

October 27, 2015



# NATIONAL DISASTER RESILIENCE COMPETITION

Phase II Application



**STATE OF LOUISIANA**

Division of Administration  
Office of Community Development  
Disaster Recovery Unit



## Exhibit A: Executive Summary

ExhibitA\_ExecutiveSummary\_LA.pdf

### State of Louisiana

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## **Exhibit A: Executive Summary**

In Phase I, we described Louisiana's unique condition as a priceless commercial hub, a vital buoy of America's national security interests, and an irreplaceable cultural gumbo. The source of this value, our working coast – and more broadly, our Coastal Zone, is home to 40% of our nation's wetlands, sources 25% of its petrochemicals, provides 26% its seafood supply, and handles 20% of its annual waterborne commerce – with 500 million tons of cargo passing through Louisiana's deep-draft ports and navigation channels annually. In a nation of 50 equally-valued states, Louisiana can realistically claim, per capita, to be our nation's breadwinner and its fishing net.

We used gumbo as a metaphor in describing Louisiana's value. One thing all gumbos have in common is they start with a roux. The roux is a gumbo's backbone, on which the rest of the concoction is built. In this context, Louisiana is the roux for our nation. If we neglect it, the consequences will be far-reaching and irreversible. Carrying the metaphor further, Louisiana's coast – its working cultural hub – is the roux for our state. If we do not protect and maintain it as an epicenter of economic and social activity, the rest of our state – including urban areas like New Orleans and Baton Rouge – will have no impetus to remain relevant, or even viable as places.

Our coast is, in itself, a protective barrier. Louisiana, its coastal communities, and the nation it serves are tied together by our common vulnerabilities – storms, land loss, subsidence and sea level rise. As we saw during and immediately after the Deepwater Horizon Oil Spill, events in Louisiana can have a market-moving economic impact on the nation. To highlight an example, if Port Fourchon in Lafourche Parish went offline for more than two weeks, it is estimated the American economy could lose up to 250,000 jobs.

Most Louisiana natives can recall a favored wetland that has since reverted to open water, or a cypress forest now dead on account of saltwater intrusion. Our risks and vulnerabilities do not lurk in the shadows, nor do they only appear when a tropical event occurs. In short, we have been on the frontlines of an environmental battle for multiple generations. Louisiana's vulnerabilities – land loss, subsidence,

and sea level rise – are conditions that will impact all the coastal areas in the United States. At risk is a generation of water-dependent cultural, social and economic activity, and perhaps a permanent breach of our nation’s symbiotic connection with the sea. We need a plan to address the impacts of these vulnerabilities on coastal communities in a systematic way and on a large scale.

HUD’s definition of resilience is “the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions.” In the past decade, Louisiana has withstood, responded to, and rapidly recovered from hurricanes Katrina (2005), Rita (2005), Gustav (2008), Ike (2008), Tropical Storm Lee (2011) and Isaac (2012), as well as the Deepwater Horizon Oil Spill (2010). Through these events, Louisiana has maintained – and in many ways has grown – its economic and cultural value. Our state has proven to the nation and the world it has the fortitude and ability to be resilient. Pivoting into the future, it has a one-of-a-kind opportunity – and we believe obligation – to stand as the nation’s laboratory developing best practices in resilience that are both scalable and transferrable to all 50 states.

This application is an expression of Louisiana’s intent to remain on the cutting edge in developing the next generation of resilient solutions. We have developed the nation’s first comprehensive [Coastal Master Plan \(CMP\)](#) specifically tasked with rebuilding and preserving our coast. The “resilience gap” in the CMP is the human piece of the equation, which this and NDRC applications from Orleans, Jefferson and St. Tammany parishes seek to address. In Phase 1, we proposed a resilience policy framework we called the ‘Louisiana Resilience Framework (LRF).’ It suggested a common sense approach combining best quantitative data with qualitative data gathered through extensive community outreach to develop equitable solutions for our most vulnerable populations.

In Phase 2, the LRF evolved to become [Louisiana’s Strategic Adaptations for Future Environments, or LA SAFE](#). Through this resilience policy framework, we have come to accept hard truths: Our coast is disappearing. [Land loss is going to get worse before it gets better – as will our exposure](#)

[to risk \(Fig1.pdf\)](#). We have no choice but to rethink how we are settling and developing our Coastal Zone communities. To respond, LA SAFE hinges on three core ideas:

- 1) Land is disappearing; therefore, we have no choice but to **resettle** communities we cannot fortify;
- 2) We cannot survive, let alone thrive, without our working coast. Moreover, that coast cannot survive without a robust connection between economic activity and the workforce that drives it. To this end, we must **retrofit** strategically-located vital communities so they may withstand future increasing risk;
- 3) As land disappears, we must maximize available high-ground territories, incentivizing high-quality development intended to foster economic and population growth. We must **reshape** these communities to fully maximize their highest and best uses.

Through this application, we have proposed the creation of a new program, the LA SAFE Fund. The Fund is our mechanism to work with local communities, exchange best available information and develop project-based solutions in accordance with the Resettle, Retrofit and Reshape typologies. To launch the Fund, we have proposed an initial 10 projects across all three categories. We have also included an unprogrammed project request to capitalize the Fund. We believe this is an opportunity to pivot from our long-term recovery efforts of the last decade toward a more resilient future, both for Louisiana and, as a laboratory, the nation as a whole.



## Exhibit B: Threshold Requirements

ExhibitB\_ThresholdReqs\_LA.pdf

### State of Louisiana

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## **Exhibit B: Threshold Requirements**

**Eligible Applicant.** The State of Louisiana; this is the only application it has submitted.

**Eligible Parish.** Each of the four target areas are located in parishes covered by Hurricane Isaac's Presidential major disaster declaration in 2012.

### **Most Impacted and Distressed/Unmet Recovery Need Target Areas.**

#### *Target Area #1: St. John the Baptist Parish*

Most Impacted: HUD has previously determined this parish to be a "Most Impacted" location as a result of 2012's Hurricane Isaac and as listed in [Appendix B of the NDRC NOFA](#). Therefore, it meets the Most Impacted characteristics listed in Appendix G.

Distressed: HUD has previously determined this parish to be a "Most Impacted" location as a result of Isaac and as listed in [Appendix B of the NDRC NOFA](#). Therefore, it meets the Distressed characteristics listed in Appendix G.

Unmet Recovery Needs: The State of Louisiana [allocated \\$32,674,000 \(50.8%\) of its \\$64,379,084 CDBG-DR](#) award to the long-term recovery of the parish following Hurricane Isaac. Despite this commitment, substantial unmet needs remain, specifically in housing and permanent infrastructure.

In Phase 1, the state reported 787 household applicants within the parish's \$11,549,820 Homeowner Rehabilitation Program, with outreach and intake ongoing. With average rehabilitation of \$47,972 per unit, we estimated this program could serve a maximum 241 households, and estimated 546 households would remain unserved – a programmatic shortfall of approximately \$26,192,712. Since the end of Phase 1, outreach and intake activities have been completed and the state now reports a current household applicant pipeline of 732. With better and more up-to-date information, the state now estimates average rehabilitations to cost \$58,980, leaving a [total programmatic shortfall of approximately \\$29,902,641](#). As a result, the state expects to be unable to serve 507 of the 732 households currently in the applicant pipeline.

Similarly, the state reported in Phase 1 an unfunded gap of \$5,419,712.79 for storm-damaged permanent infrastructure, as certified by Digital Engineering (DE). [DE has revisited its certification](#) for Phase 2 and the unfunded gap has not changed. Available CDBG-DR resources are inadequate to fill the gap. Likewise, there are no other sources of funds currently available to address these needs.

*Target Area #2: Plaquemines Parish*

Most Impacted: HUD has previously determined this parish to be a “Most Impacted” location as a result of 2012’s Hurricane Isaac and as listed in [Appendix B of the NDRC NOFA](#). Therefore, it meets the Most Impacted characteristics listed in Appendix G.

Distressed: HUD has previously determined this parish to be a “Most Impacted” location as a result of Isaac and as listed in [Appendix B of the NDRC NOFA](#). Therefore, it meets the Distressed characteristics listed in Appendix G.

Unmet Recovery Needs: The State of Louisiana allocated [\\$16,953,000 \(26.3%\) of its \\$64,379,084 CDBG-DR](#) award to the long-term recovery of the parish. In Phase 1, the state reported that, despite this commitment, substantial unmet needs remained, specifically in environmental degradation, per a Coastal Protection and Restoration Authority (CPRA) certification. Since the end of Phase 1, [CPRA has updated its certification](#) to indicate the following damages remain a valid and true reflection of unmet need.

The Barataria barrier island complex comprises several barrier islands separating the Gulf of Mexico from wetlands, communities and critical infrastructure north of the islands. As part of [Louisiana's Comprehensive Master Plan for a Sustainable Coast \(CMP\)](#), a number of barrier islands in Barataria have been restored to mitigate ongoing degradation. Severe storm surge and associated storm overwash – generated by Hurricane Isaac – along and over the Cheniere Ronquille Barrier Island Restoration project site in Plaquemines Parish caused a loss of 301,000 cubic yards of construction material for the beach and dunes on the island. The estimated cost of restoration from this loss is \$2 million.

The Pass Chaland to Grand Bayou Pass Barrier Shoreline Restoration project created 226 acres of back-barrier marsh platform, maintained 171 acres of marsh habitat, vegetated 80% of the newly created

platform, and optimized tidal linkage to the created marsh platform. The project was completed in 2009, even after Hurricane Gustav (2008) caused added erosion to the area during construction. The project incurred more than \$21.9 million in damages from Hurricane Isaac.

The Pelican Island and Pass La Mer to Chalant Pass Restoration project also experienced damages caused by Hurricane Isaac. Pelican Island has been retreating at a rate of 10 feet per year since 1988. To mitigate the loss of barrier island land area and functionality, the project created barrier island habitat, enhanced storm-related surge and wave protection, and increased the volume of sand within the active barrier system. Isaac's storm surge resulted in estimated damage of \$1.4 million to engineered beach and dunes and sand fencing on Pelican Island.

As sea levels continue to rise and tropical cyclones continue to become more intense, the role of barrier islands as storm surge buffers will become increasingly important. A CPRA-cited study concluded that with no barrier islands and significant wetland erosion and subsidence, surge would increase 1 to 3 feet. Looking forward 50 years, the communities of Buras and Venice and the surrounding area could face more than 20 feet of flooding from a 100-year storm surge flood event and more than \$2.8 billion in damages. From a similar future event, Port Sulphur could face more than 25 feet of flooding and more than \$1.8 billion in damages. This increase in threats from sea level rise and higher flood depths affects the communities who live and work in Plaquemines Parish, and places homes, businesses, and industrial activities at a much higher future risk to storm surge and economic damages.

The approximately \$25.3 million in damages to barrier islands inflicted by Hurricane Isaac and described in this section represent an unmet need, as there are no federal or state funds currently available to address these damages.

In Phase 2, the state can additionally report a remaining housing unmet need in Plaquemines Parish. With outreach and intake activities completed in the CDBG-DR-funded, \$12,828,400 Plaquemines Homeowner Assistance Program (PHAP), the program is expected to provide rehabilitation and elevation

assistance for 42 of 155 households. [This represents an approximate shortfall of \\$28,000,000.](#) As a result, the state expects to be unable to serve 113 households currently in the applicant pipeline.

*Target Area #3: Coastal Lafourche Parish*

Most Impacted (Census Tracts 209, 210, 211, 212, 213): These tracts are all listed in Appendix C of the NDRC NOFA, [respectively sustaining damage to more than 100 homes](#), and are therefore eligible as Most Impacted areas based on the housing characteristics listed in Appendix G.

Distressed (Census Tracts 209, 210, 212, 213): Census Tracts 209, 210, 212 and 213 are all listed in Appendix C of the NDRC NOFA, [respectively sustaining damage to at least 10% of the homes](#) located there, and are therefore eligible as Distressed areas based on the housing characteristics listed in Appendix G.

Distressed (Census Tract 211): Census Tract 211 is located within Lafourche Parish and includes the communities of Galliano, Larose and Cutoff, and is home to key launching points for the area's robust fishing industry. It is eligible as a Distressed area based on environmental degradation characteristics, as documented in CPRA's certification and based on characteristics listed in Appendix G – specifically damage to wetlands or barrier islands reducing protection from future disasters. Since the end of Phase 1, [CPRA has updated its certification](#) to indicate the damages following remain a valid and true reflection of environmental distress.

Tract 211 has a long-standing history of environmental distress. Specifically, this tract experienced over 89,000 acres of land loss measured from 1932 to 2010. One tangible result of this degradation is the estimated \$2.8 billion in asset loss that would occur in this tract in the event of a 100-year storm surge flood event today. Looking forward 50 years, that total grows to an estimated \$3.3 billion. Using the same 50-year vantage point, storm surge-based flood depths are expected to continue to increase from current depths of up to 11 feet to future flood depths of up to 25 feet in a 100-year storm event. Additionally, Tract 211 has suffered considerable losses from previous hurricanes, including Andrew (1992), Katrina (2005), Rita (2005) and Gustav (2008).



Unmet Recovery Needs: The following damages are unfunded environmental degradation needs, as documented in [CPRA's updated Phase 2 certification](#) and based on characteristics listed in Appendix G.

Port Fourchon serves as a critical connection between the nation and offshore drilling resources. As the southernmost port in the state, more than 1.5 million barrels of crude oil passes through pipelines at Port Fourchon per day. Isaac-attributed storm-surge inundation and coastal flooding, as well as ongoing land loss, threaten the viability of these resources and surrounding communities.

The Caminada Headland Beach and Dune Restoration project, part of the CMP and designed to mitigate ongoing degradation, created or enhanced 303 acres of beach and dune, reinforced nearly six miles of barrier headland habitat, and reduced the impacts of storm events on Port Fourchon and Highway 1, a vital hurricane evacuation route for Fourchon and Grand Isle. The restoration provides important habitat for nesting shorebirds and migratory birds as it is one of the first available stopover sites during migration. The headland is also critical habitat for the endangered piping plover. Isaac-attributed retreat at Belle Pass, on the western end of Caminada, averaged over 250 feet, and more than \$6.5 million in damages were recorded at Caminada. Repairs remain unfunded as currently no federal or state funds are available to address these damages.

*Target Area #4: Coastal Terrebonne Parish*

Most Impacted (Census Tracts 11, 13, 14): These tracts are listed in Appendix C of the NDRC NOFA, respectively [sustaining damage to more than 100 homes](#), and are therefore eligible as Most Impacted areas based on the housing characteristics listed in Appendix G.

Most Impacted (Census Tract 12.02): Census Tract 12.02 includes the community of Chauvin. It is eligible as a Most Impacted area based on environmental degradation characteristics, as documented in [CPRA's updated Phase 2 certification](#) and based on characteristics listed in Appendix G, specifically damage to wetlands or barrier islands reducing protection from future disasters.

Census Tract 12.02 experienced damage to wetlands and barrier islands from Hurricane Isaac, reducing protection from future hurricanes and placing local economies and households in surrounding areas at greater risk. Isaac's eye crossed Terrebonne Bay, exposing the surrounding areas in Terrebonne Parish to high winds, surge, and rainfall. Timbalier Island, for example, recorded winds upward of 80 mph. Additionally, Tract 12.02 experienced 2 feet of Isaac-attributed storm surge.

Damages to the Timbalier Island Dune/Marsh Restoration project, part of the CMP and designed to mitigate ongoing degradation, exceeded \$18 million attributable to Hurricane Isaac. The island experienced shoreline retreat of nearly 500 feet and widespread damage of new marsh in the island interior. The damage to barrier islands and marsh further exacerbated degradation and land loss in the area, opening the communities in those regions up to increased storm surge and inundation from future hurricanes.

Chauvin is located within the barrier-island protection. With a population of 2,611 and 978 homes, many of its residents work in the oil and gas and seafood industries. As sea level continues to rise and barrier islands degrade, greater landward inundation of storm surge, increases in salinity, and persistent land loss will continue to place this community and many others in Terrebonne Parish at higher risk of catastrophic loss. Continued exposure to Gulf water increases the salinity of many freshwater and brackish water resources and are likely to result in shifts in the distribution and productivity of fish and shellfish in these areas. The role of barrier islands as storm surge buffers becomes increasingly important when considering sea level rise and the potential for increased tropical cyclone intensity.

Distressed (Census Tract 11, 13): These tracts are listed in Appendix C of the NDRC NOFA. At [least 10% of its homes sustained damage](#). These two tracts are therefore eligible as Distressed based on the characteristics listed in Appendix G.

Distressed (Census Tract 12.02): This tract is located in Terrebonne Parish and includes the community of Chauvin. It is eligible as a Distressed area based on environmental degradation characteristics, as documented in [CPRA's updated Phase 2 certification](#) and based on characteristics listed

in Appendix G – specifically damage to wetlands or barrier islands reducing protection from future disasters.

Tract 12.02 has a long history of environmental distress. Specifically, this tract experienced over 43,000 acres of land loss from 1932 to 2010. One tangible result of this degradation is the estimated \$1.7 billion in asset loss that would occur in this tract in the event of a 100-year storm surge flood event today. Looking forward 50 years, that total grows to an estimated \$2.3 billion. Tract 12.02 has suffered considerable losses from previous hurricanes, including Andrew (1992), Katrina (2005), Rita (2005) and Gustav (2008). Hurricane Andrew brought a 10.2 foot storm surge to Tract 12.02 and reduced Raccoon Island's surface area by about 50%. Hurricane Katrina caused a 3.2 foot storm tide and additional degradation, and Hurricane Rita's 8.3 foot storm surge eroded 60% of the Isles Dernieres Barrier Islands Refuge. Hurricane Gustav was especially damaging for Tract 12.02, with storm tide levels within the city of Chauvin greater than 8.2 feet, and the average water level for the entire tract 6.74 feet above normal. Land loss and wetland fragmentation have contributed to shortened return periods for higher surge events. For example, the 10-year storm surge value for the period 1900 to 1970 was 4.75 feet, but for the period 1970 to 2012, the 10-year storm surge increased to 6.41 feet for the same area. Looking forward 50 years, flood depths from storm surge for tract 12.02 are expected to continue to increase from current depths of up to 15 feet to future depths of up to 30 feet in a 100-year storm event.

Distressed (Census Tract 14): Census Tract 14 includes the communities of Theriot and Dulac. It is eligible as a Distressed area based on environmental degradation characteristics, as documented in [CPRA's updated certification](#) and based on characteristics listed in Appendix G, specifically damage to wetlands or barrier islands reducing protection from future disasters.

Tract 14 has a long-standing history of environmental distress. From 1932 to 2010, over 52,000 acres of land were lost. One tangible result of this degradation is the estimated \$1.2 billion in asset loss that would occur in this tract in the event of a 100-year storm surge flood event today. Looking forward 50 years, that total grows to an estimated \$2.1 billion. Tract 14 has suffered considerable loss from

previous hurricanes, including Andrew (1992), Katrina (2005), Rita (2005) and Gustav (2008). Over 50 years, storm surge based flood depths in Tract 14 are expected to continue to increase from current depths of up to 15 feet to future depths of up to 22 feet for a 100-year storm event, putting the communities of Theriot, Dulac and the outskirts of Houma at considerable risk.

Unmet Recovery Needs: The following damages are unfunded environmental degradation needs, as documented in [CPRA's updated Phase 2 certification](#) and based on characteristics listed in Appendix G.

Hurricane Isaac destroyed much of the progress made towards restoring the Terrebonne Parish barrier islands. The storm surge washed away marsh and beach front, destroyed dunes and vegetation, and created inlets within the island system. Timbalier Island, in particular, experienced shoreline retreat of nearly 500 feet and widespread damage of new marsh in the island's interior. The damage to these barrier islands and marsh further exacerbated degradation and land loss in the area, exposing surrounding communities to increased storm surge and inundation risk from future hurricanes. Specifically, damages to the Timbalier Island Dune/Marsh Restoration project – part of the state's CMP and designed to mitigate ongoing degradation – exceeded \$18 million. These damages remain unfunded as currently no federal or state funds are available to meet these recovery needs.

**Eligible Activity.** The following eligible activities are further described by project in Exhibit E.

*LA SAFE Fund:* 105(a)(1-26).

*Isle de Jean Charles Resettlement:* 105(a)(1), 105(a)(4), 105(a)(11), 105(a)(12).

*Storm Harbor Network:* 105(a)(2).

*Living Mitigation:* 105(a)(2)

*Plaquemines Polders:* 105(a)(2)

*Terrebonne Oyster Bed:* 105(a)(2)

*Coastal Nonstructural Mitigation:* 105(a)(4)

*Pontchartrain Breakwaters:* 105(a)(2)

*St. John Water Works:* 105(a)(2)

*St. John Resilient Housing:* 105(a)(4), 105(a)(11)

*St. John Multimodal Transit:* 105(a)(2), 105(a)(12)

**Resilience Incorporated.** Each project and activity proposed within this application is in conjunction with the development of a statewide resilience policy framework, [Louisiana's Strategic Adaptations for Future Environments \(LA SAFE\)](#). To launch the framework, this application has proposed the creation of the LA SAFE Fund and an initial set of projects specifically designed to mitigate future risk and embody the ideals of LA SAFE. This policy framework, the Fund and its initial set of proposed projects are fully described in Exhibit E.

**National Objective.**

*LA SAFE Fund:* LMI (50.0%), UN (50.0%)

*Isle de Jean Charles Resettlement:* LMI-Housing (100.0%)

*Storm Harbor Network:* UN (100.0%)

*Living Mitigation:* LMI-Area Benefit (80.4%), UN (19.6%)

*Plaquemines Polders:* LMI-Area Benefit (29.9%), UN (70.1%)

*Terrebonne Oyster Bed:* LMI-Area Benefit (66.8%), UN (33.2%)

*Coastal Nonstructural Mitigation:* LMI-Housing (100%)

*Pontchartrain Breakwaters:* LMI-Area Benefit (36.5%), UN (63.5%)

*St. John Water Works:* LMI-Area Benefit (38.4%), UN (61.6%)

*St. John Resilient Housing:* LMI-Housing (100.0%)

*St. John Multimodal Transit:* LMI-Area Benefit (38.4%), UN (61.6%)

**Overall Benefit.** Not including general administration or planning costs, the state projects 74.9% of its funding request to benefit low- and moderate-income persons. This calculation is further detailed in the budget provided in Exhibit E.

**Tie-Back.**

*LA SAFE Fund:* Hurricane Isaac was predominantly a flooding event, as demonstrated in this application. LA SAFE, and the Fund proposed in this application to support it, have been specifically constructed to respond to Isaac's flooding impact and to mitigate future vulnerability to flooding events.

*Isle de Jean Charles Resettlement:* This project proposes to resettle a band of Choctaw Native Americans from Isle de Jean Charles in Terrebonne Parish. This resettlement is necessitated by ongoing coastal land loss and barrier island destruction, a condition both demonstrated and exacerbated by Hurricane Isaac.

*Storm Harbor Network:* Hurricane Isaac was the latest in a long line of disaster events (Katrina, Rita, Gustav, Ike) highlighting the state's lack of coastal safe harbors protecting small- and medium-sized vessels, which have been destroyed or become debris during storms.

*Living Mitigation:* This project is specifically designed to attenuate storm surge, as do the barrier islands damaged in Hurricane Isaac and demonstrated as a remaining unmet need.

*Plaquemines Polders:* Polders are designed to compartmentalize risk in a flood, much like the one experienced in Plaquemines Parish during Hurricane Isaac.

*Terrebonne Oyster Bed:* This project is specifically designed to attenuate storm surge, as do the barrier islands damaged in Hurricane Isaac and demonstrated as a remaining unmet need.

*Coastal Nonstructural Mitigation:* Hurricane Isaac was predominantly a flooding event; Coastal Zone elevations like those proposed in this program will specifically fortify residential buildings in a similar event.

*Pontchartrain Breakwaters:* Interstate 10 flooded in St. John the Baptist Parish during Hurricane Isaac as stormwaters surged from Lake Pontchartrain. This condition was exacerbated by ongoing land loss on the lake's western edge. This project will fortify that edge and curtail future erosion.

*St. John Water Works:* This project specifically addresses the effects of Hurricane Isaac, as well as unmet infrastructure needs in St. John the Baptist Parish, as demonstrated in this Exhibit.

*St. John Resilient Housing:* This project specifically addresses the effects of Hurricane Isaac, as well as unmet housing needs in St. John the Baptist Parish, as demonstrated in this Exhibit.

*St. John Multimodal Transit:* Flooding impacts in St. John the Baptist Parish were exacerbated as populations in the parish have sprawled away from the high-ground riverbank corridor and north into the floodplain. This project is proposed as part of a larger initiative to incentivize economic and population growth in LaPlace's town center, which is situated on a high-ground ridge along the Mississippi River.

**Benefit-Cost Analysis.** Included as Attachment F.

**Certifications.** All required certifications have been submitted as Attachment C.

**General Section Administrative Thresholds.** The applicant is not subject to civil rights matters rendering it ineligible for funding under Section III.C.2. of HUD's FY2014 NOFAs for Discretionary Programs, nor it is ineligible under any other general section threshold.



## Exhibit C: Factor 1 - Capacity

ExhibitC\_Fac1\_Capacity\_LA.pdf

### State of Louisiana

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## **Exhibit C: Capacity**

**Past Experience of the Applicant.** The Office of Community Development – Disaster Recovery Unit (OCD-DRU) is the state’s lead agency for the NDRC application, but it has utilized – and will continue to utilize – the full breadth of resources under the state government umbrella. As such, the state has divided its response into three sections comprising the entities of state government represented by this application (state agencies), its parish subrecipient partners (parish partners), and those external organizations (organizational partners) the state has engaged to augment its internal capacity.

### *State Agencies*

[OCD-DRU](#): As Louisiana's lead agency for long-term hurricane recovery, OCD-DRU manages the most extensive rebuilding effort in American history, working closely with local, state and federal partners to ensure that Louisiana recovers safer, stronger and smarter than before. OCD-DRU is currently administering nearly \$15 billion in CDBG-DR funds. Within its existing portfolio, OCD-DRU administers 23 individual housing programs worth approximately \$11.6 billion; 15 infrastructure programs worth approximately \$1.6 billion; and 16 economic revitalization programs worth approximately \$477 million.

The following organizations are represented in this application as state entities:

[Louisiana Housing Corporation \(LHC\)](#): The mission of LHC is to ensure that every Louisiana resident is granted an opportunity to obtain safe, affordable and energy efficient housing. LHC partners with developers, investors, lenders, realtors, non-profits, and federal, state, and local government programs to provide affordable housing opportunities. The Louisiana Housing Authority (LHA), a subsidiary of the LHC, develops and implements strategies to eradicate homelessness and address the housing needs of Louisiana’s most vulnerable households.

[Governor’s Office of Homeland Security \(GOHSEP\)](#): GOHSEP is responsible for coordinating the state’s efforts throughout the emergency management cycle to prepare for, respond to, recover from, mitigate against, and lessen the effects of man-made or natural disasters that threaten Louisiana.

Coastal Protection and Restoration Authority (CPRA): CPRA is charged with the protection, conservation, restoration, and enhancement of coastal wetlands and barrier shorelines or reefs throughout Louisiana's Coastal Zone, and is responsible for the CMP responding to the root cause of Louisiana's coastal crisis by pioneering the implementation of large-scale restoration plans that will build land and nourish coastal habitats in adherence to a multiple-lines-of-defense resilience-building strategy.

University of New Orleans – Center for Hazards Assessment, Response, and Technology (UNO-CHART): UNO-CHART is an applied social science hazards research center at The University of New Orleans that collaborates with Louisiana communities, including the City of New Orleans and its surrounding parishes. The university-based organization assists in the development of best-practices for reducing risks and implementing these practices to achieve comprehensive community resilience.

Louisiana Sea Grant (LSG): LSG promotes stewardship of Louisiana's coastal resources through a combination of research, education and outreach programs critical to the cultural, economic and environmental health of the coastal zone. LSG's Marine Extension Program (MEP) has been in place for 40 years, consisting of community-embedded coastal agents and university-based subject matter specialists serving Louisiana's coastal clientele through site visits, participation in advisory forums and the development and dissemination of science-based information.

General Administrative Capacity: OCD-DRU is fully staffed to manage all existing programs from design through close-out. The agency adds additional capacity through an administrative services contractor, which can be used for the proposed NDRC projects. This contract is utilized to assist OCD-DRU program staff, sub-recipients and grantees, as needed, with grant administration and program management. Through this staff capacity, OCD-DRU ensures grantees and sub-recipients receive full administrative services for all pre-application, application, project development, bidding, pre-construction, construction, reporting, compliance, and project close-out needs. OCD-DRU program staff works directly with assigned grant managers to implement projects and resolve any issues involving the grantee. The current administrative services contract extends through Sept. 2017.

OCD-DRU has established a detailed contract management and tracking system for its Isaac allocation to comply with HUD requirements that all funds be expended within two years of approval of the grant agreement. The system involves a rigorous process of tracking program performance, expenditures, and projections to ensure that the project is progressing as planned and that the adequate level of funding is available to subrecipients in a contractual agreement during the course of the project. For each proposed project or program, OCD-DRU works closely with subrecipients to fully develop program guidelines, processes and procedures and then establishes a projected timeline for project completion. Based on these projections, OCD-DRU submits a request to HUD to access the amount of funds that are expected to be expended within the first two years of the project. Once a project reaches a 50% expenditure rate of its current allocation, OCD-DRU submits a subsequent request for additional funds from HUD. To date, St. John the Baptist's Isaac CEA has been amended five times with additional funds, and it is expected that it may need an additional six amendments to expend all allocated funds.

