20DATA%5C95THRU99%5CTXT%5C00000022%5CP1002MH1.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=15&FuzzyDegree=0&ImageQuality=r85g16/r85g16/x150y150g16/i500&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x; accessed online at the on 15 September 2016.

U.S. Federal Highway Administration. 2012. *Manual on Uniform Traffic Control Devices*; available from http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/pdf_index.htm; Internet; accessed 9 May 2016.

U.S. Occupational Health and Safety Administration. n.d. *Regulations (Standards-29 CFR)*; available from https://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=STANDARDS; Internet; accessed 9 May 2016.

U.S. President. 1977a. Executive Order. Floodplain Management, Executive Order 11988. *Federal Register* 42 (25 May): 26951; available from http://www.fema.gov/media-library-data/20130726-1438-20490-9495/eo11988.pdf; Internet; accessed 9 May 2016.

U.S. President. 1977b. Executive Order. Protection of Wetlands, Executive Order 11990. *Federal Register* 42 (25 May): 26961; available from http://www.archives.gov/federal-register/%20codification/executive-order/11990.html; Internet; accessed 9 May 2016.

U.S. President. 2000. Executive Order. Consultation and Coordination with Indian Tribal Governments, Executive Order 13175. *Federal Register* 65 (9 November): 67249; available from https://www.gpo.gov/fdsys/pkg/FR-2000-11-09/pdf/00-29003.pdf; Internet; accessed 7 April 2016.

U.S. President. 2009. Executive Order. Federal Leadership in Environmental, Energy, and Economic Performance, Executive Order 13514. *Federal Register* 74 (8 October): 52117;

available from http://www.gpo.gov/fdsys/pkg/FR-2009-10-08/pdf/E9-24518.pdf; Internet; accessed 31 March 2016.

U.S. President. 2013. Executive Order. Preparing the United States for the Impacts of Climate Change, Executive Order 13653. *Federal Register* 78 (6 November): 66819; available from http://www.gpo.gov/fdsys/pkg/FR-2013-11-06/pdf/2013-26785.pdf; Internet; accessed 31 March 2016.