As the grantee, OCD-DRU is responsible for all procurement. The agency follows the Louisiana Procurement Code, L.A. Revised Statute, Title 39:1551-1771. OCD-DRU rebid for an administrative services consultant in 2014, seeking proposals from firms for grant management services related to CDBG-DR programs. The RFP, written by OCD-DRU staff, required the proposer demonstrate working knowledge of the regulations, statutes, policies, and procedures related to grants funded by HUD CDBG programs. OCD-DRU received 8 proposal submissions and [Pan American Engineers \(PAE\)](#) was awarded the contract.

Sound financial management services have been developed and enforced at OCD-DRU through its internal policies and procedures, established accounting systems and trained staff. OCD-DRU financial specialists ensure policies satisfy regulatory standards and the state accounting system oversees financial transactions with an eye toward meeting program objectives. Over the last three years, OCD-DRU staff has developed checklists and web-based management tools, streamlining the financial management process to be fully documented, efficient and transparent.

OCD-DRU has conducted over 500 grantee technical assistance and pre-monitoring visits from 2013-2015. During these visits, Outreach staff and Program Managers reviewed grantee and program files. The reviews included, but are not limited to, general record keeping, policy and procedure documents, procurement, financial management, and labor compliance files. If deficiencies were recognized, OCD-DRU provided guidance and assistance with obtaining and maintaining all required records. The Outreach staff has also developed an e-blast system to keep grantees and subrecipients informed of regulatory and policy updates, along with guidance on compliance issues. OCD-DRU has also held grantee trainings on topics such as CDBG compliance, labor compliance, and the close-out process.

OCD-DRU's illustrated its ability to rapidly design and launch programs in response to Hurricane Isaac. CDBG-DR funds were allocated in Federal Register Vol. 78, No. 103, on May 29, 2013. Louisiana had its initial action plan, which featured a full impact and unmet needs assessment, strategies to address the unmet needs, planning and coordination, and a citizen participation plan, published for public comment in August 2013. Funding allocation plans related to Hurricane Isaac were submitted for review in November 2013. By the end of May 2014, over \$3.2 million of the grant had been expended. OCD-DRU, GOHSEP, LHC, and the local parishes coordinated as a team to rapidly launch programs to assist the impacted populations.

OCD-DRU has several innovative methods of tracking and evaluating project and program outcomes. One such method is the Quarterly Management Review (QMR). The QMR is a detailed review of individual program expenditure projections versus actual expenditures, as well as performance progress by the review of key performance indicators that are internally defined and relevant to the individual programs. The OCD-DRU Reporting and Performance Management team takes the lead on conducting QMR reviews. The first step is to identify if each program within the agency has met its expenditure goals or if there is a shortfall. This is accomplished by pulling the expenditure data from the state financial system, then analyzing those expenditures against the previous quarter's and long-term projections. The Reporting team presents program managers with the results of the analysis and holds individual program

meetings to evaluate key performance metrics and identify reasons for success and shortfalls in meeting projected goals. The results of the evaluation process are presented at a quarterly meeting in which directors and program managers work together to identify program areas to on which to focus.

OCD-DRU has a technical services contract that is used, as needed, to assist in data analytics or other IT infrastructure and application support services. The current technical services contract with [CGI](#) extends from March 2, 2015 to March 1, 2018. OCD-DRU will either extend or rebid the contract, as it deems necessary. The Homeowner Assistance Program (HAP) utilized the CGI technical services contract in 2015 to assist in programmatic decision-making. HAP provided a set of specific scenarios to CGI to determine the impact on affected populations by changes to program policy and design. CGI created a calculator for determining the outcomes of each scenario on the affected populations and the percentage of that population to be positively or negatively impacted by the changes.

Technical Capacity: The 2012 CMP was based on state-of-the art science and analysis, and the modeling process provides a holistic understanding of our coastal environment today and changes expected over the next 50 years. The Coastal Louisiana Risk Assessment (CLARA) model is a quantitative simulation model of storm surge flood risk developed by the RAND Corporation. CPRA utilizes the CLARA model to better understand how future coastal changes lead to increased risk from storm surge flooding to residents and assets on the Louisiana coast. It also assesses the degree to which projects proposed for Louisiana's Comprehensive Master Plan for a Sustainable Coast reduce this risk. CLARA allows CPRA to systematically evaluate potential projects for inclusion in the Coastal Master Plan by estimating risk reduction and benefits.

As part of the 2017 Coastal Master Plan update, CPRA is developing a Flood Risk and Resilience Program. This program focuses on implementing nonstructural projects, increasing flood risk awareness, and supporting state-level policies that promote greater resilience across the coast. As part of CPRA's larger outreach program, it convened multiple Parish Floodplain Manager meetings in 2014 and 2015.

The meetings included parish floodplain managers and grant managers from 16 parishes to discuss the Flood Risk and Resilience Program and obtain their feedback on the program's draft framework.

UNO-CHART has partnered over the past three years with LSG on two projects, Sci-TEK and the Sea Level Rise project. The projects explore community processes and urban planning hazard mitigation methods needed to facilitate adaptation and resilience to hazards for indigenous coastal Louisiana communities facing land loss and sea-level rise. These are collaborative hazard planning projects using remote sensing, GIS experts, planners, sociologists and coastal residents. The projects make use of the resident's traditional ecological knowledge (TEK), along with scientific data, and information from community focus groups to map vulnerabilities and plan for future hazards.

The Comprehensive Resiliency Pilot Program was established in 2010 by OCD-DRU to provide support for the development of comprehensive non-structural strategies within parishes and municipalities in Louisiana. The program has funded 38 comprehensive plans, zoning codes, development ordinances, smart growth, stormwater management, and resiliency strategies. Since the beginning of 2013, 15 plans developed through the program have been adopted by the local governing bodies, including the Greater New Orleans Urban Water Plan, Think Alex Comprehensive Plan, and the Terrebonne Parish Comprehensive Plan Update, which adjusts recommendations made in Terrebonne's 2004 plan to reflect current settlement trends and environmental concerns.

Comprehensive Resiliency Program awards were made competitively and systems were put into place to ensure the intent of the award was upheld in the execution of the plan. This included review by OCD-DRU's program manager of initial scopes of work and requests for proposals for planning consultants. Project reports, including outlines of tasks completed, along with copies of draft and final plans are submitted with payment requests for verification that work and final product adhere to the principles of the awarded application. Education and training was provide to grantees, as well as other Louisiana communities, on resiliency planning via the Louisiana Resiliency Program (LRAP). LRAP, a

partnership between OCD-DRU and LSU's Coastal Sustainability Studio, hosted six webinars and six workshops on resiliency planning in 2013. The webinars are archived on their website.

UNO-CHART facilitates two Community Rating System (CRS) user groups. The CRS is a voluntary program available to National Flood Insurance Program (NFIP) participating communities that provides incentives for communities to exceed the minimum floodplain management regulations established by the NFIP to minimize risk. UNO-CHART, whose staff includes two Certified Floodplain Managers (CFM), supports the community's efforts to maintain and/or increase their CRS rating through planning, research, meeting facilitation and management. UNO-CHART's user groups are for the Lake Pontchartrain and Baton Rouge areas. The communities in the user groups have all been able to maintain or improve their community's rating through the support of the group.

Federal law requires all structures within a Special Flood Hazard Area for which federal assistance has been provided to obtain and maintain flood insurance to the level of damage incurred. Within the past three years, GOHSEP has conducted verification of adequate flood insurance coverage during the close-out process of over 2,900 FEMA Public Assistance projects.

The Low Income Housing Tax Credit Piggyback Program (Piggyback) provides nearly \$600 million in CDBG-DR funds in the form of gap financing loans. This program provided CDBG-DR funds in that were "piggybacked" onto Gulf Opportunity Zone tax credits to assist in building mixed income housing that was affordable to low-to-moderate income residents. Piggyback has made awards to 60 properties, representing more than 7,000 housing units, 4,420 of which offer affordable rental rates to people of low-to-moderate income. To date, 55 of the 60 projects are complete.

The Marais Apartments for seniors opened in New Orleans in August 2014. Funded partially through OCD-DRU's Piggyback program, the project is the adaptive re-use of the 1951 downtown Texaco Building. The project serves a need among seniors for affordable housing, eliminates blight, and restores an iconic and historic structure. Marais includes 12 studios and 100 one-bedroom apartments for seniors ages 62 and older, and is presently at full occupancy.

OCD-DRU has worked alongside LHC and other partners to construct the Iberville Housing Development, which includes Iberville Onsite Phases I and II. Phases I and II began the transformation of the 23-acre Iberville Public Housing Development, built in 1942 and located adjacent to New Orleans' French Quarter, into a vibrant, mixed-use, mixed-income community. The redevelopment of the Iberville site, including the reintroduction of the street grid and construction of new utilities, rain gardens, pervious surfaces, and public rights-of-way throughout the site, significantly contributes to the revitalization of the city's Iberville/Tremé neighborhoods. Spurred by the onsite redevelopment, the Iberville/Tremé plan will transform the physical site and structures, provide for the neighborhood's social and cultural needs, and improve the economic and retail vitality of this historic neighborhood.

The LHC and OCD-DRU worked directly with Terrebonne Parish in the development and implementation of the parish's buyout program. The buyout program was designed to purchase properties damaged by flood or wind by hurricanes Gustav and Ike. The goals of the program are to clear storm damaged homes and eliminate slum and blight, or assist low- to moderate-income residents and improve the capacity of the parish to recover from the storms. It was also designed to make land available for the construction of new structures built to codes in place since 2006, and new regulations that will take effect in the next year. New building codes and FEMA base flood elevation standards will significantly reduce the potential for flooding or wind damage in the future. The project consists of three phases: acquisition, clearance, and disposition.

Over the past three years, OCD-DRU has closed seven loan agreements including New Market Tax Credits (NMTC). One of these projects was the redevelopment of Myrtle Banks, a blighted school located within the O.C. Haley Blvd. Commercial Corridor, which was transformed into a grocery store. The \$14 million project converted the building and surrounding property into the 23,000 sq. ft. Jack & Jake's Public Market, a fresh produce and prepared foods marketplace, along with office space for non-profit, social and creative entrepreneurs.



Community Engagement and Inclusiveness: Recognizing the threats presented by climate change, the CMP serves as a pioneering example in the planning field of the interdisciplinary collaboration needed among planners, scientists and engineers to create more resilient, sustainable communities.

In carrying out its mission in accordance with the CMP, CPRA collaborates extensively with a wide range of other federal, state and local agencies. These include:

- Federal agencies such as the U.S. Environmental Protection Agency, US Fish and Wildlife Service, Natural Resources Conservation Service, National Marine Fisheries Service of the U.S. Department of Commerce, and the U.S. Army Corps of Engineers;
- State agencies such as the Governor's Office of Coastal Activities, State Budget Office, State Land Office, Louisiana Legislature, Department of Natural Resources, Department of Transportation and Development, Department of Wildlife and Fisheries, Environmental Quality, Louisiana Economic Development, Department of Agriculture and Forestry, Department of Insurance, GOHSEP, and Governor's Advisory Commission on Coastal Protection, Restoration and Conservation;
- Local government agencies and Tribal Councils.

In addition to working across multiple agencies, CPRA has developed an interdisciplinary planning process that engages diverse groups of coastal stakeholders, focus groups, and national and international experts in order to capture the wide range of perspectives and expertise necessary in developing a holistic coastal planning effort for the 2017 CMP. The Framework Development Team (FDT) serves as the primary cross-disciplinary collaborative group that supports and provides insight to the Master Plan team. The FDT membership includes 51 individuals intimately familiar with Louisiana's coastal crisis. It consists of representatives from federal, state and local governments; NGOs; business and industry; academia; and coastal communities. The Science and Engineering Board (SEB) includes scientists and engineers with national or international experience who cover the range of disciplines that will be addressed in the 2017 Plan, including socio-economics, coastal modeling, water and natural

resources, urban planning, wetlands, fisheries, coastal geoscience, economic policy, and risk reduction. The SEB provides independent technical review of plan elements and makes specific recommendations about how the planning team can improve the scientific basis and/or planning elements to create the most credible approach. The Resiliency Technical Advisory Committee (TAC) is a small cross-disciplinary advisory group that offers working-level guidance and recommendations on the programmatic and policy measures needed to implement a comprehensive flood risk and resilience program. The TAC comprises experts in the areas of climate adaptation planning, community planning, socio-economics, social vulnerability, hazard mitigation, disaster planning, and environmental policy.

LSG works with local and state stakeholders on solutions for installation of emergency moorings for fishing vessels. Since 2012, the effort has been called the Harbor of Refuge Initiative, focused in the Vermilion Bay region of the coast. In partnership with the Port of Delcambre, LSG published “*Seeking Refuge Before the Storm: Needs of Commercial Fisherman*,” to quantify the costs and benefits of harbors of refuge and earn a place for it in the parish hazard mitigation plan updates for Iberia and Vermilion Parishes. LSG has also been integral in gathering information from commercial fisherman and facilitating conversations with local and state partners.

Beginning in 2012, LSG has organized and executed an annual Fisheries Summit and Trade Show to provide relevant updates and networking opportunities to hundreds of commercial fisherman. Topics include: fisheries industry updates, Trade Adjustment Act program updates, US Coast Guard and fishing vessel safety requirements, and onboard seafood handling programs and regulations.

Historically, in New Orleans the GOHSEP-administered FEMA Hazard Mitigation (HM) program has been geared toward individual assistance for homeowners who need to mitigate their homes against future flood damage and assistance for public structures that need to be hardened. Over the past three years, GOHSEP has partnered with the City of New Orleans to transition its HM program to target localized drainage improvements, with the intent of impacting the larger community.

In 2011, FEMA provided additional HM funding at the state's request based on the substantial increase in eligible recovery costs since the initial lock-in calculation performed by FEMA following Hurricane Katrina. In 2012, New Orleans allocated much of its HM dollars to three projects: Retrofitting the Sewerage and Water Board (SWBNO) power plant, retrofitting of Charity Hospital and the hardening of the Naval Support Center. The latter two projects ran into hurdles and were not progressing in accordance with FEMA deadlines. GOHSEP offered technical assistance to move the projects forward or identify new projects. Ultimately, in early 2015, New Orleans decided to change course and identify new projects. The city is now using its HM funds for a suite of projects to improve stormwater management throughout the city. Preliminary planning and design of three of the projects were funded by grants made through OCD-DRU's Comprehensive Resiliency Program.

Following Hurricane Isaac, OCD-DRU, FEMA, GOHSEP and LHC enacted a robust community engagement effort to identify recovery goals and develop recovery projects. A series of 12 charrette-style meetings were held in both Plaquemines and St. John the Baptist parishes. These meetings allowed the public to communicate their recovery concerns and work alongside parish leadership and state and federal agencies to identify priorities in regard to housing, infrastructure, and economic development.

Citizen Advisory Committees were established in each of the recovery areas (housing, infrastructure, health and social services, natural and cultural resources, and economic development). Composed of 10-15 stakeholders and community members, the objective of the Advisory Committees was to identify programs that address the needs citizens had identified.

The community articulated housing as its most profound unmet need. OCD-DRU and LHC, who were embedded within the housing committees, worked to develop and draft projects to address the previously identified priorities. Nine months after the storm, the *St. John the Baptist Community Recovery Strategy* was completed.

OCD-DRU worked with GOHSEP to develop the Hazard Mitigation Assistance cost share program for LMI households with its Isaac CDBG-DR allocation. FEMA offers a program providing 75%

of elevation costs to mitigate household damage to future disaster for properties that have been designated as RL or SRL. Through OCD-DRU's unmet needs analysis and outreach process, a need for rehab and elevation of homes among low- to moderate-income households who did not have funds for the 25% cost-share was identified. OCD-DRU and GOHSEP worked together to combine resources, filling a needed gap in elevating LMI households in vulnerable areas.

#### *Parish Partners*

[St. John the Baptist Parish Government \(SJBPG\)](#): Within the last three years, SJBPG has managed a disaster recovery program in excess of \$60 million. This includes projects through the Coastal Impact Assistance Program, CDBG-DR, and HM. In order to successfully implement and manage a program of this scale, SJBPG has administrative consultant contracts to assist in creating and submitting applications, environmental review, development of applications, procurement, contract management, financial tracking, record keeping and other activities. The parish has 27 contracts with seven administrative consultants for the differing grant programs, with parish staff contributing to the management through oversight, financial management, and outreach activities. Through the current system of managing the recovery program, SJBPG has expended \$20 million towards completion of recovery projects, and has completed work on seven projects.

Within the last three years, SJBPG has managed two shoreline protections projects: the Reserve Relief Canal and the West Lac Des Allemand Project. SJBPG scheduled pre-construction meetings with the construction contractors to negotiate the terms and conditions of the contract, ensuring compliance with the terms and conditions in the contracts, as well as documenting and agreeing on any changes or amendments that may arise during its implementation. The project is monitored on a weekly basis. Specific tasks include authorizing change orders, monitoring the budget and the established timeline, conducting weekly site visits, and reviewing plans and specifications. The project was completed in June 2015, achieving the goal of providing shoreline protection and buffering from erosive wave action for the Pleasure Bend community. It also managed \$2 million in CDBG-DR funds for its Minor Housing Repair

Program, rehabbing 110 homes. To ensure compliance and accuracy, OCD-DRU and SJBPB held an invoicing and reimbursements process meeting. SJBPB then conducted a meeting with all contractors to discuss the payment and invoice process, and carried forward OCD-DRU's policies. SJBPB created a standard invoice for all contractors to submit to the parish accounting department for payment. SJBPB hired a grants accountant to oversee the reimbursement process. The grants accountant collaborates with the LHC Housing Specialist weekly to discuss payment status and invoices.

[Terrebonne Parish Consolidated Government \(TPCG\)](#): Currently, Terrebonne Parish is actively working on managing, implementing, and closing-out projects from the \$135 million CDBG-DR grant for damages related to Gustav and Ike. As part of the \$135 million CDBG-DR grant resulting from Hurricanes Gustav and Ike, over the past three-years, the Finance Department has tracked all revenue and expenditures. Following existing internal controls and the CDBG Administrative Manual, staff has followed procedures governing review and approval of invoices for payment. Project invoices are received by accounting manager, after review by parish engineering and projects staff, approved for payment by the parish president or manager.

TPCG provides monthly reports to OCD-DRU on CDBG-DR project expenditures and meets biweekly with GOHSEP to monitor FEMA program related payments and invoicing. These external reports are informed by an internal reporting process that includes weekly updates provided by program managers to the Department of Planning and Zoning, Recovery Assistance, and Hazard Mitigation Planning Division. These weekly updates highlight implementation activities, programmatic communication, programmatic milestones, quarterly expenditures, issues and concerns. Using Terrebonne Parish's Buyout Program as an example, the project proposed 24 units to be purchased and then returned to commerce within three years. To date, 23 of 24 homes have been purchased and it is projected that all homes will be purchased by the end of 2015. The progression of this work has been documented by the project manager from the weekly monitoring reports and provided consistently to OCD-DRU in monthly reports.

Lafourche Parish Government (LPG): As part of Lafourche Parish's Long Term Recovery Plan, a storm harbor marina to aid in reducing the number of fishing vessels damaged by storm surge was constructed, a model the state proposes to replicate in this application. In order to implement the project LPG entered into a contract with the Greater Lafourche Port Commission (GLPC). LPG acted as the projects fiscal agent while GLPC provided oversight of the project's planning, design operation, and facility maintenance. The harbor was completed in 2015, \$55,000 under budget.

Once the contract between the two entities was developed and approved by the respective boards of LPG and GLPC, the appropriate public procurement process was utilized for securing services and prices for professional services, materials, and construction services for the project. To develop the design for the project, a Request for Qualifications (RFQ) was published. The RFQ was submitted to OCD for compliance and reasonableness. The contractor was selected using the public bid process. The engineer selected for the project prepared the facility design, advertised the project as required and held a pre-bid conference at the facility to answer questions. The lowest responsive and responsible bidder was awarded the construction contract.

The Finance Department of LPG ensured that both organizations complied with OCD-DRU rules and regulations, paid all valid invoices the correct amount due, and adhered to the Storm Harbor CEA, while the project engineering consultant, GLPC staff and project consultants performed periodic inspections of the Storm Harbor Marina project.

Plaquemines Parish Government (PPG): As a part of PPG's recovery plan, the Hermitage Road Elevation Project was submitted to OCD-DRU as a part of the Gustav allocation in 2010. However, as a result of a limited amount of funds available, parish engineering had only been able to complete a cost estimate and environmental review, when in 2012, \$31.8 million in additional HM funds became available to the parish. These funds allowed the parish to undertake several projects, one of which was to construct the road elevation while also enhancing the design to include overtopping with asphalt.

The project combines CDBG-DR and HM funds to elevate and overtop with asphalt 5-miles of road in Plaquemines Parish. Hermitage Road is a critical evacuation route for the communities of Lake Hermitage, Suzie Bayou and Deer Range, which is made up primarily of low-mod income residents. Upon procuring an engineering firm, PPG staff initiated the process of developing the contract. Staff worked to modify a contract template to the scope of this particular project. The final contract was executed in September 2013. PPG has continued to ensure that the terms of the contract are being met through a process of regular meetings with the engineer, the state and federal entities, along with Plaquemines engineering.

The New Orleans to Venice (NOV) Hurricane Protection Project is an estimated \$1.5 billion project consisting of seven levee reaches, comprising 58 miles of major levee enhancements, repairs to and re-builds of the Empire Flood Gate and Empire Locks, and repair and fronting protection for 10 pumping stations in Plaquemines Parish. The project is led by the United States Army Corps of Engineers (USACE) with PPG and CPRA as co-Non Federal Sponsors. To date, PPG has overseen the engineering and design of over 30 projects, meeting on a weekly basis with design teams across the country to review and discuss ongoing project designs of the system. As part of the NOV project, PPG is responsible for working with various state, federal and local agencies to ensure that any and all impacts to property and utilities are discussed and agreed upon prior to beginning construction. This engagement includes public meetings to discuss proposed design changes, stakeholder meetings to discuss impacts caused by the ongoing project, monthly partnering meetings with all stakeholders and bi-weekly coordination calls with CPRA to discuss the progress of the project.

#### *Organizational Partners*

The Lowlander Center: The Lowlander Center is a 501(c)(3) non-profit organization supporting lowland people and places through education, research and advocacy. Lowlander is based on community participatory principles and methods to begin problem-solving at the community level. The work of the

Lowlander Center helps create solutions to living with an ever-changing coastline and land loss, while envisioning a future that builds capacity and resilience for place and people.

Over the past three years, Lowlander staff has contributed to the Sci-TEK project along with UNO-CHART and LSG. Sci-TEK is a collaborative project among sociologists, planners, scientists and coastal community members. Lowlander staff works with other team members to integrate traditional ecological knowledge (TEK) of coastal populations with geospatial technology and other scientific datasets on how TEK can be informed and be integrated into coastal restoration project planning and implementation. Lowlander staff's knowledge of risk and hazards, as well as their relationships with many indigenous communities, enable them to effectively facilitate knowledge-sharing and the gathering of both qualitative and quantitative information. As a result of their work, maps and other planning tools have been developed to assist scientists, engineers, policy-makers, and community members in utilizing traditional ecological knowledge to develop innovative, effective and sensitive approaches for sustaining the coast.

Over the last several years, staff of the Lowlander Center have been involved in the founding of the Resilient Neighbors Network (RNN), an initiative of the Natural Hazard Mitigation Association, which created a national peer co-mentoring network of local resilience leaders. Lowlander staff pulled together an initial group of six community leaders to collaborate on the design of a national network, facilitating meetings. The RNN now consists of 10 communities which meet annually, speak monthly and support each other in risk reduction efforts.

Lowlander staff has assisted over 20 communities and government entities on their Hazard Mitigation and Emergency Operations Plans over the past three years. The staff has done this by supporting the development of community-led planning processes in small tribal communities in Louisiana and South Dakota. Lowlander staff helped the Oglala Sioux Pine Ridge Reservation incorporate best available data on risk frequency and impacts, including expected impacts from climate change, along with concerns and knowledge of community members into the local hazard mitigation plan. The results of the vulnerability assessment, along with the community assessment, were utilized in identification and



ranking of mitigation projects. The extensive community engagement as a part of the hazard mitigation planning process has brought recognition to the plan, which was approved by FEMA, and is considered a model plan by the state of South Dakota.

EnvironMental Design architects, part of the Isle de Jean Charles planning team, developed the vision and participates in the ongoing development of Vermilionville, a historical, living cultural center. Vermilionville is a living history museum, whose purpose is to preserve and interpret authentic elements of folk life cultures of the Attakapas area between 1765 and 1890. Another member of Lowlander's planning team, Evans and Lighter, a landscape design and architecture firm, worked as a principal designer for the [Greater New Orleans Urban Water Plan](#), funded through OCD-DRU's Comprehensive Resiliency Pilot Program. The plan sets forth strategies to address the sustainable management of stormwater, surface water, and groundwater within the levees of St. Bernard, Orleans and Jefferson parishes. Evans and Lighter designed many of the pilot projects within the plan, including the Mirabeau Water Gardens, which is now being implemented through New Orleans HM activities, and the London Avenue Wetlands Park.

[Columbia Residential](#): Columbia Residential is an integrated development company, comprising master planning, development, project management, construction management, and property management disciplines. Columbia Residential works in locations that are underserved by the affordable housing industry, employing vendors to develop and construct housing inspired with purposeful architectural design, sustainable construction and a commitment to the community.

Columbia Residential has closed and successfully completed the largest single LIHTC transaction in state history with a total equity investment of \$65 million. These tax credits were used as part of the financing structure for the redevelopment of the St. Bernard public housing site, the first phase of Columbia Parc. Columbia Residential has also successfully obtained tax credit allocations in the Louisiana competitive rounds for various phases of Columbia Parc and is in good standing with LHC.

Columbia Residential partners with architecture firms to design place-based communities and typically has 4 projects a year under design. A recent example of Columbia's design is Columbia Senior

Residences at Forrest Hills. Columbia's standards require integrated design, meaning architects, civil engineers and landscape architects meet weekly to coordinate plans amongst the construction team and property management. Columbia Senior Residences at Forrest Hills design was managed within 12-weeks and resulted in a coordinated, competitive construction bid process, a neighborhood that felt their design input was honored, and a certified EarthCraft community that is water and energy efficient.

Columbia Residential institutes a program of development that requires green certification on every new development project. Columbia has completed and certified 10 properties LEED and EarthCraft in recent years, achieving LEED platinum certification on Heritage Senior Residences at Columbia Parc. To achieve this, Columbia conducts proper site analysis, uses integrated design, and procures experienced team members for sustainable development. At Heritage, the team was required to participate in early planning sessions with a green consultant. Additionally, the development project manager was able to identify and utilize state and federal tax incentives for the installation of the solar panels to offset costs. Development and Construction team members at Columbia are LEED accredited professionals.

[Chicago Bridge & Iron \(CB&I\)](#): CB&I is one of the world's largest energy infrastructure and program management firms with over 54,000 employees. CB&I provides proven and scalable resiliency solutions to help clients survive, adapt, and thrive in the face of change. Two critical components to achieving resiliency, energy and sustainability are a part of CB&I's portfolio. CB&I currently works with the public sector to drive efficiency and resiliency in municipal portfolios.

CB&I was contracted by the City of Palm Bay, Florida, to help meet the community's long-term goals beginning with the development of a Sustainability Master Plan and an Energy Efficiency and Conservation Strategy (EECS). CB&I worked with the City of Palm Bay, FL to design its Master Plan to address all three aspects of the sustainability triple bottom line as defined by the International City/County Management Association (ICMA): Environment, Economy, and Social Equity. With the triple bottom line as a guiding principle, Palm Bay's EECS aimed to support the creation of a new green economy and

focuses on measures that will reduce energy consumption and greenhouse gas (GHG) emissions, while optimizing the quality of services offered to the community.

CB&I conducted energy audits of 6 of the city's main facilities and provided a report identifying Energy Cost Reduction Measures (ECRM). All measures were prioritized based on cost, ROI, need, and available funding. CB&I also calculated the baseline of energy use and GHG emissions based on major end uses including facilities (buildings), information technology data centers, vehicles (fleet), traffic signals, other transportation facilities, and park lighting. CB&I developed a baseline for projecting future energy usage and cost going forward based on things such as growth, increased commodity costs, project census data, building permits, any municipal capital improvements, and any energy efficiency reduction projects.

CB&I is conducting a Coastal Resiliency Study for the Texas General Land Office, which focuses on the effects and costs of recent hurricanes and identifies potential projects that have the highest impact for long-term recovery. The study also examines ecosystem functions, resource recovery rates, existing infrastructure, and socioeconomic issues related to mitigating storm impacts. CB&I is conducting a comprehensive review of the function, stability, vulnerability and repair/recovery times of the existing infrastructure within the coastal communities. This includes reviewing and assessing regulations and statutes for usefulness in addressing vulnerabilities and implementing projects, as well as compiling a list of recommended Hurricane Ike and Dolly projects that would have the greatest impact and best improve overall resilience, while maintaining an emphasis on CDBG eligibility. CB&I is applying its skills and resources in community outreach, coastal science and design, capital planning, and sustainability to accomplish the aforementioned tasks. This project is still in progress but, to date, CB&I has created communication plans for five coastal regions in Texas, and has engaged over 120 entities through 75 meetings. Through that extensive outreach, CB&I has helped the GLO identify over 10,000 projects, prioritizing down to 2,300 based on vulnerability and consequence.

[Waggonner and Ball Architects \(W&B\)](#): W&B is an internationally active, 25-person architecture and planning firm based in New Orleans, LA. W&B's knowledge of holistic resilience and stormwater management has been recognized by American Institute of Architects (AIA) Honor Awards and American Planning Association (APA) State and National Planning Excellence Awards.

The Greater New Orleans Urban Water Plan (GNOUWP), developed between 2011 and 2013 for Greater New Orleans, Inc., through a grant from OCD-DRU, was an outgrowth of Dutch Dialogues, an interdisciplinary collaboration that developed between 2007 and 2010. The Water Plan provides an integrated framework for a resilient and sustainable New Orleans region at all scales, with a demonstrated benefit-cost ratio of 4:1. The Water Plan works at system, district and demonstration project scales across three parishes and three water basins, between river and lake with protected and external wetlands, to envision how to adapt and thrive living at sea level.

W&B is widely known for creating and leading a broad spectrum, cross-sectional, and multi-disciplinary teams that excel in working with stakeholders in local environments to interrogate challenges and identify design opportunities. Drawing on relationships with national and international professionals and institutions, this ability of W&B is demonstrated through processes like Dutch Dialogues in New Orleans and Coastal Virginia organized with the Royal Netherlands Embassy, and Rebuild by Design in Connecticut with Yale and Arcadis, as well as the Water Plan itself. These efforts are organized to leverage our internal expertise with that of collaborators whose skillsets match the project type, to ensure results that are vital, both locally and beyond. This methodology involves continual research and utilizes intensive design workshops to engage and activate stakeholders and community. Building community support throughout the process of its development, the GNOUWP has been adopted by the City and is integral to the New Orleans Resilience Strategy released in August 2015. It is the foundation of the City's National Disaster Resilience Strategy, as well as the project basis for Jefferson Parish's NDRC application. It is incorporated in the New Orleans Master Plan and the largest driver of change in the recently adopted Zoning Ordinance. Demonstration projects developed in the Water Plan are now in design.

## **Management Structure.**

### *State Agencies*

The program managers, specialists, and analysts that fall within this section maintain direct relationships with and oversight of all grantees, subrecipients, developers, and contractors involved in the implementation of programs and projects.

OCD-DRU: **Patrick Forbes, executive director**, will serve as primary point of contact and authority representing OCD-DRU on all areas of the award. **Rowdy Gaudet, chief of staff**, is responsible for the day-to-day operations of the agency, as well as the overall strategy design and implementation. **Richard Gray, director of compliance, monitoring and audits**, is responsible for providing regulatory guidance and oversight, along with project compliance reviews. **Susan Pappan, director of finance**, is responsible for the oversight of the finance managers and analysts that carry out grants management. Duties include contracts management, review of requests for payment, accounting of program/project budgets, and receipt of program income and return of grants. The finance team also manages all administrative expenses, the agency's budgets, allocation of expenses, fiscal reporting on all CDBG-DR grants received from HUD and property management and disposition. **Hugh Hyman, director of reporting**, is responsible for data, performance and reporting. He is responsible for coordination of all quarterly reports, works with staff to develop projects, and works with finance team to accurately report and reconcile budgets and expenditures between the DRGR and the state financial system. **Adrienne Celestine, director of programs**, is responsible for the management of all infrastructure, economic development, planning, and non-compensation housing programs funded with CDBG-DR assistance.

LHC: **Brenda Evans, director of housing production**, is responsible for financing and production of new multi-family residential and substantial rehabilitation of affordable housing through issuance of federal grant dollars and tax credits to incentivize private investment. Ms. Evan's staff will be responsible for assistance in financing multi-unit affordable and mixed-income housing through issuance of Low-Income Housing Tax Credits (LIHTCs) and long-term monitoring of the project. **Liza Bergeron**,

**housing finance deputy administrator**, is responsible for a team that manages an \$800 million disaster recovery housing portfolio. Her team will be responsible for program development, approving applications for use of CDBG-DR funds, administering technical assistance, tracking expenditures and performance, and monitoring for federal compliance. **Nicole Sweazy, Louisiana Housing Authority housing finance deputy administrator**, is responsible for implementing strategies to eradicate homelessness and address the needs of Louisiana's most vulnerable households. Ms. Sweazy's team provides assistance to individuals and families by helping to provide vouchers and place Louisiana's most vulnerable households in safe and affordable housing.

GOHSEP: **Kevin Davis, executive director**, conducts overall guidance, management and leadership. **William Haygood, statewide projects section chief**, is responsible for all activities related to elevation and reconstruction programs. This includes program development, design and contracting with and monitoring of construction management firms. **Tenesha Wilson, grants management section chief**, is responsible for all activities related to reimbursements, expenditure tracking, financial reporting, and financial monitoring.

CPRA: **Kyle Graham, executive director**, conducts overall guidance, management and leadership. **Bren Haase, coastal resources administrator**, manages and oversees day to day operations of the Planning and Research Division. **Karim Belhadjali, coastal resources assistant administrator**, is responsible for managing and directing the scientists, researchers, and planners within the Strategic Planning Division.

UNO-CHART: **Monica Farris, PhD, CFM, director**, is responsible for all project, outreach and research activities. She will ensure that program activities are conducted in accordance with all federal, state and university policies and procedures. **Tara Lambeth, MS, CFM, assistant director**, assists with overall project management. She supervises tasks such as scheduling of focus groups, documentation, coding and data analysis.

LSG: **Robert Twilley, executive director**, will provide overall programmatic support for LSG's activities for development of the Storm Harbor of Refuge network. **Rex Caffey, director of extension**, will provide support to the Marine Extension Program, which includes agents with relationships and knowledge on the Storm Harbor of Refuge network. **Roy Kron, director of communications**, will provide guidance and support for developing outreach material through LSG's work.

State References: (1) **Ryan Bourriaque, Cameron Parish administrator**, P.O. Box 1280, Cameron, LA 70631; (337) 775-5718; [RyanB@camtel.net](mailto:RyanB@camtel.net). (2) **Josh Collen, vice president of development, HRI Properties, Inc.**, 812 Gravier Street, Suite 20, New Orleans, LA 70112; (504) 566-0204; [jcollen@hriproperties.com](mailto:jcollen@hriproperties.com). (3) **Jeff Hebert, executive director & N.O. chief resilience officer, New Orleans Redevelopment Authority**, 1409 Oretha Castle Haley Blvd, New Orleans, LA 70113; (504) 658-4400; [jphebert@nola.gov](mailto:jphebert@nola.gov).

#### *Parish Partners*

SJBPG: **Natalie Robottom, parish president**, is responsible for direction and final decision-making on recovery activities. **Michael K. Coburn, chief administrative officer**, coordinates activities of all key staff including grants administration, disaster recovery management, public safety, utilities and public works. His staff is responsible for oversight of grants administration, including contract management, application development, amendments, and recovery program management, as well as oversight, review and tracking of engineering and construction design and budgets. **Vince Lucia, chief financial officer**, is responsible for financial and purchasing activities. The finance staff is responsible for procurement support, invoicing, audits, financial documentation and expenditure tracking. **Raymond Goodman, disaster recovery manager**, will be responsible for coordinating activities and oversight of projects. **Myra-Alexis Valentine, grants administrator**, will be responsible for grants administration and oversight of administrative services contracts.

SJBPG Reference: **Scott Reddoch, construction manager**, Royal Engineering, 4298 Elysian Fields Ave, New Orleans, LA 70122; (504) 283-9400; [sreddoch@royalengineering.net](mailto:sreddoch@royalengineering.net).

TPCG: **Michel Claudet, parish president**, is responsible for direction and final decision-making on recovery activities. **Jamie Elfert, director of finance**, is responsible for financial and purchasing activities. The finance staff is responsible for procurement support, invoicing, audits, financial documentation and expenditure tracking. **Patrick Gordon, director of planning**, manages all activities related to recovery planning, zoning and development. **Greg Bush, director of public works**, manages all infrastructure and engineering activities.

TPCG Reference: **Kevin Belanger, chief executive officer**, South Central Planning and Development Commission, P.O. Box 1870, Gray, LA 70359; (985) 851-2900; [kevin@scpdc.org](mailto:kevin@scpdc.org).

LPG: **Charlotte Randolph, parish president**, will provide final decision-making and sign all agreements and amendments necessary for the project. **Archie Chaisson, parish administrator**, is responsible for overseeing the direction of the project, monitor progress, and approve payment of project invoices. **Don Edwards, director of public works**, will perform inspections and monitor progress of project, as well as approve invoices for satisfactory work performed. **Grayling Hadnott, director of grants and economic development**, will oversee grants administration and project compliance, including all appropriate resolutions for council approval, ERR in conjunction with consultant and procurement. **Renita Jackson, finance director**, will oversee the budget, financial reporting, and expenditure tracking.

LPG Reference: **John Plaisance, President, J. Wayne Plaisance Inc.**, PO Box 730, Galliano, LA 70354; (985) 632-5596; [jplaisance@jwayneplaisance.com](mailto:jplaisance@jwayneplaisance.com).

PPG: **Amos Cormier, parish president**, is responsible for direction and final decision-making on recovery activities. **Ed Theriot, director of administration**, manages financial and purchasing activities. The finance staff is responsible for procurement support, financial reporting, invoicing, tracking of expenditures, and oversight of all administrative activities. **Stanley Wallace, director of operations**, manages public works and engineering activities. Operations staff is responsible for contract administration and oversight of all engineering activities and infrastructure projects. **Hilda Lott, grants manager**, is responsible for oversight of all recovery grants management and recovery activities.



PPG Reference: **Kevin G. Wagner, senior project manager**, United States Army Corps of Engineers, 7400 Leake Ave, New Orleans, LA 70118; (504) 862-2509; [kevin.g.wagner@usace.army.mil](mailto:kevin.g.wagner@usace.army.mil).

*Organizational Partners*

The Lowlander Center: The Lowlander Center has assembled a planning team that includes one landscape architecture and two architecture firms. **Kristina Peterson, director**, will be responsible for overall direction, management, and oversight of project, and coordination among team members. **Shirley Laska, associate director**, will be responsible for daily support to director, inclusion of cultural elements in planned development, and management of site selection and design process. **Darren Diamond, chief financial officer**, will be responsible for financing strategy, as well as coordination with administrative consultant, invoicing, financial management, documentation, and expenditure tracking. **Alessandra Jerolleman, risk and continuity manager**, will be responsible for disaster risk management, and supporting Chief Financial Officer on grants administration, project management. **Kevin Krejci, quality control manager**, will monitor design, engineering, and construction progress for consistency with green infrastructure, energy efficiency, and building performance design and principles. **Tony Laska, green infrastructure and sustainability manager**, will provide oversight and management to site and building design. **Joseph Evans and Barney Lighter, Evans and Lighter, landscape architects**, will design site elements and oversee site implementation. **Fran Palama, James Niimoto, Bill Wong, Jenkins Architecture, architects**, will design and oversee construction of the tribal community center. **Eddie Cazayoux, EnvironMental Design, architect**, will design and oversee construction activities.

The Lowlander Center Reference: **Rosina Philippe, Elder, Atakapa-Ishtak Tribe**, Grand Bayou Village, P.O. Box 1021; Port Sulphur, LA 70083; (504) 266-9047; [rpatakapa@yahoo.com](mailto:rpatakapa@yahoo.com).

Columbia Residential: **Noel Kahlil, principal & CEO**, will provide leadership and direction on the project. **James S. Grauley, principal & COO**, will provide overall management of the operations of development, financing, and property management of project. **Christina Davis, development project manager**, will be responsible for directly managing development, financing, design, and incorporation of

sustainability principles. **The Construction Manager** will be responsible for directly managing all day to day aspects of construction. The manager will be assigned when the construction is ready to begin. **Barry Weaver, president of property management**, will be responsible for providing leadership and overall management for property management of the project.

Columbia Residential Reference: Rick Parker, executive director, Athens Housing Authority 300 S. Rocksprings St., Athens, GA 30606; (706) 425-5401; [rparker@athenshousing.org](mailto:rparker@athenshousing.org).

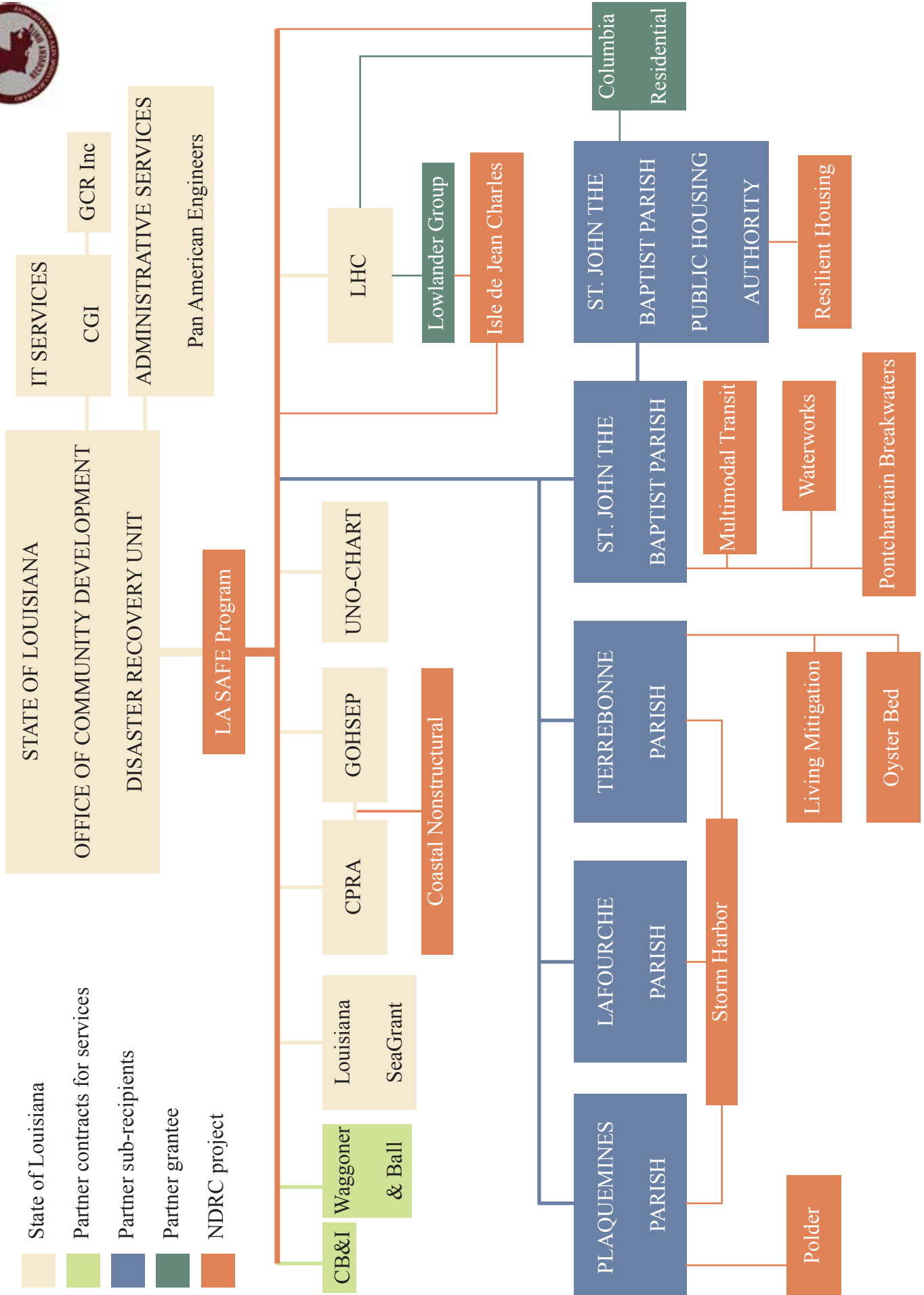
CB&I: **Malcom Jarrell, vice president of environmental and sustainability**, will serve as Corporate Sponsor and ensure all necessary corporate resources are available to assist Louisiana with execution of the LA SAFE Fund. **Tyson Hackenberg, senior director of program and construction management**, will serve as project director and will provide strategic direction to the CB&I team. **Mark Goodson, project manager**, will provide overall leadership to the CB&I team and serve as primary liaison to OCD-DRU. **James Andermann, junior project manager**, will coordinate the CB&I team's activities in Louisiana and also serve as liaison to OCD-DRU. **Ann Grodnick Nagle, resilient energy manager**, will serve as lead for resilient energy activities, coordinating resources to develop and/or evaluate energy projects, and providing strategic advice related to resilient energy. **Jordanna Rubin, sustainability manager**, will provide strategic advice related to sustainability and resilient energy.

CB&I Reference: **Dan Roberts, Utilities Director, City of Palm Bay, Florida**, 120 Malabar Road, SE, Palm Bay, FL 32907; (321) 952-3410; [droberts@pbfl.org](mailto:droberts@pbfl.org).

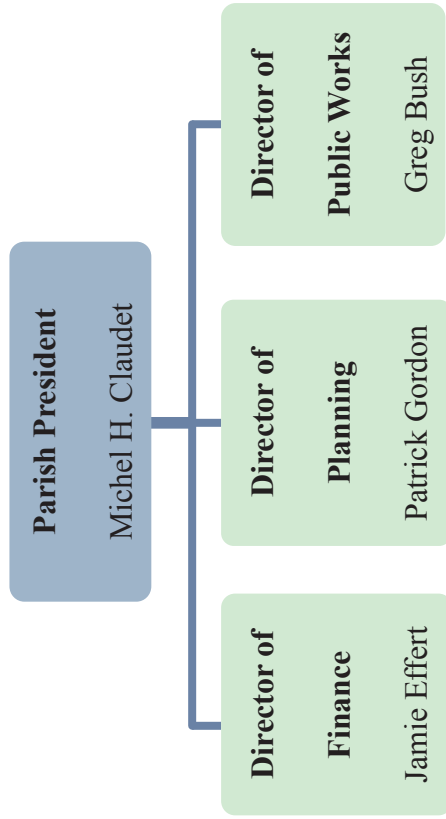
W&B: **David Waggoner, director**, will direct content, design, and program development, advising on integral approaches to challenges and opportunities. **Mac Ball, consulting principal**, will support the firm's efforts, provide critical input and advice, and provide needed design and graphical content. **Maria Papachalarambous, project manager**, will manage firm's efforts and technical proposal, as well as contract and grant administration.

W&B Reference: **Michael Hecht, president and CEO**, Greater New Orleans Inc., 1100 Poydras St., Ste. 3475, New Orleans, LA 70163; (504) 527-6900; [mhecht@gnoinc.org](mailto:mhecht@gnoinc.org).

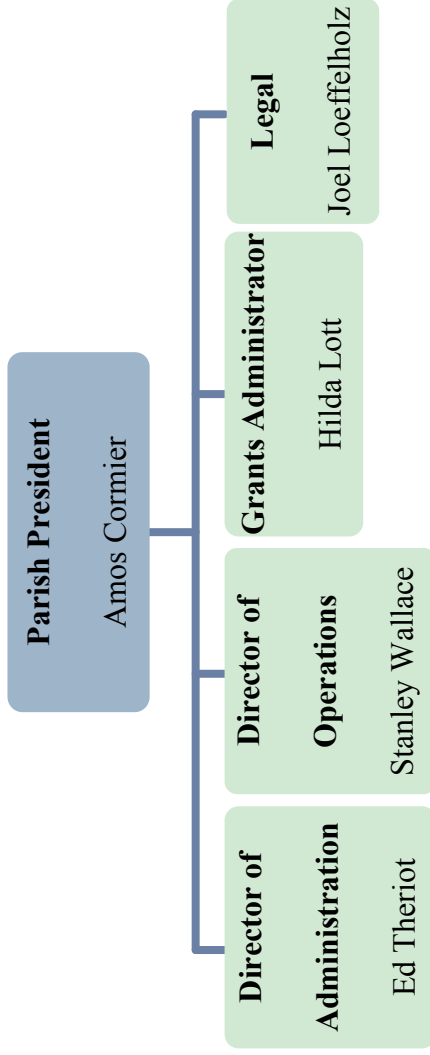
# National Disaster Resilience Partner Organization Chart



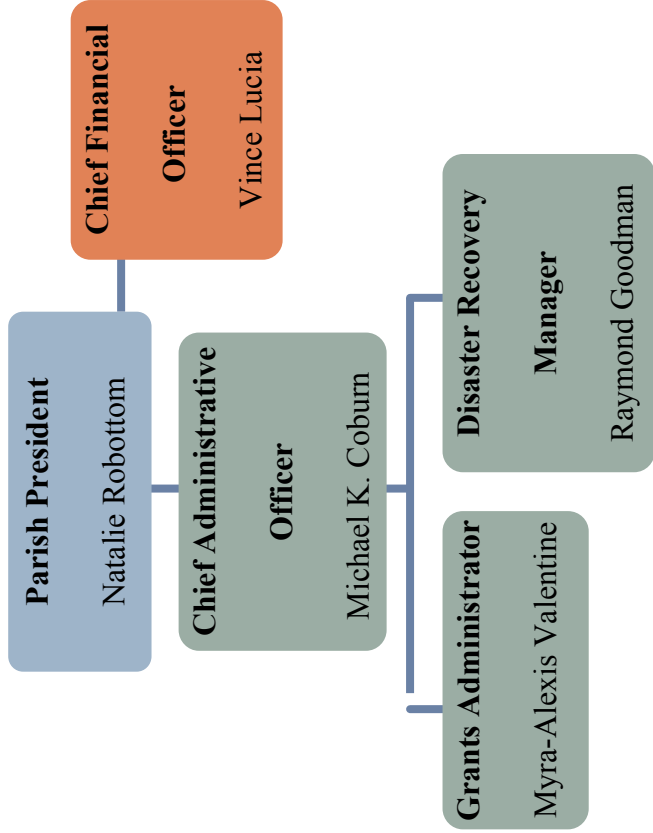
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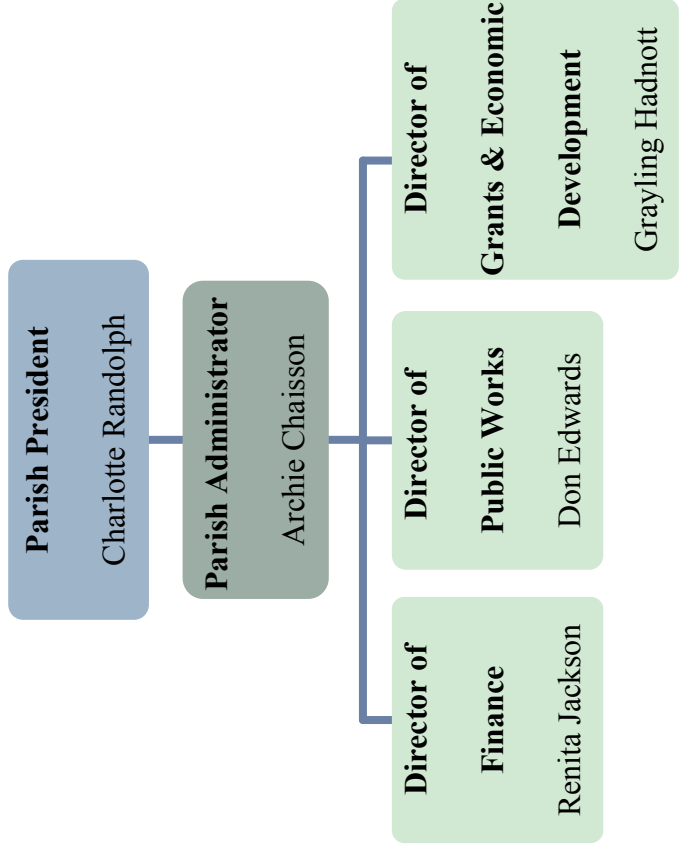
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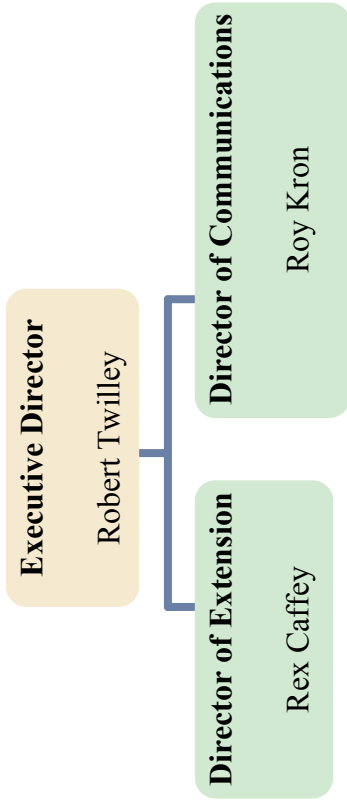
## ST. JOHN THE BAPTIST PARISH



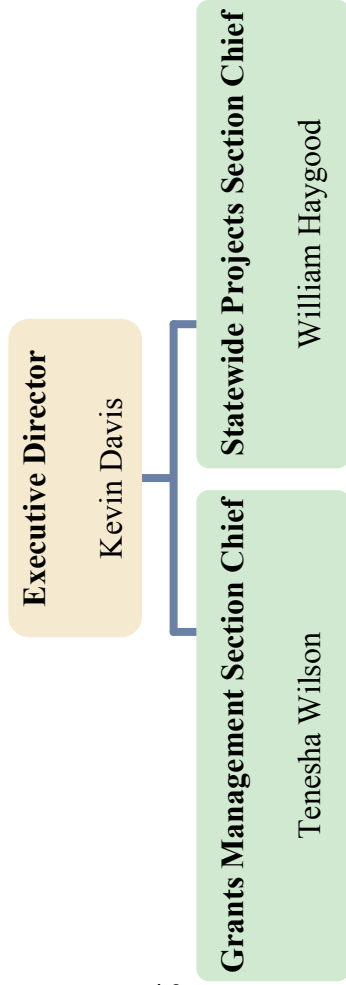
## LAFOURCHE PARISH



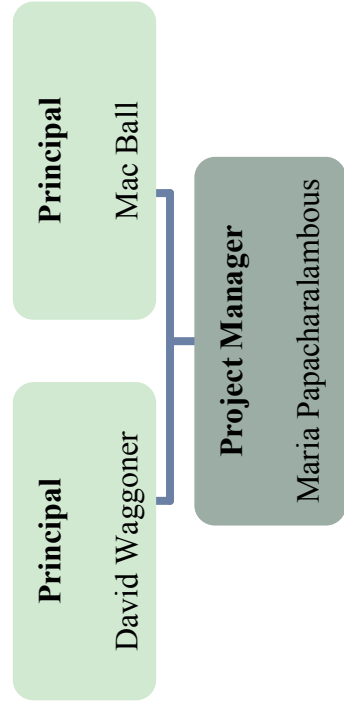
**LSU SEAGRANT**



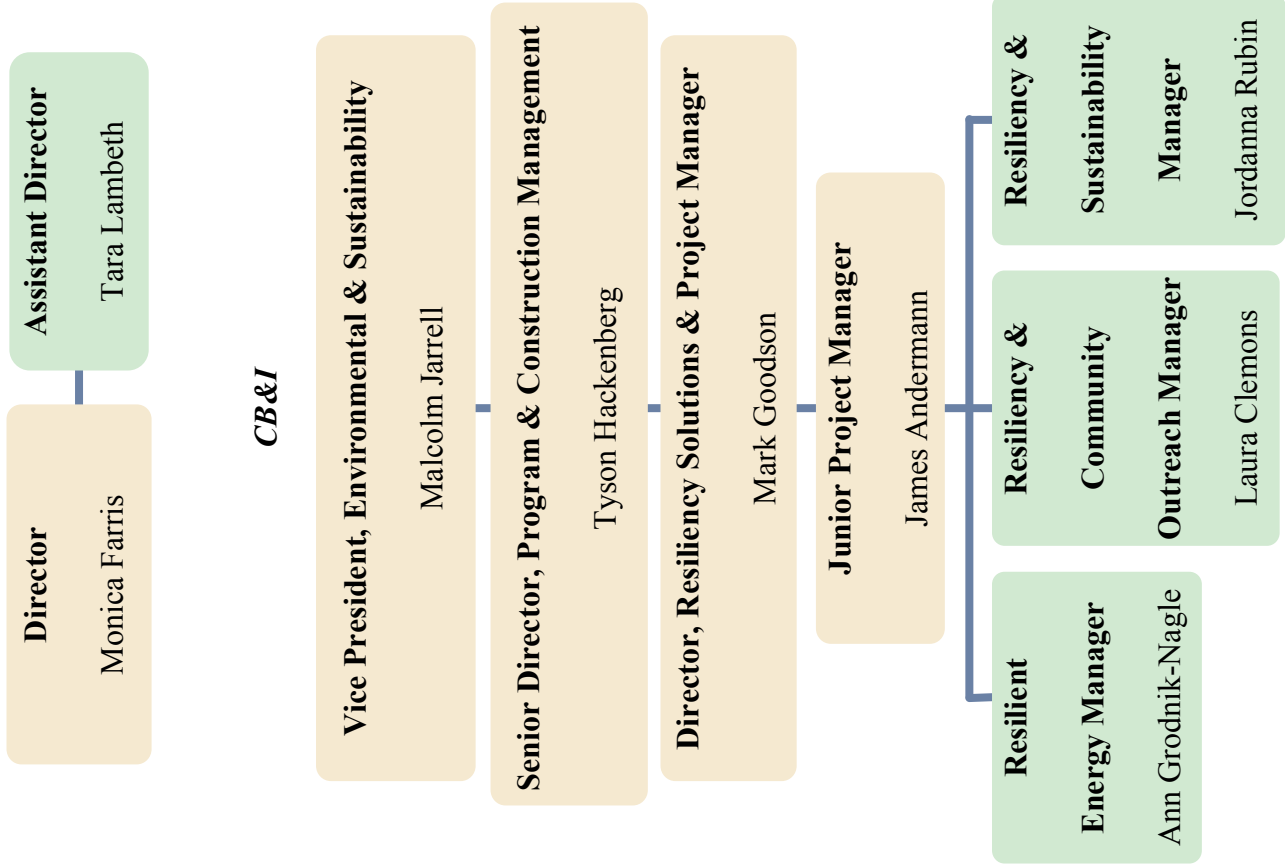
**GOHSEP**



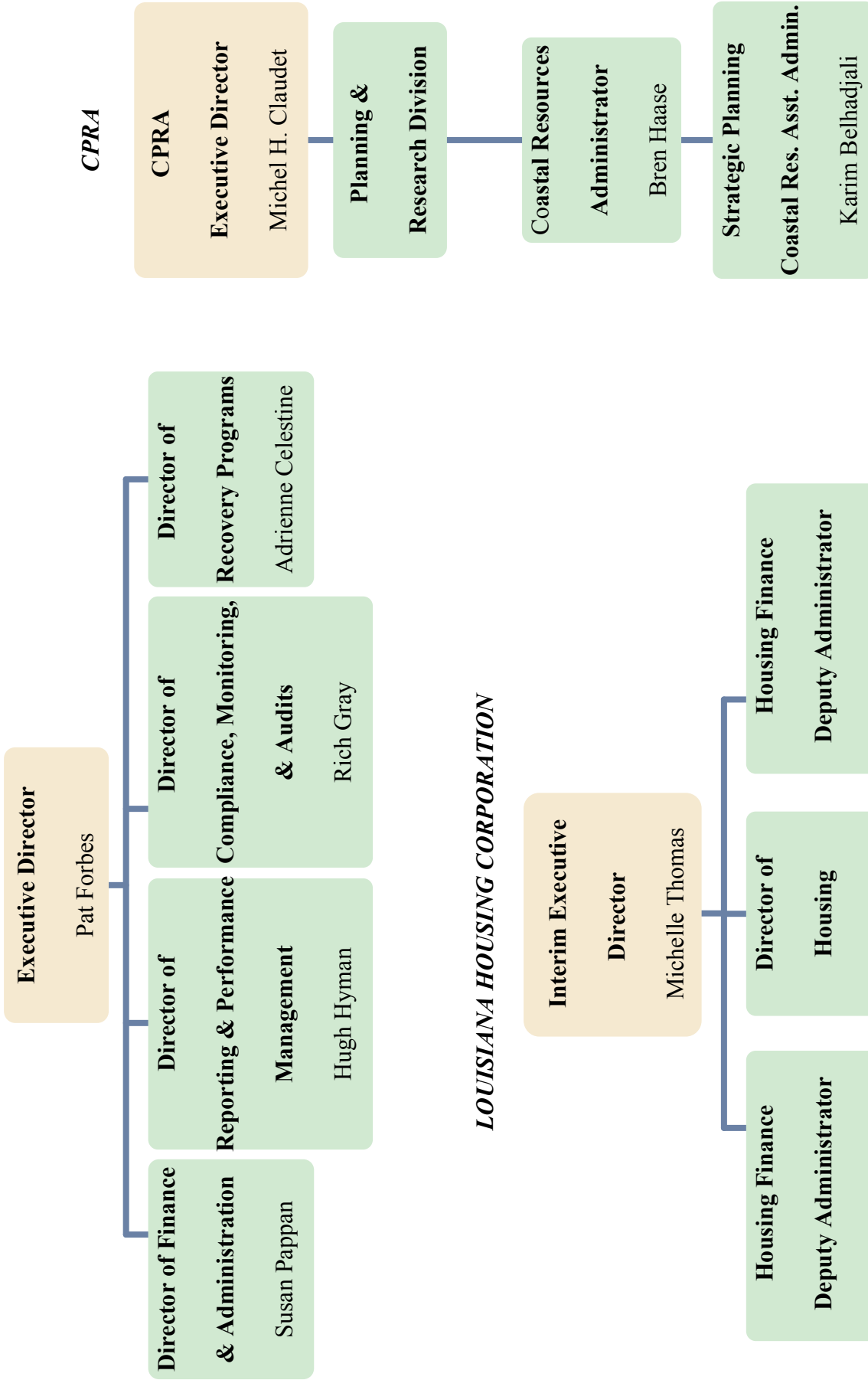
**WAGGONER & BALL**



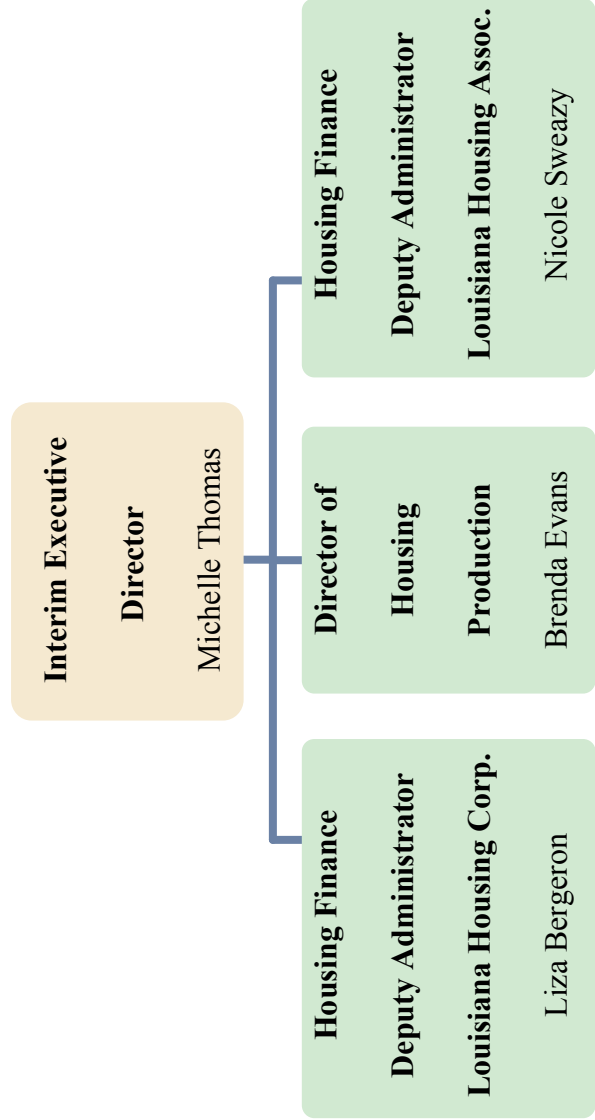
**UNO-CHART**



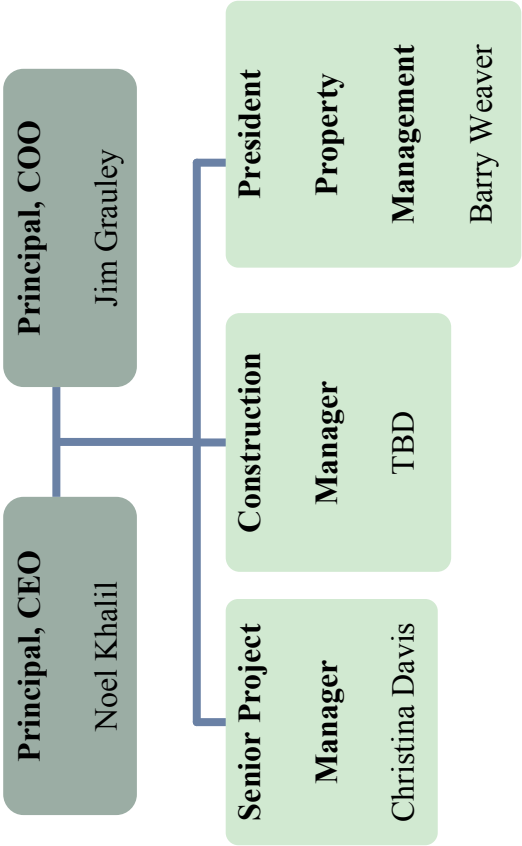
## DISASTER RECOVERY UNIT



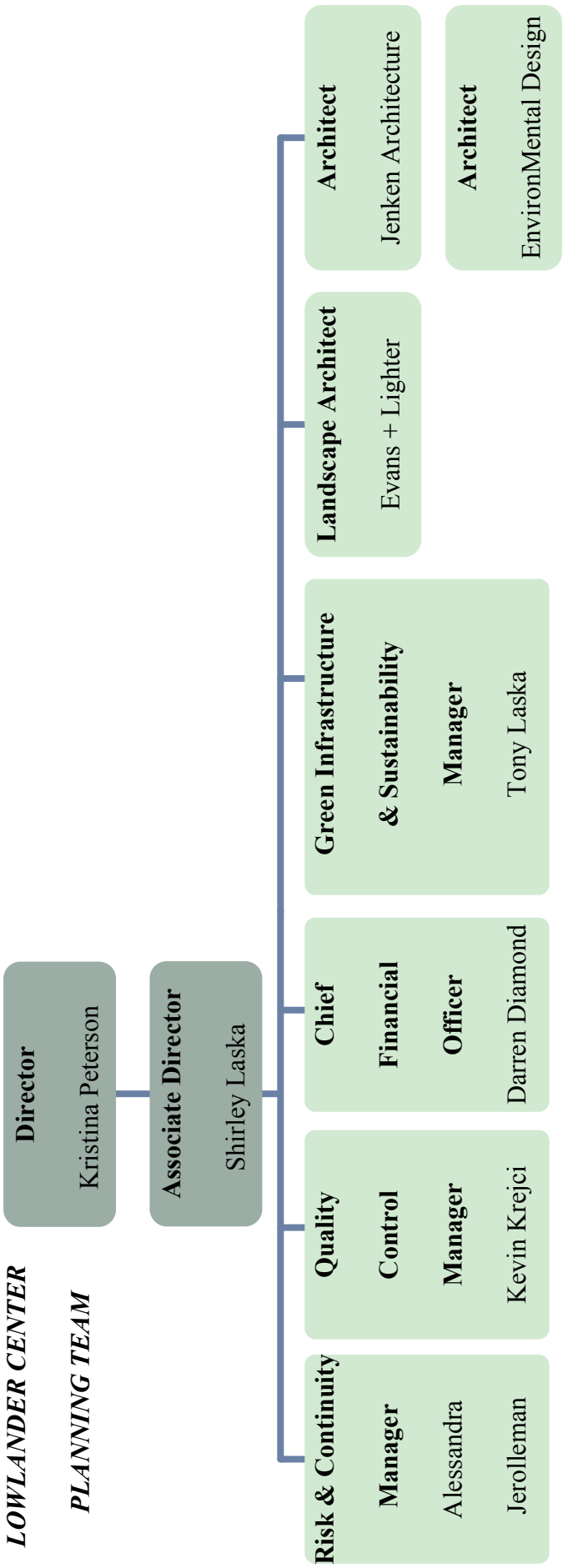
## LOUISIANA HOUSING CORPORATION



*NEW COLUMBIA RESIDENTIAL LLC*



*LOWLANDER CENTER  
PLANNING TEAM*





## Exhibit D: Factor 2 - Need/Extent of the Problem

ExhibitD\_Fac2\_NeedExtentProb\_LA.pdf

### State of Louisiana

Division of Administration  
Office of Community Development  
Disaster Recovery Unit





## **Exhibit D: Need**

**Threshold Summary.** In Exhibit B, the State of Louisiana proposed four target areas for NDRC funding consideration: all of St. John the Baptist and Plaquemines parishes and portions of coastal Terrebonne (Census Tracts 11, 12.02, 13, and 14) and Lafourche (Census Tracts 209, 210, 211, 212, 213) parishes. In St. John the Baptist Parish, unmet housing and permanent infrastructure needs have been demonstrated; unmet housing and environmental needs were demonstrated in Plaquemines Parish; unmet environmental needs have been demonstrated in coastal Terrebonne and Lafourche parishes.

**Unmet Recovery Need and Target Geography.** Broadly, the state's target areas for NDRC intervention are the entirety of its Coastal Zone. Louisiana is in the midst of a coastal land loss crisis that has claimed nearly 1,900 square miles of land since the 1930s. The primary causes of land loss are sediment starvation due to levees and dams, sea level rise, subsidence, saltwater intrusion, and hurricanes. When these causes are combined with the impacts of Hurricane Isaac (2012), and other significant coastal impacts including [hurricanes Katrina \(2005\), Rita \(2005\), Gustav \(2008\), Ike \(2008\), and Tropical Storm Lee \(2011\), and the Deepwater Horizon Oil Spill \(2010\) \(Fig2.pdf\)](#), environmental degradation of coastal wetlands in and around southeast Louisiana continues to deteriorate systems that shield vulnerable communities and wetlands. Given the importance of so many of south Louisiana's assets – waterways, wetlands, natural resources and unique culture – the effects of additional land loss and the increased risk of flooding will be catastrophic. Barrier islands, marshes, and swamps throughout the coast reduce incoming storm surge, helping reduce flood impacts. Without action, CPRA estimates damages from storm surge flooding will increase from an average of \$2.4 billion annually in 2010 to an average of approximately \$23.4 billion annually in 2060. In short, our eroding coastline has intensified the effects of past hurricanes, most recently Isaac, and will intensify the effects of future storms. In return, stronger storms, undeterred by a disappearing coast, [further accelerate the rate of land loss in our most vulnerable coastal areas \(Fig3.pdf\)](#). This cycle of land loss and storm intensification threatens Louisiana as a whole, and specifically the target areas defined in this application.

Louisiana's threats, vulnerabilities and unmet needs are part of a common ecosystem. Therefore, the proposals within this application address both the symptoms – as defined through documented unmet needs – and also the disease of our state's ever-changing and ever-more-vulnerable landscape. Coastal wetlands and barrier islands, such as those unmet needs described in Plaquemines Parish, Lafourche Parish and Terrebonne Parish, provide critical protection against hurricane storm surge, reducing inundation by as much as 40%. Since 1963, engineers have estimated that for each 2.7 miles of marsh, storm surge is reduced by 1 foot. However, more recent studies estimate that every 1.3 miles of marsh reduce storm surge by 1 foot. Models consistently show that restored barrier islands significantly reduce storm surge height and inundation extent. Restoring the barrier islands and marsh habitats that protect vulnerable communities ensures a higher level of protection from rising seas and future storms.

Further inland and more specific to the state's identified MID-URN areas, storm threats present a different set of challenges, as presented in Exhibit B through unmet housing and infrastructure needs in St. John the Baptist Parish. In this parish, unmet needs coalesce around a common theme: access. Specifically, the parish has a lack of a diverse, affordable housing stock, which is evident through widespread demand for existing CDBG-DR housing programs and also through large renter population outflows experienced immediately after Hurricane Isaac's landfall. In describing the parish's unmet infrastructure needs, access manifests itself in another way. The parish's utilities department was forced to shut off water service to Laplace to avoid system contamination due to its flood- and wind-damaged water well system located 10 miles away in Ruddock. Residents had no drinking water for four days because water towers were isolated to provide adequate fire protection to residents, and high water levels along U.S. Hwy. 51 prevented utility crews from reaching and repairing the wells. Additionally, the Belle Pointe and Woodland wastewater treatment plants and numerous lift stations were flooded and left without power, resulting in system backups and sanitary sewer overflows, which prevented residents from utilizing the wastewater system for many days following passage of the storm. In addition to crippling the system,

these overflows are a human health and environmental hazard, as raw sewage can enter homes, businesses, and local waterways during flooding events.

St. John the Baptist Parish serves as a key transportation linchpin where Interstates 10 and 55 meet. This intersection is a crucial access corridor both for daily commerce – according to the Louisiana Department of Transportation and Development in 2011, I-10 at Laplace had an average daily traffic count of 56,319 vehicles, while I-55 had an average daily traffic count of 15,950 – as well as to evacuate larger population centers and to move resources into affected areas following disaster events. Hurricane Isaac's high winds and 8.4-foot storm surge in Lake Pontchartrain and Lake Maurepas swamped all I-10 and I-55 exits with 6 feet of water, rendering them impassable. Exits 206 (Belle Terre) and 209 (U.S. Hwy. 51) were inundated and did not re-open for several days. U.S. Hwy. 641 leading to I-10 at Airline Hwy. was also closed, as was Airline Hwy. at the St. John/St. Charles parish line. With all major routes closed, the most important evacuation routes were effectively eliminated. Not only did this make it impossible for many residents to leave, floodwaters remained for several days, impeding rescue and recovery efforts.

Each of the state's four target areas – and the state's entire Coastal Zone – are at considerable risk for future storm events and other effects of land loss and subsidence. Per CPRA, St. John the Baptist Parish lost more than 4,300 acres from 1932 to 2010, with current anticipated flood depths from a 100-year storm expected to be as high as 13 feet (Hurricane Isaac flood depths were recorded at more than 7.7 feet). Looking forward 50 years, those anticipated 100-year maximum flood depths would rise to 18 feet, with anticipated annual damages increasing from \$5.6 billion currently to \$16 billion. In Plaquemines Parish, more than 275,000 acres were lost from 1932 to 2010, with current anticipated flood depths from a 100-year storm expected to be as high as 17 feet (Hurricane Isaac flood depths were recorded at more than 14.2 feet). Looking forward 50 years, those anticipated 100-year maximum flood depths would rise to 25 feet, with anticipated annual damages increasing from \$3.8 billion to \$15 billion. In Lafourche Parish, more than 138,800 acres were lost from 1932 to 2010, with current anticipated flood depths from a 100-year storm expected to be as high as 12 feet (Hurricane Isaac flood depths were recorded at more

than 4.9 feet). In 50 years, those anticipated 100-year maximum flood depths would rise to 30 feet, with anticipated annual damages increasing from \$7.5 billion currently to \$9.5 billion. Finally, in Terrebonne Parish, more than 192,700 acres were lost from 1932 to 2010, with current anticipated flood depths from a 100-year storm expected to be as high as 15 feet (flood depths from Hurricane Isaac were recorded at over 2 feet). In 50 years, those anticipated 100-year maximum flood depths would rise to 34 feet, with anticipated annual damages increasing from \$7.0 billion currently to \$10.8 billion.

Louisiana's barrier islands and coastal wetlands are especially vulnerable. Extreme meteorological events, like hurricanes, have caused more than half of all area changes on barrier islands in the Northern Gulf of Mexico from 1972 to 2014, and their impacts on coastal environments have only grown as hurricanes have become more intense. A succession of storms since 2005 caused more than \$100 billion in damages across the Louisiana coast and resulted in unprecedented land loss.

The 2007 Intergovernmental Panel Report on Climate Change (IPCC) shows the global sea-level rise rate to be 1.7 to 1.8 millimeters per year for the past century globally. But local NOAA measurements show relative sea level is rising almost 10 millimeters per year in Louisiana partially because the land is also subsiding. These impacts present a chicken-and-egg quandary for Louisiana. Relative sea level rise is increased by land loss and subsidence. These effects reduce Louisiana's ability to naturally reduce storm surge and other related threats, even removing natural barriers with capacity to cut storm intensity prior to and upon landfall. In return, higher intensity storms cause further coastal degradation, perpetuating the damaging cycle.

**Resilience Needs Within Recovery Needs.** The CMP illustrates the enormity of the task the state faces to build resilience throughout its Coastal Zone. Per 2012 CMP, "if we do nothing more than we have done to date, our expected annual damages from flooding by 2061 would be almost ten times greater than they are today, from a coast-wide total of approximately \$2.4 billion to a coast wide total of \$23.4 billion." More importantly, Louisiana's Coastal Zone is home to more than two million people. Many of these residents have called the Coastal Zone home for multiple generations, cultivating a unique way of life and

a unique bond with the land itself. Per CPRA, “should land loss continue unabated, the nation would face costs of approximately \$40 billion just to handle the retreat of communities inland.”

The CMP takes a look 50 years into south Louisiana’s future and builds world class science and engineering expertise into its strategy to define what is realistically achievable. Our world class, scientifically-driven ability to project future risk – both with and without future action from the Master Plan – presents Louisiana a unique opportunity to plan for future conditions under many environmental scenarios, some more optimistic and some less optimistic. But, regardless of scenario, two facts are indisputable: First, full implementation of the 2012 CMP would lead to a drastic reduction – but not elimination – of projected future risk. Second, while the Coastal Master Plan relies on proven scientific methodology to curb, and in some cases reverse, environmental degradation – namely land loss, it can do so neither instantaneously nor completely. Funding this plan to completion is expected to take over \$50 billion and the projects proposed will not be completed for many decades. Under an ideal scenario, in which CMP projects are adopted and implemented in its entirety, [Louisiana can hope to experience a no net land loss condition sometime between 2032 and 2041 \(Fig1.pdf\)](#), after which it may experience net gains in land creation. In this context, Louisiana’s resilience gap lies in how it approaches and addresses its community development patterns within and beyond its Coastal Zone, anticipating future increasing vulnerability through at least 2032 and slow, gradual declining vulnerability – as a best case scenario – thereafter. The LA SAFE Framework and the Fund proposed in this application is designed as a first step toward filling the resilience gap. While we cannot eliminate the threat of flooding and other effects from tropical events, we can mitigate these effects – and costs – through a general rethinking of how we build a community development footprint within the Coastal Zone.

If we accept \$50 billion as a floor to estimate the total investment needed to adequately build structural resilience through the Coastal Master Plan, we can begin to drill down on the monetary effect full implementation of the LA SAFE Framework may have had in the state’s qualifying disaster, Hurricane Isaac. In its [Action Plan for the Utilization of CDBG Funds in Response to Hurricane Isaac](#), the state

reported 55,537 instances of residential real property damage estimated to cost \$1,353,815,772, for an average of \$24,377 per household. 5,522 of these units in St. John the Baptist Parish were damaged by floodwaters specifically, and these damages can be estimated at \$134,609,794 ( $5,522 \times \$24,377$ ). Of this universe of damages, more than half (3,152) occurred to units located within the floodplain at a total estimated cost of \$76,836,304 ( $3,152 \times \$24,377$ ).

This application proposes the Reshape typology in St. John the Baptist, as it is home to an abundance of underutilized high-ground territory along the Mississippi River. However, as the parish has developed over a period of time, its community development footprint has sprawled from the river's high-ground edge northward to I-10, and into the floodplain. If the proposals articulated in this application are successful to incentivize a reversal of this sprawl condition – or to “move the centroid” back toward the riverbank – we can reasonably envision a future scenario in which development within the floodplain is minimized. Had this been the case during Hurricane Isaac, it is realistic to believe a significant portion of the \$76,836,304 in damages within the floodplain could have been avoided.

Alternatively, 915 units were damaged by floodwaters in the three targets areas – Plaquemines Parish and portions of Terrebonne and Lafourche parishes – where LA SAFE's Retrofit typology is proposed. These damages are estimated to have cost \$22,304,955 ( $915 \times \$24,377$ ). Had just the Coastal Nonstructural Mitigation program been implemented within this zone prior to Isaac, an additional 1,190 units would have been elevated to BFE+2', potentially cutting losses in these communities to a fraction, if not eliminating them completely.

As our state has experienced in past events, our most vulnerable populations are most at risk from disaster impacts. Ergo, they are less resilient than their counterparts by definition. After Hurricane Isaac, for example, of 55,510 owner-occupied households with demonstrated damages, 25,068 (45%) had no hazard insurance and 35,491 (64%) had no flood insurance. Of the affected LMI population, which itself constituted 39,345 (71%) of all households with damage – a majority, 21,442 (54%) had no hazard insurance, 28,889 (73%) had no flood insurance and 19,952 (51%) had neither hazard nor flood insurance.

Statewide, Hurricane Isaac illustrated how the affected area's risks and vulnerabilities disproportionately affect LMI households. Approximately 70% of the Isaac-affected owner-occupied population was classified LMI. Concurrently, 55% of total recorded housing damages were attributed to LMI households. Among FEMA Individual Assistance (IA) applicants identified as renters, 86% were classified as LMI. Of the 1,070 rental households with "Major" or "Destroyed" damage levels, 83% were classified as LMI.

In St. John the Baptist Parish, specifically, high concentrations of LMI owner-occupied households reported damage across the parish, with more than 55% of FEMA IA owner applicants identified as LMI. Of this total, 855 flooded LMI households reported having no flood insurance coverage and 706 LMI wind-damaged households reported having no hazard insurance coverage. Similar impacts were documented in Plaquemines Parish. In total, LMI households accounted for more than 61% of all owner-occupied households with damage and approximately 48% of the value of all owner-occupied damages. Of this total, 164 flooded LMI households reported having no flood insurance coverage and 752 LMI wind-damaged households reported having no hazard coverage.

LMI populations have suffered disproportionate impacts from the numerous storm events of the past decade, and they are further perpetuated by high concentrations of LMI populations living in areas most vulnerable to ongoing environmental degradation impacts. Conditions described in Plaquemines Parish serve as a representative model for many of Louisiana's vulnerable areas. Belle Chasse is the parish's largest population center, with more than half of the parish's total population residing there. This is an important factor to note in discussion of the parish, as Belle Chasse is located within the federal levee protection system. While Plaquemines' total population declined from 26,757 to 23,042 between the 2000 and 2010 Census counts, Belle Chasse's population grew from 9,848 to 12,679 within the same period. In short, Plaquemines' population has retreated north, where it may be better-suited to withstand major weather events. Because of that shift, Belle Chasse's demographic profile undoubtedly skews parish-wide statistics. Belle Chasse's median household income of more than \$66,700 significantly exceeds the median household income of the parish. To illustrate the contrast between Belle Chasse and the rest of the parish,

Port Sulphur, Plaquemines' next most populated CDP, has a median household income of just more than \$27,400. Furthermore, between the 2000 Census and 2010 Census, Plaquemines Parish experienced a substantial increase in median household income, from more than \$38,100 to more than \$54,700. This would indicate higher income households have concentrated behind levee protection, leaving behind populations with less capacity to respond to future events and fewer options to relocate to less vulnerable areas.

Sociodemographic factors further articulate this vulnerability. [A report completed in 2014 for the LHC](#) by Louisiana State University's Public Administration Institute *Project for Community Engagement* outlined median household (or family) income, poverty rate, the percent of the elderly who are also low income, disability rate, rental affordability, and homeowner affordability across the state. In St. John the Baptist Parish, located within the New Orleans-Metairie-Kenner Metropolitan Statistical Area (MSA), the area median family income (AMFI) for the entire parish according to the 2013 American Community Survey (ACS) was approximately \$56,540. Census Tracts 708 (Reserve), 709 (Laplace), and 710 (Laplace) have an AMFI of \$36,500, \$36,875, and \$42,387 in order. This is only 60.83%, 61.46% and 71.54% of the MSA (\$60,000) respectively. The population living in poverty in St. John the Baptist Parish according to the 2012 ACS was approximately 15.8%. Within the Census Tracts of 707 (Garyville/Reserve), 710, and 711 (West Bank) the percent of people in poverty increases to as high as 24% and in Census Tracts 706 (Garyville) and 709 as high as 34%, that is 10 and 20 percentage points higher than the United States (LSU 2014). According to the 2006-2010 HUD CHAS data, in St. John Parish 57.9% of the elderly population are also classified as low income. This is nearly five percentage points higher than the national average of 53.0%. In Census Tracts 702 (Laplace), 705 (Laplace/Reserve), and 707 the percentage of people 62 and older who are also low income rises to as high as 49%. The conditions in Census Tracts 710 and 711 are even worse where the percent of the elderly who are also low income is 75% or greater. In St. John Parish the disability rate is 14.6%, 2.5% higher than the national average of 12.1%. To go along with the 14.6% of the total population who are considered disabled, 44.5%



of the elderly population in St. John are disabled. In St. John the Baptist Parish, the disability rate gets as high as 21.8% in Census Tract 707 and as high as 57.0% of the total elderly population who are disabled in Census Tract 711. The percentage of the population in St. John the Baptist Parish considered rent distressed, meaning they spend 35% or more of their income on rent, is 46.6%, per ACS data. This is 3.3% higher than that of the country (43.0%) and 2% higher than the state (44.6%). In four Census Tracts in St. John the Baptist, Census Tracts 702, 704 (Laplace), 706 and 701, the percent of the population considered rent distressed is 50% or greater. Within St. John the Baptist, the percentage of the population with a problem of unaffordability in homeownership, which is defined by those who spend 35% or more of their income on their home mortgage payments, is 19.2%. This value is nearly 3% higher than the state average which is 16.4%. In Census Tracts 702 and 709 this percentage increases to a rate between 25% and 34% of homeowners.

In Plaquemines Parish, AMFI is relatively high at \$66,800 or \$2,081 more than the country and \$10,512 more than the state. However, in Census Tract 508 (Buras-Triumph), the AMFI is \$42,857 which is significantly lower than both the state and the country at \$56,288 and \$64,719 respectively. The condition of Census Tract 505 (Port Sulphur) is even more ominous. According to the 2013 ACS, this census tract has an AMFI of \$27,148 or only 45.25% of the New Orleans-Metairie-Kenner MSA. The parish of Plaquemines has a relatively low poverty rate of only 11.0%; nevertheless, in Census Tracts 505 and 507 (Buras-Triumph) the percentage of people in poverty jumps up to as high as 24%. In Census Tract 508 the percentage of people in poverty can be as high as 44%. In Plaquemines Parish, 59.8% of the elderly population in the parish are also classified as low income. This is 6.8 percentage points higher than the national average of 53.0%. Per 2006-2010 HUD CHAS data, every census tract – with the exception of Census Tracts 503 (Belle Chasse), 505, and 508 – the percentage of people 62 and older who are also low income is as high as 74%. The conditions in Census Tracts 505 and 508 are more dire, with the percent of the elderly who are also low income at 75% or greater. In Census Tract 507 (Buras-Triumph), the disability rate is 17% -- higher than both the national and state averages. To couple the total disability rate

of 17% in Census Tract 507, the disability of those 65 and older in Census Tract 508 is 57.5% which is 22.5 percentage points higher than the parish average for the disabled elderly at 35.0%. In Census Tracts 501 (East Bank), 506 (Empire), and 508 of Plaquemines Parish, 65% or greater are rent distressed. With the exception of Census Tracts 503 and 505, the percent of homeowners in the parish facing an unaffordability crisis is between 15% and 24%. In Census Tract 505, the percent of homeowners with unaffordable mortgage payments is 35% or more of homeowners.

In Lafourche Parish, Census Tract 209 has an AMFI of \$42,384 which is 72.20% of the Houma-Bayou Cane-Thibodaux MSA. Census Tract 212 is a bit different. Census Tract 212 has an AMFI of \$50,063 or 85.39% of the MSA which does not fall into the HUD LMI income limits; however, when looking deeper within the census tract, Block Group 1 happens to have an AMFI of \$46,875, a value below the LMI of \$46,950 set for the MSA. The poverty rate of Lafourche Parish as a whole is 14.5%; however, the poverty rates of Census Tracts 209 and 212, both of which are qualifying Census Tracts, are between 25% and 34% and 15% and 24% respectively. With the exception of Census Tract 209, all of the qualifying Census Tracts in Lafourche Parish have a significant percentage of the elderly population who are also classified as low income. In Census Tract 211 (Galliano to Port Fourchon East of Bayou Lafourche), the percentage of people 62 and older who are also low income is between 50% and 74%. In the other three Census Tracts, 210 (Des Allemands/Lockport/Larose), 212, and 213 (Golden Meadow), the percentage of elderly people who are low income is 75% or greater. The parish's disability rate is 16.3%, which is moderately higher than both the state (15.0%) and the country (12.1%) at 1.3 and 4.2 percentage points respectively. Four of the qualifying census tracts within Lafourche Parish have significantly high disability rates compared to the national average. Census Tract 209, 211, 212, and 213 have disability rates of 21.5%, 20.2%, 17.6% and 21.4% in order. These are all between 5.5 and 9.4 percent higher than the national average of 12.1%. Of the total renters residing within Census Tract 209 as much as 49% of these renters are rent distressed. In Census Tract 212, the percentage of those who are rent distressed is as high as 64%

(ACS 2012). Census Tracts 209 and 212 have 15% to 24% of the homeowners residing in a property that they are unable to afford (LSU 2014).

Within the qualifying Census Tracts of Terrebonne Parish (11, 12.02, 13 and 14), Census Tract 12.02 (Cocodrie) has an AMFI of \$45,821 which falls below the LMI income limit of \$46,950 for the Houma-Bayou Cane-Thibodaux MSA. Census Tracts 13 (Dulac) and 14 (parts of southern Houma) have an AMFI of \$48,890 and \$48,906 respectively – both of which are greater than the aforementioned LMI value – but when accounting for the individual block groups a new illustration comes to fruition. Although the AMFI of Census Tract 13 is \$48,890, Block Groups 3 and 4 within Census Tract 13 have an AMFI of \$42,083 and \$42,108 respectively. As for Census Tract 14, Block Groups 1 and 2 have AMFIs of \$24,871 and \$44,271 respectively which are both below the LMI limit of \$46,950. The data for Census Tract 14 (Theriot/Dularge) is noticeably skewed because of the Block Group 3 AMFI value of \$78,348 which is three times larger than Block Group 1 and close to two times greater than Block Group 2. The parish's poverty rate is 16.8%; however, the poverty rates of Census Tracts 13 and 14, both of which are qualifying Census Tracts, are between 25% and 34%. Additionally, Census Tract 12.02 has a poverty rate between 15% and 24%. Each of the qualifying four Census Tracts in Terrebonne Parish have a significant percentage of the elderly population who are classified as low income. In Census Tracts 12.02 and 13, the percentage of people 62 and older who are also low income is between 50% and 74%. In the other two Census Tracts, 11 and 14, the percentage of elderly people who are also low income is 75% or greater. Terrebonne's disability rate is 15.5%, which is moderately higher than both the state and the country. Within Census Tracts 11, 12.02, 13 and 14, the disability rate is 21.3%, 16.9%, 17.3%, and 15.6% in order. Census Tract 11 (Isle de Jean Charles) has a disabled elderly population of 60.6%. Of the total renters residing within Census Tract 13, between 40% and 49% of these renters are rent distressed. In Census Tract 12.02, the percentage of those who are rent distressed is even higher at between 50% and 64%. The most rent distressed Census Tract in Terrebonne Parish is Census Tract 14 with 65% or more of the renters residing there being rent distressed.

The population of St. John the Baptist Parish in 2010 was 45,924. Population projections for the parish three years and eight years into the future are as follows: 48,421 in 2013 and 50,182 in 2018. If the projections are correct, this would be an increase of 2,497 from 2010-2013 and 1,761 from 2013 to 2018 and a net increase of 4,258 from 2010-2018. Unfortunately, according to the U.S. Census Bureau, the population of St. John has decreased since 2010. The population of St. John in 2013 dropped to 43,761; this only 95.29% of the 2010 population and 90.38% of the 2013 projection.

In accordance with the 2014 LSU Housing Need Assessment which used 2012 ACS data, the top 5 industries in St. John in order are as follows: Health care etc. (19.0%), Manufacturing (13.8%), Retail (13.2%), Construction (11.2%), and Arts etc. (9.9%). The parish compiled an analysis for future employment growth in the parish. The following are some of the findings from this analysis, “the projection for the following 5 years (2012 – 2017) indicate continuing employment increases among the leading growth industries: - Retail industries – 700 jobs - Accommodation and food services – 500 jobs - Transportation and warehousing – 450 jobs - Construction industries – 400 jobs - Health care and social assistance – 400 jobs - Manufacturing industries – 350 jobs - Other service industries – 250 jobs.”

According to the U.S. Census Bureau, the population of Plaquemines Parish was 23,123 in 2010. The parish of Plaquemines projects population in five-year increments, from 2015 to 2030, using high, medium, and low projections. The medium population projections for the parish indicate a gradual increase to 24,090 (2015), 25,770 (2020), 27,460 (2025), and 29,130 (2030). Assuming trends go as projected, this is a net increase of 6,007 people or 25.95%.

Per the LSU Housing Need Assessment, the top 5 industries in Plaquemines in order are as follows: Health care etc. (14.9%), Public admin. (12.5%), Retail (12.0%), Manufacturing (11.2%), and Professional etc. (8.5%). Projections anticipate growth in three of Plaquemines’ strongest industries: a 10.5 percent growth in Mining, an 8.2 percent growth for manufacturing, and 9.9 percent growth in transportation and warehousing. These projections also indicate a 10.5 percent drop in agriculture, fishing, forestry, and hunting, suggesting that this sector of the economy was experiencing reverse growth even

prior to the Deepwater Horizon Oil Spill. Greater growth is anticipated in service sectors, including Health Care and Social Assistance (47.3 percent growth), Accommodation and Food Services (41.6 percent growth), and Arts, Entertainment and Recreation (39.8 percent growth). The educational services sector is also anticipated to see notable growth at 32.9 percent increase from 2006 levels.

In accordance with the Lafourche Parish Comprehensive Plan, the projection in Lafourche was 96,318 in 2010. The parish anticipates an increase in population over the next twenty years. The Lafourche Parish growth rate projection is as follows: 98,750 in 2015, 101,244 in 2020, 103,800 in 2025, and 106,421 in 2030. If projections are accurate, then the parish will have a net increase of 10,103 from 2010-2030. According to the Housing Need Assessment, the top 5 industries in Lafourche Parish as a whole, in order, are as follows: Health care etc. (20.6%), Retail (11.8%), Manufacturing (11.0%), Construction (10.8%) and Agriculture (7.9%) (ACS 2011). Employment and Workforce Trends Employment is strong in Lafourche with a five year, 13% job growth totaling 7,000 new jobs in the period from 2005 to 2010 concentrated in sectors where the Parish has a regional advantage including transportation and warehousing, forestry and fishing, and management. Almost 40% of these jobs (2,681) were in transportation and warehousing alone. Most industries had net job growth and the top five growth industries added a total of 4,510 jobs.

The population in Terrebonne Parish in 2010 was 111,860. The growth rate projection from 2010-2030 for the parish of Terrebonne is as follows: 117,453 in 2020 and 123,326 in 2030.

**Appropriate Approaches.** In Phase 1, the state described its approach as one enhancing its adaptive capacity, reflecting its rapidly changing landscape, in such a way that its large knowledge base can be captured and utilized to create solutions tailored to specific at-risk communities. We referred to this framework as the ‘Louisiana Resilience Framework,’ or LRF. Cognizant that its challenges are far more robust than can be addressed through the NDRC, the LRF and this approach was intended to yield model projects and programs that are scalable and transferrable, reflective of the various scales, typologies, and levels of risk faced by communities not only along Louisiana’s coastline, but throughout

the state. As presented in Phase 2, [LA SAFE](#) is the logical evolution of this approach and conceptual framework.

In the wake of the five major hurricanes and the oil spill that have impacted Southeast Louisiana over the past decade, numerous state, local, and federal initiatives have sought to reduce the impacts of future disasters. The CMP addresses the mission critical issue of coastal land loss. While implementing the complete plan would be an optimal choice for resilience across coastal Louisiana, many of the activities within the plan are not feasible to complete within traditional CDBG-NDR guidelines – particularly large-scale structural risk reduction projects (e.g. barrier island restoration, sediment diversions, and floodgates).

Levee protection, a key component of the CMP and an intervention identified in each of the public workshops completed in the target areas, has been a mainstay of building safe communities in Louisiana for over a hundred years. As wetlands erode and open water draws closer to formerly inland communities, levees offer communities critical protection against the impacts of hurricanes. Many levee systems in Louisiana are designed and built by the U.S. Army Corps of Engineers and monitored and maintained by regional levee authorities. In Plaquemines and St. John the Baptist parishes, such large-scale, comprehensive storm risk reduction systems would be an optimal choice; however, the long-term maintenance requirements associated with levees cause them to be a poor fit for CDBG-NDR funding.

Finally, improving transportation options was another activity identified through the public engagement process as a need – both to restore ferry service that existed in St. John the Baptist Parish prior to the qualified disaster (Hurricane Isaac) but also to improve the public transportation system and bicycle and pedestrian infrastructure that exist in the region. Operating expenses for public transportation are not an eligible activity, though improved public transportation would increase the resilience in the targeted area by improving connections to essential services, retail, and job opportunities. St. John seeks to address these long term issues of designing and funding a long-term public transportation system through the planning study proposed in this application.

Our consultations with the public, within the context of CDBG-NDR eligibility, allowed the state to fundamentally change the nature of the two-way conversation it ultimately engaged in. The types of large-scale structural risk reduction projects that are specifically ineligible are often thought of as a panacea. Priming our state's consultation efforts by removing those ineligible activities from the conversation allowed a different, more difficult, and more nuanced conversation to take place. This conversation centers around what we believe is our state's resilience gap – the adjustment of our development patterns in the midst of large-scale structural risk reduction projects championed by USACE and CPRA.

LA SAFE fills this resilience gap in that it articulates a development strategy combining the world class science behind the CMP with the community-building planning and policy techniques the state has honed over its decade-long, post-Katrina recovery effort. While the CMP focuses on techniques to reverse negative environmental trends, remaining mindful of the cultural and social uniqueness of our communities and our way of life, LA SAFE complements the CMP by taking a people-driven approach to maintain that uniqueness and way of life, remaining mindful of the future risk projections at the state's disposal.

LA SAFE is built upon a few basic ideals. [First, the state's land mass is physically shrinking \(Fig3.pdf\)](#). Per the U.S. Geological Survey, Louisiana currently loses more than 16 square miles of land per year due to coastal erosion. If this trend can be reversed by 2041 and the state can begin to experience a net gain in land thereafter – a best-case scenario – Louisiana will not return to a current condition of land area for many decades into the future. Thus, an interim plan is needed for protecting our people and our economic assets as they remain vulnerable and are becoming more vulnerable each day. In response, the state – and many of its constituent local communities – has implemented a bevy of risk-reduction projects, from levee systems to stormwater capacity initiatives to green infrastructure implementations. These are both effective and crucial efforts, and as technology in these fields advances over time, we have every expectation they will become more effective – and more cost effective. Still, the reality is there is

no everlasting flow of financial resources. Not every inch of Louisiana's land can be preserved, nor can every economic asset and community be protected. In short, our Coastal Zone will always be vulnerable, and in some locations, this risk will be considerable, if not overwhelming.

Therefore, LA SAFE is a response to the reality that our state must contemplate a scenario in which we take a three-pronged approach to the future of our coastal parishes: Depart from our most vulnerable geographies, fortify economic assets and maintain a community development footprint to service those assets, and finally, maximize underdeveloped areas – in which minimal risk is projected – as a catalyst for thoughtful, high-quality community development in our high-ground territories.

Exhibit E further articulates the typologies of this program and focuses on the ideals and the methodologies LA SAFE employs to plan for and implement safer, stronger and smarter development strategies in resettlement, retrofit and reshaping zones. However, above all else, LA SAFE is a flexible, fluid policy and one driven by and responsive to the communities within each identified zone, as well as changes to projections of risk. In this sense, while it does draw zonal lines identifying geographies relative to their projected future risk, the program also acknowledges this is just a projection. Projections change over time, as do techniques and technologies to mitigate risk. As best available information changes, LA SAFE is designed to adapt. Therefore, it is imperative to note this strategy does not suggest every community located in a resettlement zone must move, nor does it suggest each community in a retrofit zone must take drastic fortifying action or each reshaping zone grow in population or economic activity. In some cases and communities, these typologies will not be a fit. However, LA SAFE does suggest our state must be proactive in developing effective strategies to resettle, retrofit and reshape when and where it is prudent to do so. Moreover, it acknowledges Louisiana's unique opportunity to position itself as a laboratory and a leader in risk-oriented community development that can be replicated and transferred throughout the world.





## Exhibit E - Factor 3 - Soundness of Approach

ExhibitE\_Fac3\_SoundessAppr\_LA.pdf

### State of Louisiana

Division of Administration  
Office of Community Development  
Disaster Recovery Unit



## **Exhibit E: Soundness of Approach**

**Sound Approach Description.** The [LA SAFE Framework](#) focuses on three typologies – Reshaping, Retrofitting, and Resettlement – utilizing a forward-thinking, risk-based approach to guide our state’s land use and development patterns throughout its Coastal Zone. Areas projected to experience in excess of 14 feet of flood inundation in a 100-year storm event 50 years from now are resettlement zones. Areas projected to experience between 3 feet and 14 feet of flood inundation in a 100-year storm event 50 years from now are retrofit zones. Areas projected to experience less than 3 feet of flood inundation in a 100-year storm event 50 years from now are reshaping zones. These three zones embody the reshape/retrofit/resettle concepts LA SAFE promotes. We know we cannot protect the entirety of the coastal zone, but we must preserve – and when possible expand – economic and community development opportunities in moderately vulnerable areas, while incentivizing population and economic growth in those areas minimally at risk.

### *LA SAFE Fund.*

In order to achieve the outcomes articulated by the LA SAFE Framework, the State of Louisiana is creating the LA SAFE Fund (the Fund) – designed to provide gap funding for critical resilience-building projects across Louisiana. Resources provided through the Fund are intended to fill a potential void between capital outlay, conventional financing, grants and other non-traditional funding sources and the cost to implement resilience activities. The Fund will provide gap financing for planning, design, and construction or rehabilitation projects, located in designated Reshape, Retrofit, and Resettlement zones, and based on priority program areas set through the LA SAFE Framework. As such, the Fund will focus on six program areas: Resilient Housing, Resilient Transportation, Resilient Energy, Economic Development, Mitigation, and Planning/Education.

The LA SAFE Fund may initially be capitalized with CDBG-NDR funding along with the sources of leverage articulated in this application. The State of Louisiana will remain compliant with all CDBG-NDR requirements until all allocated funds and associated program income are expended on eligible

activities. As the Fund matures, it may seek additional capital from financial institutions, philanthropic organizations, private equity, and other external sources. Through the NDRC application process we have had the opportunity to forge new connections with private, nonprofit and philanthropic funders, and we believe there is a clear opportunity to capitalize on those new relationships into the future as Louisiana addresses its resilience gap, irrespective of the outcome of this competition.

Fund investments will be available to local governments, political subdivisions of the state, and nonprofit organizations. Public-private partnerships will be eligible so long as the public entity is the lead applicant. Any project for which an applicant is requesting funding through the Fund must meet certain established criteria based on location, program area, and project.

#### A. Location Criteria

In order to be eligible for funding, projects must be located in a Reshape, Retrofit, or Resettlement Zone, as designated by the Louisiana Office of Community Development.

#### B. Program Area Criteria

All eligible projects must fall within at least one current priority program area of the Fund. Each program area is allocated a certain amount of money within the Fund, and each has its own criteria for eligible projects that must be considered along with location and project criteria. Below are the current priority program areas and their criteria.

##### a. Resilient Housing –

- i. Real estate development or rehabilitation that provides a minimum of 25 affordable housing units. An “affordable unit” is defined as a residential unit for which the annual gross housing costs do not exceed 30 percent of household income for those households that earn 80 percent of Area Median Income (AMI).
- ii. Preference will be given to housing projects located near critical economic assets, employment centers, schools and transit routes.

iii. Projects will not be located in Resettlement Zones.

b. Resilient Transportation –

- i. Eligible transportation projects must both solve a current adverse condition and also increase capacity for future populations, or directly promote economic growth along a high-ground corridor.
- ii. Eligible projects must consider multiple modes of transportation.
- iii. All transportation projects be accessible by, and provide benefit to, a wide range of users.
- iv. Transportation projects may be located in Reshaping or Retrofit Zones.

c. Resilient Energy –

- i. Eligible technologies will include renewable electric and thermal generation; high-efficiency CHP (65 percent efficient) and fuel cells (50 percent efficient); energy storage (electric or thermal); energy management systems (controls, switches, software); islanding technology; and microgrids. Conventional technologies, such as diesel generators not combined with other systems, will not be eligible.
- ii. Projects will be required to be able to operate in island mode continuously for at least 3 days, with longer duration projects receiving higher scores.
- iii. Energy projects may be located in Reshaping or Retrofit Zones.

d. Economic Development –

- i. Eligible projects must create job opportunities for low-to-moderate income individuals.
- ii. Projects must incentivize economic and population growth in areas either behind 100-year flood protection systems or outside of the floodplain.

- iii. Economic development projects must create value for the communities in which they are located.
- iv. Projects may not be located in a Resettlement Zone.
- e. Mitigation –
  - i. Eligible mitigation projects must:
    - 1. Identify cost effective actions for storm risk reduction that are agreed upon by stakeholders and the public.
    - 2. Focus resources on the greatest risks and vulnerabilities.
    - 3. Build partnerships by involving people, organizations, and businesses.
    - 4. Increase education and awareness of hazards and risk.
    - 5. Align risk reduction with other community objectives.
  - ii. Structural mitigations created through the Fund should be limited in scale and provide a demonstrable, quantifiable benefit for an industry or community.
  - iii. Interventions should focus on the use of land use planning, building code adaptations and education efforts to plan for current and future risk.
  - iv. Strategies should utilize green infrastructure and innovative, community-level techniques to incrementally reduce risk, or at least maintain a current risk profile.
  - v. Retrofitting may consider the needs of particular industries to preserve their ability to operate in emergent, recovery and normal conditions.
  - vi. Interventions should focus on strategic, targeted nonstructural mitigations supporting vital economic interests. Such interventions may include limited development of workforce housing and elevations of existing property supporting a nearby economic asset.

vii. Eligible projects may be located in Reshaping, Retrofit or Resettlement Zones.

f. Planning/Education –

i. Projects may cross multiple fields building resilience, and will be judged on a case-by-case basis. These may include general education initiatives, projects designed to create quantifiable benefits – like those intended to improve Community Rating System (CRS) scores, or it may target vulnerable populations including those with mental health or addiction issues.

ii. Eligible projects may be located in Reshaping, Retrofit or Resettlement Zones.

C. Eligible Project Criteria

All projects, regardless of program area, must meet the following criteria in order to be considered by The Fund:

- a. Planning and construction projects are eligible for funding. Construction projects may include design and engineering costs.
- b. All projects must be located in a designated Reshaping, Retrofit, or Resettlement Zone.
- c. Where applicable, all projects must comply with existing local, regional, and statewide plans.
- d. Projects must exhibit a demonstrable gap in funding.
- e. All projects must demonstrably build resilience for a specific community (or communities).

The program will offer variable levels of support, based in part on the ability of the host community to pay. Investments will be calculated using a formula that includes the population and per capita income of the municipality, with the result that low-income communities receive additional support.

In order to be an effective instrument in making Louisiana more resilient, while ensuring sustainability, The Fund will exercise as much flexibility as possible when making investments in resiliency projects. Therefore, The Fund may employ a variety of investment “products”, including:

- Grants;
- Loans – interest rates to be individually determined based on investment necessary from the Fund;  
or
- Equity Investments.

Projects financed through the Fund must begin work, in earnest, within three months from closing, and work must be completed within 24 months from closing. A project is deemed complete upon final review and/or inspection by OCD-DRU and, when applicable, the submission of proof by the recipient that all appropriate code and permit approvals have been secured, including Certificates of Occupancy. Extensions may be evaluated on a case-by-case basis.

The Fund will offer technical assistance (TA) support to help applicants define their needs and design project proposals. This will allow applicants who do not have in-house expertise, and who cannot afford up-front engineering expertise, a fair chance to craft a successful project proposal. The state will hire consultants to form a technical assistance team and will encourage municipalities to apply for a technical assistance grant in the first round of the solicitation. Those who are awarded TA assistance will be eligible to apply for project implementation funds once the TA is complete. This will help both to encourage proposals from applicants that might not otherwise have participated and to secure higher quality proposals.

LA SAFE, and the general reorganization of the Coastal Zone's development footprint it is designed to incentivize, cannot achieve success without an extensive two-way conversation with communities that embody each of the three typologies. In Phase 1, we reported the state's collaborative partnership had conducted approximately 40 separate acts of consultation and citizen participation. In addition, we reported numerous consultation and citizen participation efforts with disaster affected UGLGs, native tribes, regional organizations, and other stakeholders involved with this application.

In Phase 2, we took a different approach, hosting local workshops in each of the four target areas to kick off the 120-day application period. We used this information to develop the following slate of

proposed projects created through the LA SAFE Fund, before returning to each of those target areas to gather additional information and discuss the contents of this proposal. In total, the state and its partners have conducted more than 140 individual acts of consultation and citizen participation across both Phase 1 and 2. These efforts are further outlined in Attachment D.

It is important we highlight a few points from our consultation process. While we do not have a quantifiable way to verify this, we believe this marked the first occasion state officials engaged populations in Terrebonne, Lafourche and Plaquemines parish and discussed the prospect of large-scale population movements away from the most vulnerable areas of the Coastal Zone, while simultaneously articulating the need to strategically identify those areas of vital cultural and economic importance to fortify. Moreover, we will take the opportunity to repeat here what we said in those community workshop and engagement outings: Regardless of the NDRC's outcome, this has to be the beginning of a much longer and more comprehensive exchange of information and ideas if we are to realistically mitigate the risks and vulnerabilities we face now and into the future.

Louisiana proposes to launch the LA SAFE Fund through an initial \$767,000,614 investment, of which \$433,101,143 would be sourced through CDBG-NDR. [An initial proposed slate of 10 Fund projects \(Fig4.pdf\)](#) across Resettlement, Retrofitting and Reshaping typologies is further discussed below, but the state also requests an initial \$40 million in unprogrammed dollars to capitalize the Fund and invest in future projects based on the program parameters outlined above. The state feels the importance of this request is not limited to the potential projects it may invest in, but rather how it may utilize these dollars to leverage the different financial mechanisms and relationships that could not be finalized in the 120-day Phase 2 application period. We believe these relationships would prove valuable with an initial investment to the Fund. In short, our goal is to create a self-sufficient revenue stream that, in the long-term, can realistically begin to address the sizeable resilience gap we face. Finally, we propose that if HUD chooses to invest in the Fund with unprogrammed dollars, the state would solicit and accept project proposals not only from the four target areas it has proposed in its application, but also from the other three in-state



applicants – Orleans, Jefferson and St. Tammany parishes – so long as their applications have met NDRC threshold requirements and would otherwise be eligible for CDBG-NDR awards. Longer term, once the Fund is self-sufficient, it would expand from these seven CDBG-NDR target areas to a coverage area encompassing the entire Coastal Zone.

Eligible Activity: 105(a)(1-26). This request is for unprogrammed resources. As such, specific eligible activities will be determined upon approval of applications submitted to the Fund.

National Objective: LMI (50.0%), UN (50.0%)

Metrics:

- **Resilience Value:** (1) Reduction of expected property damages due to future disasters; (2) Reduced vulnerability of energy and water infrastructure to large-scale outages.
- **Environmental Value:** (1) Reduced energy use; (2) Reduced stormwater runoff.
- **Social Value:** Benefit to low- and moderate-income persons and/or households.
- **Economic Revitalization Benefit:** Direct effects on local or regional economy.

*Reshaping (<3' future 100-year flood risk).*

Typically, population migration patterns are dictated by one of two macro forces. Populations are drawn to a locale on the promise of an increased quality of life, usually in the form of economic opportunity, outward social mobility, or a combination of both. Conversely, populations flee locales for inverse reasons. Economic opportunities dry up, or are relatively less abundant than in other destinations. Catastrophic events, including acute events like natural disasters or loss of a major employer or chronic deteriorating conditions such as land loss and sea level rise have a similar effect on migration patterns. In short, people are drawn to locations that are both safe and bountiful, while they are drawn away from locations plagued by risk and barrenness.

[Louisiana has experienced significant population shifts \(Fig5.pdf\)](#) from both types of catastrophic events, acute and chronic deterioration. For example, in Plaquemines Parish, an area heavily impacted by Hurricane Katrina in 2005, total population declined 14 percent, from 26,757 to 23,042, between 2000

and 2010. However, Belle Chasse – Plaquemines’ largest municipality and an area within the U.S. Army Corps of Engineers-designed Hurricane and Storm Risk Reduction System (HSDRRS) – grew 28 percent, from 9,848 to 12,679, over the same period. In a general sense, this pattern was replicated throughout southeastern Louisiana from 2000 to 2010. Areas heavily impacted by Katrina declined in population, like St. Bernard (-46 percent), Orleans (-29 percent) and Jefferson (-5 percent), while higher-ground “receiver” parishes gained population, like Ascension (40 percent), Livingston (39 percent), St. Tammany (22 percent), St. Charles (10 percent), East Baton Rouge (7 percent), St. John the Baptist (7 percent) and St. James (4 percent). Two outliers to this trend, Lafourche and Terrebonne parishes, were both heavily impacted by Katrina, but also experienced population increases of 7 percent each, respectively. However, even within these outliers, the trend remains apparent. Even in Lafourche and Terrebonne parishes, coastal places like Dulac (-40 percent), Montegut (-14 percent) and Chauvin (-9 percent) significantly lost population, while areas further upland like Chackbay (29 percent), Schriever (17 percent) and Bayou Cane (14 percent) experienced substantial gains.

Mindful of event and risk-influenced migrations, Louisiana must reshape underdeveloped, high-ground corridors in anticipation of future population and economic growth. LA SAFE envisions a larger-scale strategy geared toward parish-level planning and engagement designed to incentivize smart, structured and contextual development. To launch this typology, the state focused on St. John the Baptist Parish, [which has an abundance of underdeveloped, high-ground land \(Fig6.pdf, Fig7.pdf, Fig8.pdf\)](#) along the east and west bank of the Mississippi River. The parish itself is located approximately 30 minutes west of New Orleans if travelling by I-10, and as such, it is an obvious location to project future economic and population growth. Additionally, it is poised to become an ideal ‘receiver’ community for populations migrating away from more vulnerable coastal areas.

Still, despite its advantages, St. John the Baptist has its own threats and vulnerabilities – notably exacerbated during Hurricane Isaac – that are barriers to the parish’s realizing its full development

potential. Through the NDRC process, [the state has organized its responses to these vulnerabilities around three themes \(Fig9.pdf\)](#):

- *Tap the River*: As described in Exhibit D, the east bank of St. John the Baptist currently accesses potable water from a well system in Ruddock, a location on the north end of the parish and situated between lakes Maurepas and Pontchartrain. This is a flood-prone area, and during Hurricane Isaac, it was inaccessible, leaving residents without water for four days. The current well system is operating at capacity relative to its current service population, therefore, if the parish is to grow, it must achieve water security. This can be achieved through the utilization of the Mississippi River as part of a larger infrastructure buildout to increase the system's capacity.
- *Set the Edge*: Interstates 10 and 55 converge in St. John the Baptist Parish in LaPlace. This convergence point was inundated by floodwaters during Hurricane Isaac as waters from Lake Pontchartrain encroached from the east. This condition was exacerbated by ongoing coastal erosion affecting the lake's western edge. As the shoreline erodes, vulnerability increases to I-10 and I-55, a major rail line running along the lake, and LaPlace itself. This shoreline must be reinforced as part of any comprehensive growth strategy.
- [Move the Centroid \(Fig10.pdf\)](#): Long term, St. John the Baptist must maximize its high-ground lands along the Mississippi River on both the east and west bank. Currently, a critical mass of the parish's population is located in LaPlace, the easternmost community on the east bank of the river. Over time, LaPlace has sprawled from the high-ground riverbank northward to I-10 and into the floodplain. As described in Exhibit D, the majority of instances of residential flooding during Hurricane Isaac occurred within the floodplain. Therefore, as we contemplate growth strategies in the parish, it is logical to start by creating growth corridors in LaPlace hugging the river's edge, drawing the community's population center back toward the river and high ground. Long term, such a growth strategy would extend along the river on both the east and west bank – orienting development outside of the floodplain.

## **Reshaping Project #1: St. John Water Works.**

The following is a seven step process by which St. John the Baptist proposes to ‘Tap the River,’ Reshaping its water-management system to build capacity and remove system vulnerability in anticipation of future economic and population growth:

*Task 1 – Water Intake Pump Station on Mississippi River in LaPlace.* A new water intake pump station on the Mississippi River, in conjunction with a new water transmission main route to the reverse osmosis unit site, will provide an alternative water source for LaPlace. The intake pump station will have the capability to supply up to 8.64 million gallons per day with a 6000 gallon per minute pumping capacity.

Multiple intake sites along the Mississippi River were investigated. Three alternative intake sites were chosen for further investigation. No other intake sites were determined feasible for evaluation.

*Task 2 – New Transmission Water Main from Mississippi River to Reverse Osmosis Site on Woodland Drive.* A new transmission water main originating at the new intake pump station will provide an alternative water source for LaPlace, Louisiana. Raw water from the new intake pump station will undergo a pretreatment process through new clarifiers located near the intake structure. Sludge removed from clarification will be disposed of through an 8-inch sludge line. The water transmission main will transfer the clarified water supply to the reverse osmosis unit site on Woodland Drive for treatment before release into the existing distribution system. The conceptual engineering design calculations indicate that the water transmission main will have an inside diameter of 24-inches.

*Task 3 – Water Pre-Treatment and Treatment at Reverse Osmosis Unit Site on Woodland Drive.*

The switch from a groundwater to surface water raw water supply will require a more stringent pretreatment process to minimize fouling potential of the reverse osmosis (RO) membrane elements at the Reverse Osmosis Unit Site on Woodland Drive. The focus of the pre-treatment system will be the reduction of fouling potential from suspended solids (turbidity), naturally occurring organic matter (NOM), and pathogens, including viruses, bacteria, and protozoans (*Cryptosporidium* and *Giardia*) found in surface water in much greater quantities than in a groundwater source.

*Task 4 – Modifications to the Lions Water Treatment Plant.* The Lions WTP has exhibited an inability to meet total organic carbon (TOC) reduction requirements as required by the Stage 1 Disinfectants and Disinfection By-Products Rule, especially during the warmer summer months. Undesirably high TOC in the treated water can lead to potential issues with disinfection by-products formation potential in the distribution system with free chlorine disinfection. As such, the parish wishes to explore methods of enhanced TOC removal in the treatment process, in conjunction with improvements to maintain the current capacity of 3 mgd on a firm basis, as well as a potential facility expansion to 6 mgd.

*Task 5 – Distribution Pump Station and Transmission Water Main from Lions Plant to LaPlace.* A new distribution pump station and transmission water main from the Lions Water Treatment Plant will provide an alternative water source for LaPlace.

The New Lions Plant Distribution System Pump Station will have the ability to deliver a pumping capacity of 3 million gallons per day (2,100 gallons per minute) through a new 14-inch inside diameter transmission main that will tie-in to the LaPlace water distribution system at the intersection of Airline Hwy and New Hwy 51. This tie-in location is currently the main distribution location for the LaPlace water distribution system.

*Task 6 – Decommission Ruddock Well System.* The Ruddock Wells, Wells 1 and 2, are located approximately 9 and 8.5 miles north, respectively, of LaPlace. They are the current source of water for LaPlace, and will need to be decommissioned once a new system is in place.

*Task 7 – Establish Power Redundancy to Pump and Lift System.* None of the 156 wastewater lift stations and fewer than half of the 11 stormwater pump stations in St. John the Baptist Parish have backup power. These pumps are used to manage floodwaters from Lake Pontchartrain, and local wastewater management on an ongoing basis as well as during storm events. These systems currently do not function when the grid goes down, aside from relying on temporary diesel generators that may be distributed prior to a storm event. The state proposes to introduce resilient power systems to these selected three critical

lift stations and three pump stations to allow for wastewater management during loss of power and during storm events.

The parish has identified a list of 18 lift stations and five pump stations as critical infrastructure for emergency service. Due to the prohibitive cost of providing resilient power at all of these facilities in this initial funding program, the parish utilities department has selected the top three of each type of water pumping facility. These pumping facilities are too distant from each other relative to consolidate under an aggregated, single power distribution system. Consequently, each facility will be treated as an individual, self-sustaining microgrid. Each microgrid's control system will be programmed to have the capability to function individually or in conjunction with the other microgrids via an enterprise level controller for the overall Parish waste water system.

During emergency operations, disconnected from the grid in island mode of operation, the solar PV system will provide primary power to the pumps in each facility with the battery energy storage system providing frequency support, and during motor starting also providing voltage support to the microgrid. The battery system is sized to provide power quality support capabilities, therefore, emergency diesel generators must be employed for the nighttime hours of pump operation. From an overall system operations standpoint, the PV system can be considered as reducing the amount of fuel to approximately half that normally required for the diesel generators to run.

When operating in parallel with the grid, all generating assets will be leveraged into the power market to save power cost to the facility depending on daily circumstances. For example, the battery energy storage system may be programmed to discharge a portion of its capacity on hot afternoons when power prices are high if storms are not forecasted and other grid power supply risks are also considered low.

Eligible Activity: 105(a)(2). The above described activities all relate to the construction, installation or rehabilitation of public works facilities.

National Objective: LMI-Area Benefit (38.4%), UN (61.6%)

Metrics:

- **Resilience Value:** Reduced vulnerability of energy and water infrastructure to large-scale outages.
- **Environmental Value:** (1) Reduced energy use; (2) Reduced stormwater runoff.
- **Social Value:** Benefit to low- and moderate-income persons and/or households.
- **Economic Revitalization Benefit:** Direct effects on local or regional economy.

### **Reshaping Project #2: St. John Multimodal Transit.**

The St. John the Baptist Parish *Transportation Center and Growth Strategy (TCGS)* focuses on reshaping the LaPlace area to become more accommodating to development through a smarter regional transportation system and land use plan. This two-pronged project will ensure that St. John has the capacity to absorb residents from coastal parishes as well as accommodate its current residents in a safe and resilient manner. The specific TCGS project activities are:

1. [\*Build a multimodal transportation center \(Fig11.pdf, Fig12.pdf, Fig13.pdf\)\*](#) that provides flexible space that can be used for rentals, public meetings and other civic uses, as well as a disaster shelter and staging area during emergency events, and,
2. [\*Develop a long-range “smart growth” \(transportation and land use\) plan \(Fig14.pdf\)\*](#) that guides development and public transit on the Parish’s highest ground, which is least susceptible to storm surge and sea level rise.

St. John the Baptist lacks diverse and affordable housing choices, as evidenced by heavy demand for existing CDBG-DR housing programs and the continued displacement of renter households following Hurricane Isaac. Planning for increased housing supply in low-risk zones will accommodate this current demand and maintain affordability as population increases over time. Meanwhile, a coalition of state and local economic development and transit champions are currently working to establish a commuter rail corridor between Baton Rouge and New Orleans. The route as planned will include a dedicated stop in LaPlace. Quick rail service from this location to the job centers in either city will generate significant opportunity to create new homes on high ground with strong local and regional connections. Through this

initiative, the parish will build a multimodal transportation terminal and optimize its regulations governing land use and development form in a transit-oriented development zone surrounding the terminal site.

The proposed site for the multimodal transportation center is on to-be-determined property between the current Kansas City Southern railroad and West Airline Highway, in central LaPlace. The terminal at this site would serve primarily as a transfer hub for bus and automobile modes in the short term, as a rail transfer station in the longer term, and as a disaster response staging area in times of emergency. It will include the following components: demand-response and fixed-route bus waiting and boarding area, indoor waiting area, a commuter rail waiting and boarding area, solar energy system including energy storage (for resilient power during widespread outages), flexible indoor space that may serve as a staging area for disaster supplies, rental or retail/concessions space to generate operating revenue, and a parking lot.

The planned commuter rail, imminent job boom and lack of a coordinated and comprehensive transportation network warrant a comprehensive transportation and land use planning process. Specifically the plan will:

1. Convene regional stakeholders such as employers, workforce training organizations, government officials, and residents, to ensure the development of a publicly supported, shared vision for effective public transportation and associated land use development.
2. Identify key transit corridors and evaluate costs and benefits of each.
3. Determine procurement, fleet management, technology and other operational needs.
4. Identify opportunities for transportation oriented development, particularly in relation to the new commuter rail terminal.
5. Develop a phased implementation plan and funding strategy.

The multimodal transportation center design will follow case studies of other similar terminals constructed recently in other communities, such as Athens, GA, Lafayette, LA, and Meridian, MS. Numerous communities line the Mississippi River corridor between Baton Rouge and New Orleans and



share some of the same assets that make St. John the Baptist Parish well suited for resilient growth. They are located on high ground, are between major metropolitan areas, have major transportation assets, and expect significant job growth through the expansion of energy manufacturing facilities. Commuter rail stations are also planned in a handful of these, including the cities of Gonzales, Kenner and suburban Baton Rouge. These communities will have the opportunity to follow St. John the Baptist Parish's lead to leverage the transportation investment to drive resilient development. Currently, none have plans for station construction and area planning, and so each one will benefit from similar projects and planning processes.

Eligible Activity: 105(a)(2). The above described activity relates to the construction of a public facility. 105(a)(12). There is a described planning component to the project.

National Objective: LMI-Area Benefit (38.4%), UN (61.6%)

Metrics:

- **Resilience Value:** Reduction of expected casualties from future disasters.
- **Environmental Value:** Reduced energy use.
- **Social Value:** (1) Benefit to low- and moderate-income persons and/or households; (2) Greater access to resilient community assets.
- **Economic Revitalization Benefit:** Direct effects on local or regional economy.

### **Reshaping Project #3: St. John Resilient Housing.**

St. John the Baptist Parish Housing Authority's (SJBPHA) manages 260 Section 8 vouchers and 296 public housing units over 4 communities throughout the Parish. The LaPlace (116 units), Reserve (92 units) and Garyville (54 units) communities are located on the east side of the Mississippi River. The Edgard site (34 units) is located on the west side. Of the 296 total units; 196 are vacant due to age and storm damage.

Recent physical needs assessments across different SJBPHA communities note similar conditions. Exteriors of the buildings are deteriorating with peeling paint, rotting wood, missing bricks,

damaged trim work and damaged soffit panels. The steel stairs are rusting and have created a hazardous situation while root activity of the large trees on the complexes produce trip hazards. Interiors of units are severely outdated and deteriorating and contain asbestos containing materials in the floors and walls. Furthermore, 3 and 4 bedroom units contain only 1 or 1.5 bathrooms per unit contributing to overuse and mildew due to improper ventilation.

In 2012, Hurricane Isaac caused water and wind damage. Mold damage to building unit interiors range from minimally impacted to heavily impacted areas. Many building units had broken windows, roof damage, or insufficiently sealed exterior perimeters that allowed water intrusion into the units. The majority of buildings do not have air conditioning, thus moisture laden air condensates on the interior walls, ceilings, floors, and cabinets and, in some units, has caused microbial contamination.

In May 2013, the Parish published its Community Recovery Strategy, which highlights the concerns and priorities of the Parish officials and its residents. As set forth in the report, the highest priority is to upgrade the Parish infrastructure; drainage, roads, and water are at the top of the list, and preservation of the ferry service is another important priority.

The report states, “The Citizens Advisory Committee’s (CAC) Housing Subcommittee used residents’ input to develop strategies focused on locating and leveraging the best possible funding sources and development tools to provide a variety of housing options. During the parish’s open houses, residents sent a loud, clear message that housing was one of their highest priorities. Therefore, the CAC has concentrated a good portion of its efforts on housing recovery”.

The strategy also noted a substantial need for affordable housing available within the Parish. As a result of Hurricane Isaac, there is a currently a shortage of safe, sanitary, and decent housing available. This is borne out by the fact that fewer than half (43 percent) of the 936 households that received FEMA assistance due to the storm were able to find appropriate housing accommodations within the Parish. Of the 3,328 rental units in the Parish, 1,475 were damaged by the storm, and almost 70 percent of these were in LaPlace. Many remain uninhabited and in a state of disrepair more than three years later.

Twenty-one percent, or 3,328 of St. John's 15,965 households, are renters. Hurricane Isaac damaged 1,473 of those households. Like the single-family population, damage to renters' property was concentrated in LaPlace, as 1,117 of the 1,473 (76 percent) damaged rental households are located there. Of this total, 1,049 households are LMI, comprising 85 percent of the damaged rental population. Parish-wide, 1,235 of 1,473 (84 percent) of damaged rental households are LMI.

The need for affordable housing is evidenced by the great demand for the Housing Authority's Section 8 voucher program. The Authority has 260 vouchers issued and the wait list, last updated in November 2014, contains 4,721 families on it who need housing assistance. SJBPHA baseline of 260 vouchers is insufficient to address the demand of individuals and households in need of affordable housing.

The first phase of the Housing Transformation is the Garyville Redevelopment expected to break ground in first quarter of 2017. It is progressing forward as a 9% Low Income Housing Tax Credit application in 2016, and will leverage Hurricane Isaac CDBG-DR funds to transform a 54 unit development housing 17 public housing families into a 73 unit community with a mixture of public housing (either ACC or RAD conversion), tax credit and market rate units.

The second phase of the Housing Transformation is the [LaPlace Redevelopment \(Fig15.pdf, Fig16.pdf\)](#) located in the LaPlace community. Currently, the Authority's LaPlace community contains 116 units, 86 of which were damaged by Hurricane Isaac and only 51 of which are currently occupied. The 10 acre site is walking distance to the major commercial district in LaPlace as well as major transportation routes through the Parish including Airline and River Road. LaPlace Redevelopment will contain 128 newly constructed units across 8 'stacked flat' building types. The Housing Authority and Columbia Residential held a design workshop attended by 42 residents, neighbors, Parish leadership and community leaders on August 19, 2015. The input from this meeting included preferences for a walking trail, outdoor bar-b-que area, playground and indoor fitness area as well as a more cottage style exterior, porches and 'eyes on the street and playground area' so the community can stay safe. All buildings will

be certified LEED to ensure lower water and power bills as well as healthy indoor air quality for residents. The complex will be powered by a combined heat and power (CHP) system, which will be designed to continue providing a reduced level of electricity and cooling to the building in the event of a grid outage. Additionally, the site contains several large live oak trees the design protects from construction activity and utilize as a grand entryway to the revitalized community.

The community is anticipated 68% low income units and 32% market rate units. All 51 occupied public housing units will be retained.

Eligible Activity: 105(a)(4). The above describes the creation of new housing units. 105(a)(11). In conjunction with the replacement of a public housing development, there may be temporary relocation expenses.

National Objective: LMI-Housing (100.0%)

Metrics:

- **Resilience Value:** Reduction of expected property damages due to future disasters.
- **Environmental Value:** Reduced energy use.
- **Social Value:** Benefit to low- and moderate-income persons and/or households.
- **Economic Revitalization Benefit:** Direct effects on local or regional economy.

#### **Reshaping Project #4: Pontchartrain Breakwaters.**

The natural landscape barrier between Lake Maurepas and Lake Pontchartrain, the Maurepas Land Bridge, is a primary barrier for storm surges from Lake Pontchartrain into the eastern portion of St. John the Baptist Parish. Home to a portion of the CN Railroad, the terminus of over 20 miles of I-55, and the I-10/I-55 interchange, the land bridge also serves as a major transportation corridor and evacuation route. The land bridge is also home to the potable water source for LaPlace which serves 30,732 people. Since 1915, the western shore of Lake Pontchartrain has eroded at a rate of approximately 10 feet per year near the St. John the Baptist/St. Charles Parish line. Increased flooding risks resulting from the continued

erosion of the Maurepas Land Bridge threatens residents and businesses of St. John the Baptist Parish in addition to major public and private infrastructure.

This project proposal provides shoreline protection in the form of breakwaters to create a more resilient shoreline. Constructing breakwaters along the western shore of Lake Pontchartrain will protect the Maurepas Land Bridge from wave action, which will stabilize the shoreline and reduce erosion. As an additional benefit, the breakwaters may be optimally designed to capture sediment released into Lake Pontchartrain by the periodic opening of the Bonnet Carre Spillway, which could rebuild the shoreline behind the breakwater structures. Future phases of the project can include dredging of sediment from borrow areas in Lake Pontchartrain to create new shoreline and wetlands on the land side of the breakwaters. Strengthening the shoreline using these methods ensures that the Maurepas Land Bridge is maintained as a critical surge barrier for the parish.

At the time of this submission, St. John the Baptist Parish has identified multiple sources of potential funding to expand this project, including public and private resources. In addition to the possible NDRC funding, the Parish plans to utilize money from the Restore Act allocated to St. John the Baptist Parish to fund this project. Additionally, the parish has initiated talks with CN Railroad, which has already invested approximately \$14 million into repairs resulting from Hurricane Isaac.

A conceptual layout has been developed for the shoreline protection project for the western shoreline of Lake Pontchartrain in St. John the Baptist Parish. The project includes the construction of rock breakwaters along approximately 2.2 miles of shoreline which will strengthen the existing shoreline and prevent shoreline retreat, in turn maintaining the existing land between Lake Pontchartrain and LaPlace as a storm surge buffer. The concept establishes proposed boundaries of the St. John/St. Charles Parish line and Ruddock, where the new breakwaters will tie-in to an existing shoreline protection structure. The project is split into two phases: Parish Line to Frenier (2.2 miles) – proposed here – and Frenier to Ruddock (9.8 miles), which may be completed at a later date.

To establish the dimensions of the breakwater, numerous empirical breakwater models were referenced to determine the optimum placement of the breakwaters from the shoreline, length of the breakwaters, and gap distance between breakwaters. Using these models as a guide, the dimensional components of the conceptual breakwaters were determined to be 140 total structures 250 feet in length, gaps between the structures 200 feet in length, and an offshore distance of 600 feet. It should be noted that bathymetric and sediment transport data was not available at the time of the development of this concept, therefore the dimensional components of the structures should be refined through detailed design using surveyed bathymetric data and coastal engineering methods. The cost of the project is not anticipated to increase with the optimization of the breakwater geometry.

Eligible Activity: 105(a)(2). The above proposal relates to the installation of a public facility.

National Objective: LMI-Area Benefit (36.5%), UN (63.5%)

Metrics:

- **Resilience Value:** (1) Reduction of expected property damages due to future disasters; (2) Reduced vulnerability of energy and water infrastructure to large-scale outages.
- **Environmental Value:** Reduced coastal erosion.
- **Social Value:** Benefit to low- and moderate-income persons and/or households.
- **Economic Revitalization Benefit:** (1) Direct effects on local or regional economy; (2) Value of property.

*Retrofit (3' to 14' future 100-year flood risk).*

The value of Louisiana's Coastal Zone can be neither fully stated, nor accurately measured. We cannot and will not initiate a comprehensive retreat from the coast; it simply offers too much economic and cultural value to our state and nation which, if lost, would degrade our American way of life, not just Louisiana's. It is out of necessity that we maintain communities in close proximity to vital economic activities, adapting these communities so they can continue to prosper in rapidly changing and deteriorating environmental conditions.

The 2012 Coastal Master Plan highlights a few specific examples of this scenario. Hackberry, in Cameron Parish, lies adjacent to salt domes housing one of the nation’s four strategic petroleum reserves, with capacity to hold more than 228 million barrels of crude. Meanwhile, the nearby Chenier Plain wetlands are deteriorating, heightening flood risk in Hackberry. Lafitte, a strategically-important fishing community in the Barataria Basin, is currently experiencing significant land loss and, with no action, may experience up to 12-feet of flooding in a 50-year storm event by 2061. LA Highway 1, a thoroughfare connecting Port Fourchon to inland areas and cross-country transportation corridors, regularly experiences closures during high tides and has remained underwater for days following previous storm events. In short, Louisiana constantly balances its economic and cultural interests with clear and present risks. It is an unavoidable arrangement, but one which requires thoughtful, strategic interventions to maintain a vital connection between residential corridors – the human element – and hubs of commerce and industry.

The 2012 Coastal Master Plan articulates the state’s desire “to provide 100-year protection to all communities and businesses... (but) it is not feasible to do so given the inherent risk of living in a hurricane-prone area, as well as current funding levels and engineering constraints.” CPRA’s strategy involves restoration projects like barrier islands, hydrologic restoration projects and oyster reefs, structural protections like earthen levees, concrete walls, floodgates and pumps, and nonstructural protections through elevations, floodproofing, land use planning, voluntary acquisition, building code adaptations and community education efforts. LA SAFE dovetails with and augments this framework by envisioning a medium-scaled, town and neighborhood-level approach designed to preserve community development footprints in proximity to moderately-vulnerable, high-value economic and cultural assets, and where possible, expand upon that existing value.

#### **Retrofitting Project #1: Coastal Zone Nonstructural Mitigation.**

Understanding that many communities face serious flood risks which will likely increase in the future, the state is pursuing a “multiple-lines-of-defense” strategy and investing in a combination of restoration, structural, and nonstructural projects to reduce coastal storm surge impacts. Knowing that

structural projects such as levees alone will not provide adequate protection and risk reduction over the long term, nonstructural protection approaches offer additional methods to decrease flood risk in a dynamic coastal environment. In general, structural protection reduces storm surge through the construction of physical barriers such as earthen levees or concrete seawalls, as well as pumps and floodgates. However, instead of blocking floodwaters, nonstructural protection offers an alternative to structural protection by accommodating floodwaters and either removing structures from harm's way or protecting buildings and infrastructure from flood damage through elevations and floodproofing. Nonstructural projects are often beneficial in areas where structural protection is not feasible, cost-effective, or would have negative impacts on the environment. Additionally, nonstructural projects and policies can offer further protection in areas enclosed by levees. Both structural and nonstructural protection measures are part of a comprehensive "multiple-lines-of-defense" strategy, which when implemented in a complementary and coordinated manner will greatly reduce the risk of future flooding.

To support this project, OCD-DRU partnered with CPRA and the RAND Corporation to utilize CPRA's CLARA model and develop a nonstructural project in the state's identified target areas in Plaquemines, Terrebonne and Lafourche parishes. [The study supporting the project](#) evaluates flood risk in the target regions with and without nonstructural interventions using CLARA. Specifically, a version of the CLARA model updated to support Louisiana's 2017 Coastal Master Plan analysis was applied to estimate flood depths, damage, and damage reduction. In this analysis, CLARA takes as input storm surge and wave height estimates from Advanced Circulation (ADCIRC) storm surge model simulations for a large sample of hypothetical storms. CLARA also receives information on the location, elevation, and composition of hurricane protection systems, on land elevations, and on the historical record of storm events. It then estimates flood depths across the coast based on land elevations and the specifications and estimated performance of hurricane protection systems. Specifically, it calculates flood depths for areas fully enclosed by protection systems as well as those that are not, and it evaluates overtopping of protection



systems and the probability that these systems will fail based on estimates of system fragility. CLARA's interior drainage sub-module equalizes flood depths among adjacent areas.

Flood depth estimates are then combined with information about storm likelihood derived from the historical record of storm activity in the area in order to estimate the statistical return period of coastal flooding across the coast, ranging from the 5-year (20 percent annual chance) to the 2,000-year (0.05 percent annual chance) return period. Flood depths are then combined with structure and infrastructure inventory and valuation data to estimate the economic damage caused at each return period. The damage sustained by a building is a function of the flood depth and flood depth/damage curves. Value and damage calculations follow standard methodologies used by the FEMA Hazus-MH model; inventory data are drawn from the most current, high-quality data sources available to the CLARA model in the study regions. Lastly, the CLARA model summarizes risk across the distribution of damage by calculating Expected Annual Damage (EAD). EAD is the amount of damage that would occur in each year, on average, from coastal storm surge and wave events ranging from the 5-year to 2,000-year flood. CLARA estimates EAD at each of several thousand CLARA 'grid points' and can aggregate the results to more commonly used geographic areas such as U.S. Census block groups

Nonstructural projects involving the elevation of residential properties, as proposed in this program, reduce flood risk by decreasing the damage sustained by a structure during a flood. In CLARA, elevating structures is modeled by adjusting the flood depth/damage curves by the height of the elevation. This analysis developed a set of nonstructural projects using different specifications, as shown in an online portal developed for this project, which we encourage HUD to explore on its own:

[https://public.tableau.com/views/LA-HUD-NS\\_Analysis/ANALYSIS](https://public.tableau.com/views/LA-HUD-NS_Analysis/ANALYSIS)

This evaluation of nonstructural projects represents an important step forward in policy design and assessment of nonstructural risk mitigation options for coastal regions. The method shown here can support the formulation of large-scale nonstructural projects of the type that are needed to achieve the goals of the CMP. Specifically, this method innovates by:

- Using outputs from a detailed flood risk model that incorporates changes in the future coastal landscape and storm hazard, rather than static flood maps
- Considering a broad range of events—from 5-year to 2,000-year flood events—instead of focusing on a single (i.e., 100-year) or small number of recurrence intervals only
- Incorporating additional factors, such as low to moderate income and repetitive loss data, when formulating projects

Importantly, this methodology takes a “deliberation with analysis” approach to providing technical analysis (i.e., flood risk assessments) to support decision making (i.e., developing nonstructural flood mitigation programs). Specifically, this study uses a Planning Tool to explore different possible specifications of nonstructural projects and to consider the tradeoffs in terms of affected areas, cost, and benefits. Further, we have examined how the resulting project compositions change in accordance with different policy-maker preferences for providing mitigation in low to moderate income areas or regions that have experienced repetitive losses in the past.

The analysis presented provides the state with new innovations and insights related to nonstructural risk reduction planning, but it is not without limitations. It relies on a single projection of future conditions in one plausible scenario drawn from the 2012 CMP analysis, for example. Alternate plausible scenarios might yield differing results. Conversely, some data inputs are treated as static although conditions will certainly change in the future, for example using historical data on repetitive loss properties and low to moderate income populations.

This analysis nevertheless provides a step forward and enables the State to define nonstructural projects that complement other risk reduction and coastal restoration projects for the 2017 CMP and improve upon the approach used in 2012 CMP development.

This approach could also be used to develop nonstructural projects in other communities. Flood risk modeling tools, such as CLARA, are increasingly available and can be used to evaluate risks over a wide range of flood events. Planning organizations can then augment risk data with other metrics, such as

LMI or repetitive loss data to identify the communities where nonstructural investments should be prioritized. Lastly, the Planning Tool can serve as an example of a useful, flexible device supporting the development of a comprehensive plan for coastal flood risk mitigation.

The residential elevations proposed in this nonstructural project will be targeted exclusively to LMI households. Historically, elevations have been conducted in Louisiana through FEMA programs, which have an associated cost share. While this cost share is technically a state obligation, practically, such cost shares have historically been passed down to the end user. Therefore, it is likely the state has provided elevations to non-LMI populations disproportionately in the past, a gap this proposal attempts to fill. In this sense, this request is made as an element of the state's larger nonstructural mitigation program covering an area including, but not exclusive to, the NDRC target areas proposed in this application. Ideally, the state will be able to coordinate resources such that those with cost share requirements may serve non-LMI populations and in the larger Coastal Zone, while CDBG-NDR funds may serve LMI populations in Lafourche, Terrebonne and Plaquemines parishes specifically.

The state is embedding two additional planning activities within this initiative, both through its partner UNO-CHART. The first is to work with all four target areas to maximize Community Rating System (CRS) credit for any and all projects implemented through LA SAFE. However, two of the state's target areas, Lafourche and Plaquemines parishes, do not currently participate in CRS. Both parishes have expressed interest in participating in the program, and UNO-CHART will provide technical assistance to integrate these communities into the program.

Second, UNO-CHART will work with the state to both develop policies and procedures for the nonstructural program, while also taking a lead role in monitoring the impacts of elevations on communities. This initiative includes qualitative methods, such as interviewing, conducting focus groups and visual analysis. The quantitative methodology will be a survey of areas that have a significant number of elevated homes. Semi-structured interviews will include homeowners (those who have elevated and those who have not), employees of community organizations who have helped with elevation, and local

planners. Thirty semi-structured interviews will be conducted, with a flexible interview schedule that will allow participants to be interviewed at their own pace. The idea is to develop a base of knowledge guiding how elevations may take place with minimal adverse impacts to communities and their culture. This will involve three deliverables: The first deliverable will be a review of the architectural designs based both on an extensive literature review and a visual analysis. The second deliverable will be an analysis of the quantitative and qualitative data that will provide the bases for an analysis of benefits and challenges of elevation. The third deliverable will use the analysis to develop a planning guide for nonstructural programs. This guide will be intended for an audience of planners, community leaders and residents. The guide will include issues and recommendations for elevation based on the lived experience of coastal Louisiana. As part of this process, UNO-CHART personnel will provide workshops for communities and neighborhoods with significant elevation activities. When complete, the elevation program and associated planning and assessment activities will provide a model and guide for performing no-structural mitigation on a large scale.

Eligible Activity: 105(a)(4). The above describes residential elevations, a rehabilitation activity.  
105(a)(12). The above describes a planning component to this project.

National Objective: LMI-Housing (100%)

Metrics:

- **Resilience Value:** Reduction of expected property damages due to future disasters.
- **Environmental Value:** Reduced stormwater runoff.
- **Social Value:** Benefit to low- and moderate-income persons and/or households.
- **Economic Revitalization Benefit:** Direct effects on local or regional economy.

#### **Retrofitting Project #2: Living Mitigation.**

The Terrebonne Parish Living Mitigation Project proposes measures for mitigated hazards of future storm surges in Terrebonne Parish, as completed under the U.S. Army Corps of Engineers' (USACE) Louisiana Silver Jackets Program. The overall goal of the Terrebonne Living Mitigation Project

is to provide sustainable flood risk management to protect the public and reduce flood damages in Terrebonne Parish using living mitigation, or vegetative, techniques. Accomplishing this goal requires reduction of future storm surge energy in coastal marshlands south of Houma, the southernmost metropolitan area of Terrebonne Parish and most susceptible to storm surge hazards.

[The project site is located south of Houma \(Fig17.pdf\)](#), north of Lake Boudreaux, and east of Bayou Grand Calliou. The site is part of the Terrebonne Bay drainage basin in the Mississippi River Deltaic Plain. The area is prone to high rates of subsidence due to compaction of Holocene alluvial sediments and movements of nearby faults. With the additive effects of eustatic sea level rise, nutria herbivory, and hydrologic modifications due to canal and embankment alterations in the landscape, this area has some of the highest rates of coastal land loss in the world.

Terraces are vegetated soil ridges produced by raising shallow bottom sediments to a height supportive of vegetation establishment. Ridges of on-site sediments are constructed to a design height relative to water elevations, tidal water level fluctuations, and vegetation selected for ridge stabilization. Ridges are planted with marsh vegetation, typically grasses and woody shrubs. Terrace elevations are typically designed to 1 foot above sea level for establishment of grasses. Woody shrubs require greater elevations (e.g. ~2+ feet above sea level) for establishment. Terrace ridges are installed in patterns to maximize intertidal edge, minimize fetch between ridges, and maintain water flow in and out of inner terrace areas, necessary for an environment conducive to sediment deposition. Ultimately, terraces can convert shallow waters to marsh between terraces and subsequent establishment of terrace vegetation by natural propagation. Reduction of storm surge energy results from provision of a more tortuous flow path for storm surge water and vertical deflection of storm surge energy by the vegetation and elevation of intermittent terraces, respectively. Marsh, as created in inner terrace spaces, will further reduce storm surge energy by providing additional tortuous flow path and thus, increasing the resistance to storm surge flow.

The following bulleted lists provide the advantages of terracing and terrace vegetation:

- Woody shrub vegetation provides resistance to storm surge;
- Woody shrub vegetation provides a vertical resistant to affect wind energy;
- Immediately creates elevated ridges capable of deflecting storm surge energy;
- Increasing surface area of tortuous flow path and thus, potential for reducing storm surge energy immediately;
- Producing wetlands ecosystem;
- Depending on site soil conditions, in situ materials may be used for foundation;
- Depending on site soil conditions, terrace construction material could be from on-site sources;
- Does not completely alter surface water and flood water flow directions, as compared to embankments;
- Less expensive compared to marsh creation and embankment development;
- Flexible design and able to be rescaled post design (i.e. adding/removing terraces to accommodate budget variations).

Eligible Activity: 105(a)(2). The above describes a public installation.

National Objective: LMI-Area Benefit (80.4%), UN (19.6%)

Metrics:

- **Resilience Value:** (1) Reduction of expected property damages due to future disasters; (2) Reduced vulnerability of energy and water infrastructure to large-scale outages.
- **Environmental Value:** Marshland restoration.
- **Social Value:** Benefit to low- and moderate-income persons and/or households.
- **Economic Revitalization Benefit:** Value of property.

### **Retrofitting Project #3: Plaquemines Polders.**

The proposed project will enhance the regional resilience against flood risk by compartmentalization of the Plaquemines Parish flood protection system. Compartmentalization is a

Dutch-developed, practical flood risk reduction strategy that protects critical functions in the flood-prone area and reduces the flood effects by dividing the area into compartments with the use of intermediate levees or dikes – a polder. Long-term social and economic sustainability of the Louisiana coast is also a fundamental objective of this project and is achieved by protecting Louisiana Highway 23 from inundation from minor storm events. All objectives fall under the basic five (5) root objectives:

1. Reduce risk to public safety from catastrophic storm inundation. The plan should ensure that LA 23, the main evacuation route on the west bank, is protected to the extent possible from Oakville to St. Jude.

2. Reduce damages from catastrophic storm inundation. Future economic damages to existing homes and businesses should be minimized through the implementation of nonstructural and/or structural measures.

3. Avoid and minimize impacts to existing residential or commercial structures. Any structural plan should avoid homes or businesses, or minimize such effects to the maximum extent practicable.

4. Minimize impacts to existing stormwater drainage canals. Because all structural plans proposed for this project will cross across or cover an existing drainage canal or ditch, it is critical that the plan provide a new drainage canal or ditch that extends to the existing pump station or any relocated pump station.

5. Consistency with a “multiple-lines-of-defense” storm risk reduction strategy.

Reducing Flood Risk for the Plaquemines Parish community is critical. USACE has not been able to successfully provide the 50-year Level of Risk Reduction (LORR) with the current budget as previously intended. Due to cost over runs, unforeseen conditions, and delays the Level of Protection for the residents of Plaquemines Parish will fall short of the promised 2% storm event and this shortfall will have a dramatic effect on not only the residents but the business community as well. The Phillips 66 Refinery, an oil and gas refinery and a large employer of residents in the area, is located less than a mile from the south end of the NOV-NFL-04a polder. Highways 23 and 11 are the main access routes to the refinery and traverse

through this polder. Protection of these highways is crucial because any down time of the refinery has significant local, regional, and national economic impacts. Down time of the refinery can be kept to a minimum by enhancing the protection of the infrastructure and other commercial facilities that support refinery operations. Increased LORR to the polder will facilitate this. Per the USACE calculations in their Risk Analysis Report for the Non-Federal Levee (NFL) system, the total estimated damage resulting from overtopping of NOV-NFL-04a levee reach alone is estimated to be \$85M for a water-level of 9.0 ft. with an anticipated life loss ranging from 0.02 during day and 0.03 overnight. The total estimated damage resulting from overtopping of MRL-WB-179 levee reach is estimated to be \$600M for a water-level of 17.5 ft. with an anticipated life loss ranging from 0.79 during day and 1.52 overnight. Similar figures have been determined for the entire Non Federal System of Plaquemines Parish.

This project will not only lower the estimated consequence of overtopping locally, it will have significant regional impact by potentially reducing the economic consequence of the Alliance refinery shut-down during a disaster, and lowering recovery times for the offshore oil & gas industry south of the area. The project will tie-in to the ongoing FEMA LAMP Pilot project in the Parish, and could contribute to further lowering insurance costs for residents. Since some of the Non Federal levee reaches are already under construction, an expedited approval and execution of this project could leverage significant cost savings since the construction grade of the levee sections is close (in some sections greater than) to the 100-year design elevation.

The project is located on the west bank of the Mississippi River in Plaquemines Parish [between Oakville and Diamond \(Fig18.pdf\)](#). This area lies in the delta of the Mississippi River approximately 15 miles south of downtown New Orleans. Barataria Bay, an estuary of the Gulf of Mexico, lies on the west side of the Mississippi River delta. The project area consists of a narrow strip of land enclosed by the NFL to the west and by the Federal Mississippi River levee to the east along the Mississippi River's west bank. The northern and southern bounds of the project area are the communities of Oakville and St. Jude, respectively. The project area extends on the flood-side of the NFL into the coastal marshes along the



northeastern perimeter of Barataria Bay. It also extends east to include the Mississippi River. On the Mississippi River, the northern and southern project area limits correspond approximately to River Miles 70 and 46, respectively. LA-23 parallels the Mississippi River along the west bank and traverses the levee protected area.

Eligible Activity: 105(a)(2). The above describes a public installation.

National Objective: LMI-Area Benefit (29.9%), UN (70.1%)

Metrics:

- **Resilience Value:** (1) Reduction of expected property damages due to future disasters; (2) Reduced vulnerability of energy and water infrastructure to large-scale outages.
- **Environmental Value:** Reduced stormwater runoff.
- **Social Value:** Reductions in human suffering.
- **Economic Revitalization Benefit:** (1) Direct effects on local or regional economy; (2) Value of property.

#### **Retrofitting Project #4: Storm Harbor Network.**

Coastal Louisiana has a long and rich history in the commercial fishing industry, both through offshore and inshore fishing and seafood processing. The brackish and wetland environment provides the right mix of nutrients and habitat for robust fisheries. Fisheries success translates directly into economic livelihood for thousands of commercial fishermen along the coast. Between 2002 and 2004, the region of the state including Plaquemines, Jefferson, Lafourche, and Terrebonne parishes accounted for 74% of the state's production in commercial fishing activity, averaging \$203 million per year in landed value. These areas also dominated the state's commercial fishing industry for the number of fishing licenses, fishing vessels, and seafood dealers and processors. The southeast region of the state alone accounted for 6,297 commercial licenses, 4,205 commercial vessels, and 367 commercial dealers and processors.

Inherently, the exposure of coastal Louisiana to natural hazards results in exposure of fishermen and seafood processors to business interruption and economic damages. When a hurricane is in the Gulf

of Mexico, commercial fishermen feel pressure to maximize the time to continue their business (i.e., harvest seafood) and to protect their business (i.e., seek safety for their vessels and their crewmembers). A commercial fishing vessel is defined as a vessel with a commercial fishing license (either state or federal) whose purpose is harvesting a seafood commodity from Louisiana saltwater areas and selling that product in Louisiana. In the past decade, Louisiana commercial fishermen have experienced cumulative vessel loss, infrastructure damage, and business interruption from Hurricanes Katrina and Rita (2005), Gustav and Ike (2008), and Isaac (2012). For example, the initial damage to areas hit by Katrina included 15 major fishing ports, 177 seafood processing facilities, 1,816 federally-permitted fishing vessels, and more than 13,000 state-permitted fishing vessels. The actual fish and crustacean populations did not suffer substantial or significant damage to their numbers, but the ability of fishermen to go out and harvest was severely limited due to damages to boats and coastal infrastructure.

The state did not collect fisheries damage estimates from Hurricane Isaac in 2012 due to the aftereffects of the Deepwater Horizon (DWH) Oil Spill in 2010. Hurricane Isaac presented a confounding factor for processing damage claims due to DWH; therefore, the state did not issue a fisheries disaster declaration or proceed with collecting damage estimates to avoid issues of double-counting damage. However, researchers calculated fisheries damage estimates in excess of \$700 million after hurricanes Katrina/Rita and Gustav/Ike.

Economic damages to commercial fishermen are difficult to assign to individual parishes because the nature of the profession is highly mobile. While each vessel captain has a physical mailing address on land (usually his home), his business follows the fish, which can take him across all coastal areas of the state. In Louisiana, no coordinated plan exists for commercial fishermen to seek “harbors of refuge” that might offer protection from damaging storm tides and prevent vessels from becoming water-borne debris during a storm. The paucity of publicly-owned waterfront space in coastal Louisiana greatly exacerbates the problem. Many fishermen stay on their boats during the events to “ride out the storm” at local shrimp docks. With engines at full throttle, some are able to hold position and keep the vessel in place, even

during the height of the storm. Captains who leave their vessels to evacuate come back after the storm to find their boats stranded on land. Methods of tying to old oak trees or tying to other boats creates stress on the lines, and as a result, storm tides carry fishing vessels onto private property. When the tides recede, the boats stay grounded on private property.

In the aftermath of previous hurricanes, FEMA, the U.S. Coast Guard and the U.S. Navy contracted with salvage companies to clear navigable waterways of debris. The priority focus on navigable waterways essentially classified disabled fishing vessels as “nuisance” debris. Only when expedient and convenient to the mission did salvage companies refloat or recover stranded boats. That lengthy process took millions of dollars to accomplish and in many cases made the recovered vessels inaccessible for repairs by the rightful owners for months on end. With 85% of the fishing fleet disabled, the total cost for vessel and debris removal for Katrina and Rita was approximately \$294 million. In 2015, the question still remains, where is there a suitable place along the waterways for commercial fishing boats to seek harbor of refuge during storms? Such locations are needed to prevent vessel damage and vessel groundings, which create obstacles for hurricane response and recovery.

After hurricanes Katrina and Rita, part of the CDBG Disaster Recovery money delivered to the state was used to construct harbors for commercial fishing vessels in southern Louisiana. [In Golden Meadow, a harbor of refuge \(HOR\) was constructed for a cost of \\$1.4 million \(Fig19.pdf\)](#). This protected facility has capacity for 60-75 commercial fishing vessels. A resolution and partnership between Lafourche Parish and the Greater Lafourche Port Commission provided the mechanism to accomplish this project. The state proposes to replicate this successful model across the regions affected by successive hurricanes, including Hurricane Isaac, to create a regional network of HORs.

A feasible solution for constructing a HOR network follows a two-pronged approach: building new infrastructure with hardened sites for fishing vessels and retrofitting existing infrastructure with hurricane-resilient pilings and docks. Resilient power systems, in the form of solar photovoltaic systems and battery energy storage, will be installed to provide a portion of ongoing electricity needs to the HOR, as

well as emergency power in the case of a grid outage. Sites will need to accommodate vessels of varying lengths and will also need to account for expected storm tides. Commercial fishing vessels range in size from smaller crab boats (~25-30' in length) to large, offshore shrimp boats (~70-100' in length). The majority of vessels are 40'-80' in length.

Eligible Activity: 105(a)(2). The above describes the installation of a network of public facilities.

National Objective: UN (100.0%)

Metrics:

- **Resilience Value:** Reduction of expected property damages due to future disasters.
- **Environmental Value:** Reduced energy use.
- **Social Value:** Improved living environment.
- **Economic Revitalization Benefit:** Direct effects on local or regional economy.

#### **Retrofitting Project #5: Terrebonne Oyster Surge Attenuation.**

Erosion of bay shoreline marshes results in substantial losses of habitat allowing higher salinities and increased wave action to intrude northward, ultimately threatening low-salinity habitats at the northern ends of the area's intertributary basins. The erosion of the marshes threatens both natural and built environment infrastructure existing and proposed.

Maintenance of shoreline integrity along Terrebonne Bay is a regional strategy in the Coast 2050 plan as well as the Parish Comprehensive Plan Vision 2030 and the Hazard Mitigation Plan Update 2015. This project follows a CWPPRA-funded demonstration project, TE-45, which documented clear benefits from the placement of Gabion mats on the shoreline to disrupt wave action on the marsh and significantly reduce shoreline marsh erosion. Oysters naturally recruit on the newly placed substrate creating a layer of living shell superstructure that appears to grow at a rate sufficient to maintain the protective height for surge attenuation over time regardless of mat subsidence and/or sea level rise. Given the great linear distances involved in implementing this strategy, techniques less costly than traditional rip-rap armoring will likely be needed to effectively address this problem. Rip-rap is also not as effective in recruiting and

supporting oyster populations, and has a tendency to sink in the soft soils over time requiring re-arming of the shoreline. Artificial intertidal oyster reefs have been shown to be effective protection measure installed on marsh shorelines providing wave-protection without interfering with either navigation or oyster fishing rights in the adjacent subtidal bay bottoms, promoting essential fish and invertebrate habitat, and enhancing estuary water quality.

The proposed project follows a number of demonstration projects supporting the feasibility of the effort. The TE-45 project was monitored for 8 years and showed significant reductions in erosion on the banks treated with Gabion Mats, especially when compared to the other two employed types of artificial reef structures, as well as the unprotected shorelines used as control (reference) sites.

The Oyster Bed Surge Protection System will benefit both the built environment and the existing shoreline. The installations are expected to protect the shoreline and provide wave attenuation to significantly reduce erosion. [Due to the location \(Fig20.pdf\)](#), the retention of the existing marsh will continue to provide wave and storm surge protection and will delay the erosion of Island Road and several levee structures surrounding Isle de Jean Charles and LDWF's Point-aux-Chenes Wildlife Management Area. Being outside the footprint of the proposed Morganza to the Gulf, these areas will not be protected in the future, and in fact the health of the marsh will be critical to the long-term maintenance of the Morganza system. Marsh and wetlands provide significant economic benefits in terms of surge protection and need to be maintained or enhanced. Both the presence of wetlands and the friction caused by healthy wetland vegetation have protective value. Habitat benefits include oyster cultch development as well as observations of fishery support and bird populations. Water quality is also expected to benefit from the filtering capacity of the oysters potentially increasing water clarity and nitrogen cycling.

The Oyster Bed Surge Protection System is one component of a strategy of multiple lines of defense. In addition to this project and the TE-45 Terrebonne Bay Shoreline Protection project to the west, the Parish has initiated marsh restoration projects with thin mat systems north and south of Island Road, and the CPRA has identified as a priority the ridge restoration project recreating the hydrology south of

Lake Felicity/Lake Chien (03a.RC.06). A separate project in the CMP is proposed to recreate marsh on the lower border of Lake Tambour (03a.MC.03p), which shows the importance of the area. The oyster bed surge protection may reduce the erosion such that the land will still exist when the marsh recreation is approved.

Eligible Activity: 105(a)(2). The above describes a public installation.

National Objective: LMI-Area Benefit (66.8%), UN (33.2%)

Metrics:

- **Resilience Value:** (1) Reduction of expected property damages due to future disasters; (2) Reduced vulnerability of energy and water infrastructure to large-scale outages.
- **Environmental Value:** Restoration of ecosystem habitat.
- **Social Value:** Improved living environment through recreational value.
- **Economic Revitalization Benefit:** Direct effects on local or regional economy.

*Resettle (>14' future 100-year flood risk).*

LA SAFE acknowledges resettlement is both a controversial and difficult typology within which to achieve and measure success. However, it is a logical component to any comprehensive policy framework for a future Louisiana. If we are to adopt and adhere to the goal of maximizing undervalued and underdeveloped space while preserving space with high value and moderate vulnerability, we must also acknowledge not all territory can be maximized or preserved – some will be lost. Moreover, if we are to envision such a reality, we must also commit to techniques mindful of cultural and social bonds – and of long-held and deeply-rooted ties to the land itself, especially if we intend to increase community resilience, which is driven by such cultural and social bonds.

A 2014 Tulane Institute on Water Resources Law & Policy issue paper succinctly summarized the Federal and Louisiana governments' track record in community resettlement:

*The Federal government has displaced individuals and communities for a wide variety of reasons – from public development projects to national security concerns – and*

*used a variety of statutory authority. The statutes enabling the dislocation often have proven much more effective at relocating individuals than resettling entire communities; however history shows both relocation and resettlement programs have a difficult time succeeding. Both federal and local support and funding often prove unreliable or unsustainable.*

*The history of population dislocation in Southeast Louisiana is generally one of failed government intervention. Some communities have been driven away by flooding. Some have disappeared as a result of public works projects. Still others have maintained community integrity in spite of a lack of government consideration and assistance. Where resettlement efforts have been undertaken, they have been curtailed or limited for political or philosophical reasons. This history has led to an ingrained public distrust of relocation or resettlement projects.*

The Tulane paper goes on to note up to 86 percent of at-risk families stand to benefit from Coastal Master Plan structural interventions; however, those outside of that number, specifically those residing in sparsely populated rural communities, remain vulnerable in their current locales. Native American communities in southern Lafourche and Terrebonne parishes are particularly at-risk.

Put plainly, Louisiana must improve upon our nation's track record in both relocation and resettlement initiatives. Without a proactive approach, relocation will take place ad hoc, as illustrated by previously noted migration patterns following Hurricane Katrina. Whether a household uses insurance proceeds to move following a disaster event, or accepts a voluntary buyout for fair market value, the outcome is the same – there is no investment in keeping communities together, nor is there a mechanism to maintain social and cultural bonds developed within our state's most vulnerable populations. As such, our choice is to wait for individual households to relocate on their own, or we can engage our most vulnerable communities and attempt to preserve their cultural and economic value by initiating community resettlements before individual relocations erode whatever communal value may have existed.

Resettlement is painful, but in parts of Louisiana, it is also necessary. LA SAFE envisions a systems-based approach to community-led planning and group migration. It is a small-scale, targeted strategy for culturally-sensitive at-risk communities and special needs groups, including the disabled, the elderly, disaffected minority groups and very low income populations. It is intended to capture a community's remaining – and often rapidly dwindling – value and transfer it to an environment in which it has the opportunity to grow and ultimately thrive.

#### **Resettlement Project #1: Isle de Jean Charles Resettlement.**

In the face of a rising sea level and its effects on the safety and viability of coastal communities, nations worldwide have acknowledged the urgent need to establish working models to assist in resettling coastal communities while maintaining their cultural integrity. The Isle de Jean Charles Band of Biloxi-Chitimacha-Choctaw located in coastal Terrebonne Parish, a region that leads the world in land loss, is ideally positioned to develop and test resettlement adaptive methodologies because their need to resettle has become urgent. Until the new millennium, the tribe's self-sufficiency and ability to adapt to change and maintain culture at the site of their community were strong and allowed most tribal families to remain on the site called "The Island". With the loss of more than 98 percent of the land, however, relocation is inevitable; only 320 acres remain of what was a 22,400-acre Island in 1955. Many families have been forced to leave the Island on account of this dramatic condition.

A new settlement (Fig21.pdf) will provide tribal members an opportunity to relocate to disaster resilient and energy efficient housing, while offering the tribe a space to build cultural resilience. The tribe faces increasing pressures from storms and relative sea level rise on the Gulf Coast. In reaction, many tribal members have moved to disparate parts of the state. The tribe has physically and culturally been torn apart with the scattering of members. A new settlement offers an opportunity for the tribe to rebuild their homes and secure their culture on safe ground.

In visioning a culturally appropriate, healthy and sustainable community, utilizing best practices, the tribe anticipates the successful resettlement will include innovative technologies and state-of-the-art



resilience measures, integrating historical traditions and proactive solutions for this time of change. These efforts can help not only Isle de Jean Charles but will also lead other communities to implement appropriate resettlement measures when the conditions of their coastal locations warrant such action.

Resettlement presents several challenges and complexities that require a more precise planning method than might be implemented for other community changes and requires a systems approach, given:

- The process is excessively complex.
- Failure to accomplish a successful resettlement, including in the time-frame required to manage community risk, could lead to a potentially catastrophic outcome.
- Because community resettlement has so few examples to learn from, especially under the specific circumstances of this situation, the precise outcomes are uncertain.

An ideal systems-based planning process will approach the goal of community change with consideration of the common actions and outcomes for a class or “family” of communities (all types of communities in coastal Louisiana) that will be needing, or wanting to accomplish a similar action, in this case resettlement. Then the principles and processes would be applied to assist specific communities.

Therefore, the development of the best practices for resettlement to a safer location of a specific community – such as that of the tribe – will occur concurrently and interactively (including feedback loops) between the specific Isle de Jean Charles resettlement with the proposed building of general best practices for the resettlement of the class of at risk coastal Louisiana communities which desire to relocate. The intent is to hone many of these generic principles before the next community(ies) request/require resettlement. As resettlement of coastal communities at risk to sea level rise and storm inundation in the lower 48 states has never occurred, the guidance that will be developed will also be proposed to begin identifying the principles important for resettlement of coastal communities throughout the risk zones of all lower-48 coasts of the United States.

The overarching goal is to create a teaching-learning community, a pilot site for climate change relocation with tribal livelihoods enhanced by innovation, teaching and sharing activities while traditional

cultural traditions are rekindled with the tribal members living in one community rather than scattered as they are today – some on The Island and others living in surrounding villages and towns.

The acquisition of a site for relocation is the first major phase in providing a planned, healthy community. Sites are being evaluated for their suitability for raising families, for growing food, for having characteristics as similar to their original site as possible (Fig21.pdf) and as safe as possible within the context of coastal Louisiana. As a site with reduced risk is being sought, the location should not be extremely far from the original site in order to retain traditional livelihood and cultural practices. All factors of the design and process will help to support and enhance tribal identity, sovereignty and dignity.

A Community Center (Fig22.pdf) is planned as part of the development, serving as an anchor and gathering place for the tribe. It is intended to be a point of contact with the land, a place for meetings, rituals and evolution of site development. Its design includes temporary residential space that will double as refuge in the event of storms that threaten the existing homes of the tribal community. The community center also incorporates a resilient power system, in the form of solar photovoltaics and battery energy storage, which will provide a portion of the ongoing electricity needs as well as electricity during a grid outage. Housing designs will include layouts suitable for seniors and others who require assisted living, homes large enough for extended families and space for the next generation's homes near their elders. The community will be constructed as flexibly as possible so that as functions and uses emerge, the structures and infrastructure will be appropriate for current as well as these future goals. And as long as The Island exists, it will be retained for traditional uses and tribal identification as all the members relocate. It is expected that the connecting road will very soon be impassible and thus the access will be only by boat.

The new site is envisioned as a practical, affordable, living demonstration of a tribal resettlement. Tribal community input, vision and leadership will be core to all phases of the design of a site that meets current and future needs and desires while tracking previous Island life, resources and infrastructure to the maximum feasible. Individual family gardens, localized flooding and water management methods will be used to treat water as a resource rather than a problem. Bioswales, strategic tree planting, and community

parks and play areas will be multi-functional and will receive excess rainwater (stormwater detention) as well as provide locations for recreation and community interaction dynamics.

The structures will be created with resilient design methods that include extreme storm risk reduction, low-tech infrastructure and design and energy efficiency. The process will examine modest-income comparables nationwide. First floor elevations will meet both current requirements and anticipated increases (i.e. ‘freeboard’). Renewables will be emphasized such as solar, earth-coupled (or water-coupled) heat pump systems, with wells shared by clustered homes, and locally-sourced building materials and equipment. Tribe members will have the opportunity to be trained in advanced sustainable building technology and participate in construction of new homes while gaining capacity for employment in the region. Other green approaches will include construction waste reduction, pervious paving and pedestrian-friendly community/commercial facilities. Wastewater innovations are also transferable globally.

In order to accomplish these large and complex goals, the site and buildings which are built upon it must reflect the tribe’s culture and their preferences while also incorporating the most advanced state-of-the-art practices in order to assure that the community represent physical and economic resiliency along with cultural. The site relies on culturally appropriate green infrastructure design, a process described in publications from the Sustainable Native Communities Collaborative (2015). The tribe will be supported by the Lowlander planning team. The team, who also partnered with the state to develop this proposal, includes one landscape architecture and two architecture firms. The team was assembled based on experience working with tribal and indigenous communities, designing sites on environmentally sensitive lands and their ability to work well with the tribe.

The site will be a livable and walkable community with green infrastructure designs such as innovative storm water management, bioswales and rain gardens; wetland creation and management, various types of concrete as a prime building material, and electricity generation with photovoltaic panels. These sustainable and resilient practices combine with culturally appropriate community designs,

including 100 single family homes arranged with lines of sight to other homes within a family, a central community space, and a barrier between public and private space on the settlement.

This approach is in line with the elements of resiliency included in the NDRC Capacity Building Rockefeller Academy held in July. The Economy and Society goals described were:

- Develop strategies that support livelihoods, bolster social stability and build resilience value in communities.
- Build collective identity and empower stakeholders to strengthen community resilience.

For no other project are these recommendations more appropriate because a tribe is being rejoined that must recreate the social stability and collective identity some 50 years after the coastal degradation began driving it apart. This will very likely be the only opportunity that the tribe has to escape final community destruction and re-gather with the site/infrastructure/homes capacity to achieve the two goals described above.

Eligible Activity: 105(a)(1). 105(a)(2). 105(a)(11). 105(a)(12). The above describes the resettlement of the Isle de Jean Charles community to higher-ground, less vulnerable lands. This involves the acquisition of a new site on which to found the settlement, construction of housing, relocation of the community and a planning initiative to both guide the resettlement and monitor its outcomes.

National Objective: LMI-Housing (100.0%)

Metrics:

- **Resilience Value:** (1) Reduction of expected property damages due to future disasters; (2) Reduction of expected casualties from future disasters; (3) Value of reduced displacement caused by future disasters.
- **Environmental Value:** (1) Reduced energy use; (2) Reduced stormwater runoff; (3) Wetlands restoration and reforestation.
- **Social Value:** (1) Benefit to low- and moderate-income persons and/or households; (2) Improved living environment; (3) Greater housing affordability.

- **Economic Revitalization Benefit:** (1) Direct effects on local or regional economy; (2) Value of property.

**BCA.** A BCA has been completed for this proposal and is submitted as Attachment F.

**Scaling/scoping.** The state has unveiled a resilience policy framework, LA SAFE, along with a Fund to develop programs and projects consistent with this set of policy objectives. In doing so, we have presented a set of 10 initial projects across Resettlement, Retrofitting and Reshaping typologies that are designed to both launch the framework as a serious initiative across the state's Coastal Zone and also test the logic of the typologies of LA SAFE. Therefore, the state does not expect, nor does it require HUD to make awards toward each and every proposed project in this application; rather, it has presented a series of options from which HUD may choose to invest in a good faith effort to build upon lessons learned in Louisiana during the past decade. However, we do believe each of the typologies are imperative as not only a collective, three-pronged strategy to build resilience, but also as stand-alone proposals benefitting individual communities within our larger vulnerable geography. As such, the state believes it makes sense to award across the typologies in some fashion, as they are part of a systemic approach to resilience.

Specific opportunities for scaling and scoping are listed as follows:

*LA SAFE Fund.* The state chose to request \$40 million as it believes this is a realistic total to both make awards that may reasonably impact resilience-building activities while also having the opportunity to leverage dollars with other sources of financing, including revenue generated from assessments, bonds, financing districts and any other mechanism by which value additions may be quantified and monetized. Still, as these dollars are not programmed to any particular activity, they may be scaled in any way HUD deems prudent.

*Reshaping.* Collectively, we have proposed four separate projects – Pontchartrain Breakwaters, St. John Water Works, St. John Resilient Housing and St. John Multimodal Transit – which we believe would lead to real change in future community development patterns in the parish and specifically and emphasis on high-quality development oriented within its high-ground riverbank lands. While HUD may not choose

to award all four proposals to achieve this goal, we do believe all four contribute in a unique and meaningful way as a catalyst for smart suburban growth patterns in the future. The following discusses scaling opportunities within individual project proposals:

- St. John Water Works: The state's CDBG-NDR request is broken into three parts – LaPlace Water System (\$34,175,000), Pump and Lift Station Power Redundancy (\$9,364,409) and Decommission Ruddock Well System (\$1,113,600). While the Ruddock Well System cannot be decommissioned without first resourcing water from the Mississippi River, the resourcing can take place without the decommissioning at Ruddock. Likewise, the resourcing of water and the retrofitting of critical pump and lift stations can individually provide benefit irrespective of one another.
- St. John Resilient Housing: This development has been modeled to create 128 units to replace 116 public housing units currently at the site. As HUD is aware from its extensive experience building multi-family developments, there is always built in scalability with the trade-off of creating fewer units.

*Retrofitting*. Each project proposed within this typology provides individual protective benefit in the communities for which they are proposed. As such, they are not interconnected and can either occur collectively, as proposed here, or individually, as HUD may so choose. An individual discussion of scoping within the proposed Coastal Nonstructural Mitigation Program follows:

- Coastal Nonstructural Mitigation: To build the portal and complete the study supporting this project, we decided on an arbitrary amounts to plug into the CPRA and RAND modeling tool. The tool is meant to demonstrate our unique capacity to build a more nuanced and advanced project around the asset mapping and modeling capabilities at our disposal. HUD may notice that we have built the tool around three budget levels – low, medium and high – but also added an ‘infinite’ option. This option illustrates the total estimated need – \$731.7 million – within target areas in

Plaquemines, Lafourche and Terrebonne parishes. Therefore, through the tool, we can develop a prioritized elevation project at any level between the cost of a single elevation and \$731.7 million.

**Resettlement.** The resettlement of Isle de Jean Charles has been priced over three phases at approximately \$100 million to settle 100 households. Within this application, we have scaled this back to development Phase 1 only, which includes land acquisition, pre-planning, physical infrastructure, utilities and housing construction for an initial 40 units. We do believe this is scalable based on whatever priority HUD may have, but this would require a more nuanced conversation involving HUD, the state, its partners and, ultimately, the tribe in question.

**Program Schedule.** The following assumes an approximate program timeline of 1,270 days if initial grant agreements are in place April 2016 and all activities are completed by the end of September 2019, with subsequent grant agreements executed as funds are obligated between April 2016 and September 2017. All timelines are assumed to begin with the execution of an initial grant agreement in April 2016.

#### **LA SAFE Fund Timeline**

<b>LA SAFE Fund (unprogrammed)</b>		<b>IDJC Resettlement</b>		<b>Storm Harbor Network</b>	
<i>Milestone</i>	<i>Days</i>	<i>Milestone</i>	<i>Days</i>	<i>Milestone</i>	<i>Days</i>
Application Intake & Review	180	Planning/ Site Selection	180	Planning/ Site Selection	365
Awards Announced	-	Pre-Development/ Procurement	180	Pre-Development/ Procurement	180
Environmental Review/Permitting	180	Environmental Review/Permitting	180	Environmental Review/Permitting	180

Construction/					
Implementation	820	Construction	640	Construction	365
Closeout	90	Closeout	90	Closeout	90
<b>Total</b>	<b>1,270</b>	<b>Total</b>	<b>1,270</b>	<b>Total</b>	<b>1,180</b>

<b>Living Mitigation</b>		<b>Plaquemines Polders</b>		<b>Terrebonne Oyster Bed</b>	
<i>Milestone</i>	<i>Days</i>	<i>Milestone</i>	<i>Days</i>	<i>Milestone</i>	<i>Days</i>
Pre-Development/		Pre-Development/		Pre-Development/	
Procurement	180	Procurement	455	Procurement	180
Environmental		Environmental		Environmental	
Review/Permitting	180	Review/Permitting	365	Review/Permitting	180
Construction	540	Construction	360	Construction	540
Closeout	90	Closeout	90	Closeout	90
<b>Total</b>	<b>990</b>	<b>Total</b>	<b>1,270</b>	<b>Total</b>	<b>990</b>

<b>Coastal Nonstructural Mitigation</b>		<b>Pontchartrain Breakwaters</b>		<b>St. John Water Works</b>	
<i>Milestone</i>	<i>Days</i>	<i>Milestone</i>	<i>Days</i>	<i>Milestone</i>	<i>Days</i>
		Pre-Development/		Pre-Development/	
Planning/Outreach	180	Procurement	180	Procurement	180
Application Intake &		Environmental		Environmental	
Review	180	Review/Permitting	180	Review/Permitting	180
Environmental					
Review/Permitting	90	Construction	365	Construction	730
Construction	730	Closeout	90	Closeout	90



Closeout	90	<b>Total</b>	<b>815</b>	<b>Total</b>	<b>1,180</b>
	<b>Total</b>	<b>1,270</b>			

<b>St. John Resilient Housing</b>		<b>St. John Multimodal Transit</b>	
<i>Milestone</i>	<i>Days</i>	<i>Milestone</i>	<i>Days</i>
Pre-Development	180	Planning	365
Environmental		Pre-Development/	
Review/Permitting	180	Procurement	180
		Environmental	
Construction	730	Review/Permitting	180
Closeout	90	Construction	365
	<b>Total</b>	Closeout	90
	<b>1,180</b>	<b>Total</b>	<b>1,180</b>

**Budget.**

<b>Project Number</b>	<b>Project/Activity Title</b>	<b>Funding Source</b>	<b>Responsible Organization</b>	<b>Project Budget</b>	<b>Activity Budget</b>
<b>001</b>	<b>Administration</b>			<b>\$20,623,864</b>	
	Administration	CDBG-NDR	State of Louisiana		\$20,623,864

<b>002</b>	<b>LA SAFE Fund</b>			<b>\$40,000,000</b>	
	LA SAFE FUND - UN	CDBG-NDR	State of Louisiana		\$19,875,000

	LA SAFE FUND - LMA	CDBG-NDR	State of Louisiana		\$19,875,000
	Leverage	OCD/DRU	State of Louisiana		\$250,000

<b>003</b>	<b><i>IDJC Resettlement</i></b>			<b><i>\$48,379,249</i></b>	
	IDJC Resettlement	CDBG-NDR	State of Louisiana		\$42,068,912
	Project Delivery	CDBG-NDR	State of Louisiana		\$6,310,337

<b>004</b>	<b><i>Plaquemines Polders</i></b>			<b><i>\$46,963,611</i></b>	
	Plaquemines Polders - UN	CDBG-NDR	Plaquemines Parish		\$22,268,419
	Plaquemines Polders - LMA	CDBG-NDR	Plaquemines Parish		\$9,498,227
	Plaquemines Polders - Leverage	Port of Plaquemines	Plaquemines Parish		\$500,000
	Plaquemines Polders - Leverage	Plaquemines Parish	Plaquemines Parish		\$6,000,000

	Plaquemines Polders - Project Delivery	CDBG-NDR	Plaquemines Parish		\$8,696,965
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<b>005</b>	<b><i>Storm Harbor Network</i></b>			<b><i>\$12,000,000</i></b>	
	Storm Harbor Network	CDBG-NDR	State of Louisiana		\$10,700,000
	Storm Harbor Network - Project Delivery	CDBG-NDR	State of Louisiana		\$1,300,000

<b>006</b>	<b><i>Living Mitigation</i></b>			<b><i>\$11,440,000</i></b>	
	Living Mitigation - LMA	CDBG-NDR	Terrebonne Parish		\$5,435,040
	Living Mitigation - UN	CDBG-NDR	Terrebonne Parish		\$1,324,960
	Living Mitigation - Leverage	Terrebonne Parish	Terrebonne Parish		\$3,640,000
	Living Mitigation - Project Delivery	CDBG-NDR	Terrebonne Parish		\$1,040,000

<b>007</b>	<b><i>Terrebonne Oyster Bed</i></b>			<b><i>\$7,432,515</i></b>	
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	Terrebonne Oyster Bed - LMA	CDBG-NDR	Terrebonne Parish		\$2,771,166
	Terrebonne Oyster Bed - UN	CDBG-NDR	Terrebonne Parish		\$1,377,286
	Terrebonne Oyster Bed - Leverage	Terrebonne Parish	Terrebonne Parish		\$2,608,380
	Terrebonne Oyster Bed - Project Delivery	CDBG-NDR	Terrebonne Parish		\$675,683

<b>008</b>	<b><i>Coastal Nonstructural Mitigation</i></b>			<b><i>\$481,266,408</i></b>	
	Coastal Nonstructural Mitigation - LMI	CDBG-NDR	State of Louisiana		\$169,960,000
	Coastal Nonstructural Mitigation - Leverage	FEMA HMGP	State of Louisiana		\$299,166,408
	Coastal Nonstructural	CDBG-NDR	State of Louisiana		\$12,140,000

	Mitigation - Project Delivery				
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<b>009</b>	<b><i>Pontchartrain Breakwaters</i></b>			<b><i>\$4,798,744</i></b>	
	Pontchartrain Breakwaters - LMA	CDBG-NDR	St. John Parish		\$1,085,080
	Pontchartrain Breakwaters - UN	CDBG-NDR	St. John Parish		\$1,887,741
	Pontchartrain Breakwaters - Leverage	St. John the Baptist Parish	St. John Parish		\$1,200,000
	Pontchartrain Breakwaters - Project Delivery	CDBG-NDR	St. John Parish		\$625,923

<b>010</b>	<b><i>St. John Water Works</i></b>			<b><i>\$84,806,490</i></b>	
	St. John Water Works- LMA	CDBG-NDR	St. John Parish		\$17,146,755
	St. John Water Works - UN	CDBG-NDR	St. John Parish		\$27,506,254

	St. John Water Works - Leverage	St. John the Baptist Parish	St. John Parish		\$33,455,531
	St. John Water Works - Project Delivery	CDBG-NDR	St. John Parish		\$6,697,950

<b>011</b>	<b><i>St. John Resilient Housing</i></b>			<b><i>\$19,477,403</i></b>	
	St. John Resilient Housing - LMI	CDBG-NDR	St. John Parish		\$11,336,251
	St. John Resilient Housing - Leverage	Chase Bank	St. John Parish		\$3,000,000
	St. John Resilient Housing - Leverage	State of Louisiana/ LIHTC	St. John Parish		\$4,402,402
	St. John Resilient Housing - Project Delivery	CDBG-NDR	St. John Parish		\$738,750

<b>012</b>	<b><i>St. John Multimodal Transit</i></b>			<b><i>\$10,135,580</i></b>	
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	St. John Multimodal Transit - LMA	CDBG-NDR	St. John Parish		\$3,475,056
	St. John Multimodal Transit - UN	CDBG-NDR	St. John Parish		\$5,574,569
	St. John Multimodal Transit - Project Delivery	CDBG-NDR	St. John Parish		\$1,085,955
				<b>Total</b>	<b>\$787,323,864</b>
				<b>Total Leverage</b>	<b>\$354,222,721</b>
				<b>Total Request</b>	<b>\$433,101,143</b>

**Consistency with Other Planning Documents.** All activities proposed as part of this application have been developed in accordance with local comprehensive and hazard mitigation plans. Planning officials from St. John the Baptist, Terrebonne, Lafourche and Plaquemines parishes have submitted letters verifying that the projects proposed are consistent with local plans. This evidence has been included in Attachment D.

## Exhibit F: Factor 4 - Leverage and Outcomes

ExhibitF\_Fac4\_LevOutcomes\_LA.pdf

### State of Louisiana

Division of Administration  
Office of Community Development  
Disaster Recovery Unit





## **Exhibit F: Leverage**

For the purposes of this application and any future CDBG-NDR award, the state has secured the following sources of leverage:

### **LA SAFE Fund (unprogrammed).**

OCD-DRU has committed \$250,000 – as demonstrated in Phase 1 – toward the creation of the LA SAFE Fund. Should HUD not make an award to this program, OCD-DRU may reprogram this commitment to another CDBG-NDR project.

### **Living Mitigation.**

TPCG has committed \$3,640,000 as direct leverage toward this project, contingent upon award.

### **Plaquemines Polders.**

The following sources of direct leverage have been secured, contingent upon award of this project:

- *PPG*: \$6,000,000
- *Port of Plaquemines*: \$500,000

### **Terrebonne Oyster Bed Surge Attenuation.**

TPCG has committed \$2,608,380 as direct leverage toward this project, contingent upon award.

### **Coastal Nonstructural Mitigation.**

GOHSEP has committed \$299,166,408 as direct leverage to conduct nonstructural mitigation activities within and in an area larger than the state's four target areas.

### **Pontchartrain Breakwaters.**

SJBG has committed \$1,200,000 as direct leverage toward this project, contingent upon award.

### **St. John Water Works.**

The following sources of leverage have been secured, contingent upon award of this project:

- *SJBG (direct)*: \$27,353,392
- *SJBG (supporting)*: \$6,102,139

The distinction between direct and supporting leverage is made as the parish has already made investments in various aspects of this project. The supporting leverage indicated here are those investments made between the NOFA's release on September 17, 2014 and October 1, 2015.

**St. John Resilient Housing.**

The following sources of direct leverage have been secured, contingent upon award of this project:

- *OCD-DRU*: \$4,402,402 (Note: OCD-DRU has pledged this sum as leverage intending to be taken out upon sale of 4% Low Income Housing Tax Credits. Letters from LHC indicating the project appears eligible for a LIHTC award and Boston Capital pledging to provide this sum as an equity investment have been included. If for some reason LIHTCs do not materialize, OCD-DRU is aware it is responsible for this direct leverage commitment.)
- *Chase Bank (mortgage)*: \$3,000,000

Letters guaranteeing the above leverage commitments have been included as Attachment B.

Additionally, we believe all of our target areas meet non-metro scoring criteria.

**Total Leverage Commitments.** \$354,523,335

**Total CDBG-NDR Request.** \$433,101,143

**% Leverage Above Request:** 81.9%



## Exhibit G: Factor 5 - Long-Term Commitment

ExhibitG\_Fac5\_LTCommitment\_LA.pdf

### State of Louisiana

Division of Administration  
Office of Community Development  
Disaster Recovery Unit



## **Exhibit G: Long-Term Commitment**

In Phase 1, the state made a number of commitments specifically designed to build resilience not only within its four target areas, but across its entire vulnerable region. To build upon this response in Phase 2, the state will first provide an update on what it previously committed, followed by further action it has committed to undertake.

### **Phase 1 Commitment Updates.**

#### *CDBG-DR Commitments.*

Through its allocations of CDBG-DR funds specifically intended to address the effects of the area's Qualifying Disaster, Hurricane Isaac, as well as those allocated to recover from hurricanes Katrina, Rita, Gustav and Ike, the state has committed to numerous ongoing actions to enhance the resilience of both the target areas and a larger regional area impacted by the event. These actions are outlined and updated below.

St. John the Baptist Parish: In Phase 1, the state highlighted two Hurricane Isaac recovery programs, the parish's \$11,549,820 Homeowner Rehabilitation Program and its \$2,500,000 Housing Elevation Program, which are designed to rebuild and fortify residential structures within the floodplain and with recent flood-inundation history. In Phase 1, we projected the Homeowner Rehabilitation Program would provide mitigation and protection for 241 households and the Housing Elevation Program would serve an additional 20 homes. As of October, this program was completing pre-construction and environmental requirements, with construction activities to begin in November. All remaining program activities are expected to be completed prior to the grant's September 30, 2019 deadline.

Plaquemines Parish: Previously, the state highlighted two Isaac recovery programs underway in Plaquemines Parish, a \$12,828,400 Housing Assistance Program and a \$4,124,600 program providing cost shares for LMI recipients of Hazard Mitigation Grant Program elevation awards. As in St. John the Baptist, both programs were designed to rebuild and fortify residential structures within the floodplain and with recent flood-inundation history. In Phase 1, we projected these programs would provide

mitigation and protection for 282 households through the Housing Assistance Program and an additional 129 homes through the HM Cost Share elevation program. As of October, this program was completing pre-construction and environmental requirements, with construction activities to begin in January 2016. All remaining program activities are expected to be completed prior to the grant's September 30, 2019 deadline.

Comprehensive Resiliency Pilot Program: Additionally, in Phase 1 the state highlighted its Comprehensive Resiliency Pilot Program, which is intended to facilitate resilience-building community planning efforts through the creation of legislation, policies, knowledge, and public commitments necessary to avert disaster. In Phase 1, the state committed to completing and enacting plans and ordinances in 40 different parishes and municipalities. To date, 29 have been completed, and all are anticipated to be completed by the end of 2016.

*Louisiana Sea Grant Resilience Program.*

In December 2014, [LSG gave awards to five proposals](#) selected for their ability to enhance regional resilience. At the conclusion of this process, the state will use the products created through this program to inform both specific initiatives that may be proposed through the NDRC, as well as the LA SAFE Framework, and the long-standing resilience-oriented initiatives in which it has engaged over the past decade. As stated in Phase 1, all projects are designed to last two years, and are projected to be completed by the end of 2016.

*Coastal Master Plan (CMP).*

Since 2007, the state has substantially increased its financial commitment to coastal restoration and protection through its CMP. Overall, the state has built or improved approximately 250 miles of levees, constructed 45 miles of barrier islands and berms, improved over 25,700 acres of coastal habitat, identified and used dozens of different federal, state, local, and private funding sources, and moved over 150 projects into design and construction. In Phase 1, the state highlighted projects within target areas in

Plaquemines, Lafourche, and Terrebonne parishes. We projected these projects would create, maintain and nourish an additional estimated 73,399 acres of land in Plaquemines Parish, 7,640 acres in Terrebonne Parish, and 7,943 acres in Lafourche Parish. All of the projects are expected to be completed by June 30, 2017. Additionally, since the conclusion of Phase 1, projects have been completed creating 2,000 linear feet of levee in Lafourche Parish, 425 acres of dune and 553 acres of marshland in Plaquemines Parish, and 10,584 feet of rock dike shoreline protection in Terrebonne Parish. It further moved on October 21, 2015 to advance two major sediment diversion projects to engineering and design, a major step toward restoration and land building in the coast.

### **New Commitments in Phase 2.**

#### *Measuring Recovery: Impact Analysis of Hurricane Recovery.*

On January 20, 2015, the state released a “Request for Information (RFI) Regarding Analysis of CDBG-DR Programs and Expenditures in the State of Louisiana Since 2005.” Its intent was to analyze the net effects of its various long-term disaster recovery investments as HUD’s largest ever CDBG-DR grantee. It explored the potential ways future disaster recovery and resilience-building processes may be improved through lessons learned in Louisiana. Among other items, the RFI requested information on “methodology related to macro-and-micro level economic impacts resulting from its various investments in the housing, infrastructure, economic development and planning sectors” with emphasis on economic growth in impacted communities. In short, this effort seeks to guide and inform policy and program decision making in post-disaster environments to maximize the taxpayers’ investment in long-term recovery and resilience-building efforts – specifically the stated dual intent of the NDRC.

Following the RFI’s release, the state received submissions from eight well-respected consultant and academic organizations detailing how they would structure such a retrospective effort. For the first phase of this ‘Impact Analysis’ study, the state partnered with Louisiana State University’s Stephenson Disaster Management Institute (LSU SDMI) to find correlations between disaster recovery investments

and both immediate recovery and longer-term resilience indicators. This initial effort, dubbed [\*Measuring Recovery: Impact Analysis of Hurricane Recovery\*](#), was released on Hurricane Katrina's 10<sup>th</sup> anniversary and revealed initial findings through reports outlining housing, economic development, and infrastructure efforts.

The housing study found that the state can quantify real gains through its housing initiatives, and those gains lasted over time and through subsequent disaster events, like hurricanes Gustav and Ike and the Deepwater Horizon Oil Spill – indicating a resilience value. Within its infrastructure research, LSU SDMI found we have been able to show a correlation between the types of recovery investments made and structural improvements in the fiscal health of governments representing those affected areas. Again, by showing how such foundational interventions continued through 2013, we can quantify how repetitively affected areas have been increasingly well-equipped to withstand subsequent storm and other disaster events. Finally, economic development research indicated that the program not only helped businesses stay open, but it helped them expand.” Again, at a foundational, resilience-building level, the LSU SDMI study found correlations between the state's recovery investments and longer-lasting, sustainable growth.

As HUD's largest CDBG-DR grantee, the state has a unique ability to develop a robust slate of lessons learned informing future long-term disaster recovery efforts. Our first phase in this effort allowed us to articulate correlations over a period of time in which subsequent events repetitively affected common geographies and communities. The next step in the process is to establish causality. If we can understand how to tailor programmatic investments to reasonably cause resilience-building outcomes, then we can provide an effective blueprint for how a recovering jurisdiction can achieve maximum resilience outcomes in their own long-term recovery initiatives. The state sees such an effort as akin to the goals of the NDRC itself, insofar as they both actively seek to further a national knowledge base addressing long-term unmet disaster recovery needs while pivoting forward and building foundational resilience in our most affected

communities. Therefore, the state is committed to taking that next step in its efforts in developing national recommendations based on the causal relationships it can identify between its past investments and quantifiable resilience-value additions.

*Louisiana's Strategic Adaptations for Future Environments (LA SAFE).*

Elsewhere in this application, the state has outlined its resilience-building strategic policy framework, LA SAFE. The Framework articulates a resilience gap between the state's efforts to combat the effects of land loss, subsidence, and sea level rise and community development strategies within its Coastal Zone parishes. It accounts for current vulnerability while using state-of-the-art modeling to project future vulnerability over time. Through this NDRC process and the development of LA SAFE, the state is committed to bridging that gap. The state's lead organization for this NDRC application, the Office of Community Development (OCD-DRU), has outlined its adoption of LA SAFE through the proposals articulated in Phase 2. Moving forward, the state commits to aligning this strategic policy framework with existing state Hazard Mitigation Plans and the state's CMP before the end of 2016. It also commits to partnering with the four parishes within this application, St. John the Baptist, Terrebonne, Lafourche, and Plaquemines parishes, as well as the three parishes applying for NDRC funds separately – Orleans, Jefferson, and St. Tammany parishes – to locally adopt LA SAFE and align it with comprehensive plans within those respective jurisdictions.

Furthermore, the state commits to creating a responsible governance structure for the LA SAFE Fund to implement the program. OCD-DRU will establish an Investment Committee to evaluate and select projects for funding (as it becomes available) – beyond those already identified in this application. The Investment Committee will have not more than seven members, and be made up of representatives from OCD-DRU, as well representative from other partner state agencies. This committee will meet as needed to review projects and related information, as well as hear presentations from applicants and public comment related to projects under consideration. Projects to be brought before the Investment Committee



should be recommended for approval by OCD-DRU staff, as well as an Advisory Committee, which will be made up of representatives from the Resilience Committee (articulated below), statewide association(s) or nonprofits dealing with local governments, housing, economic development and/or planning; financial institutions, higher education institutions, and low income communities.

*Consultation with Alaska.*

Through Louisiana's participation in the NDRC, we have been made aware of Louisiana's and Alaska's shared coastal vulnerability and unique condition by which indigenous populations may be appropriate candidates for resettlement activities. Each state has partnered with such a vulnerable coastal community through our respective NDRC application efforts and have proposed resettlement activities within our two applications.

Regardless of the competition's outcome, we recognize our shared condition and we further recognize each of our states has a mutual interest in developing scalable and replicable models by which we facilitate organized communal retreats from our coastlines in cases where geographies have become untenable for habitation and local populations residing in such geographies have taken the hard choice to abandon their current settlements. As such, we have committed to work with Alaska to explore all opportunities by which we may share information and develop best practices.

Specifically we commit to the following:

- Upon submission of our states' respective NDRC applications, we will facilitate an exchange of all pertinent information and materials developed in conjunction with our respective resettlement proposals.
- Between the October 27 NDRC application submission date and January 2016, we will initiate an initial conference call to kick off and discuss the parameters of our states' ongoing collaboration. Additionally, we will discuss and critique the proposals submitted in conjunction with the NDRC.
- In each subsequent quarter following NDRC award announcements, we will hold at a minimum one conference call to monitor progress, exchange ideas and troubleshoot potential issues as they arise.
- To ensure open access to information, we will mutually collaborate to develop a file sharing system or other online mechanism to exchange information.

Should each states' resettlement activities move forward, we will explore opportunities to facilitate in-person fact-finding exchanges in both Louisiana and Alaska. Additionally, we will explore opportunities to meet in mutually agreeable locations as conferences and other occasions arise during which we may facilitate an exchange of information and ideas.

To solidify this commitment, we exchanged letters with our counterparts in Alaska outlining and agreeing to move forward in the above-stated fashion. This letter is included in Attachment D as evidence of this consultation.

#### *Regional Coordination.*

Throughout the NDRC application process, the State of Louisiana has worked closely with the three entitlement parishes eligible to apply in their own right. Through this coordination, multiple strategies have been developed by which the state, as a whole, may further resilience building actions beyond the NDRC. These are discussed individually below:

Regional Planning Commission (RPC) – Resilience Committee: The state, along with Jefferson, Orleans and St. Tammany parish, has agreed to stand on the newly-formed Resilience Committee. The Committee will serve as a key forum for all member parishes to convene and discuss the implementation of projects that build the region's resilience. The committee members will deliver project updates from each parish, discuss how the projects can create complementary outcomes and shared benefits, and share best practices and lessons learned.

Regional Resiliency Exchange – <https://louisiana.sphaera.world/>: Through a partnership with the Rockefeller Foundation, the four Louisiana applicants will share best practices and case studies. While the Regional Resilience Committee will be the place for sharing on an ongoing basis, this online portal will serve as a mechanism to memorialize and share success and challenges far beyond the grant period and with partners outside of the NDRC process.



## Attachment E: Optional Maps, Drawings, Renderings

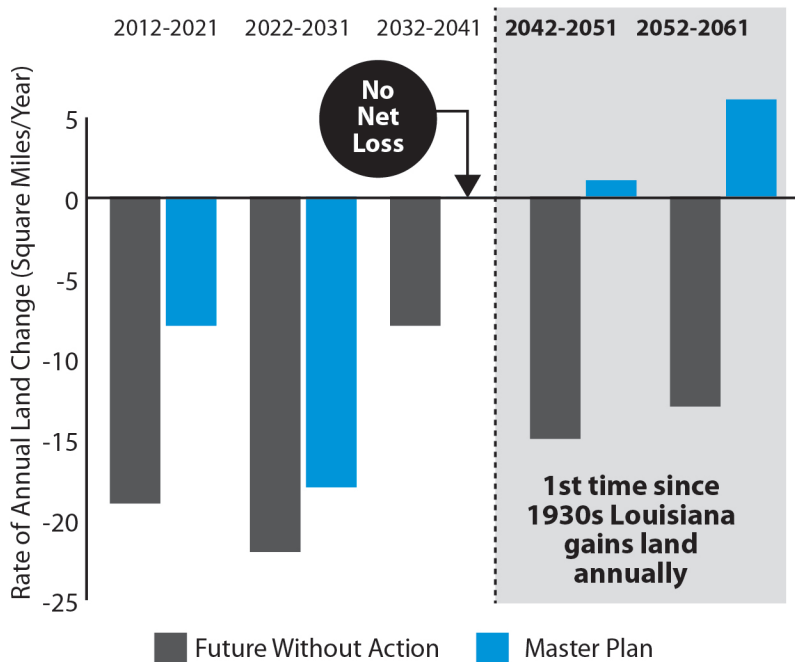
AttchE\_OptMapDrawingRendering\_LA.pdf

## State of Louisiana

Division of Administration  
Office of Community Development  
Disaster Recovery Unit



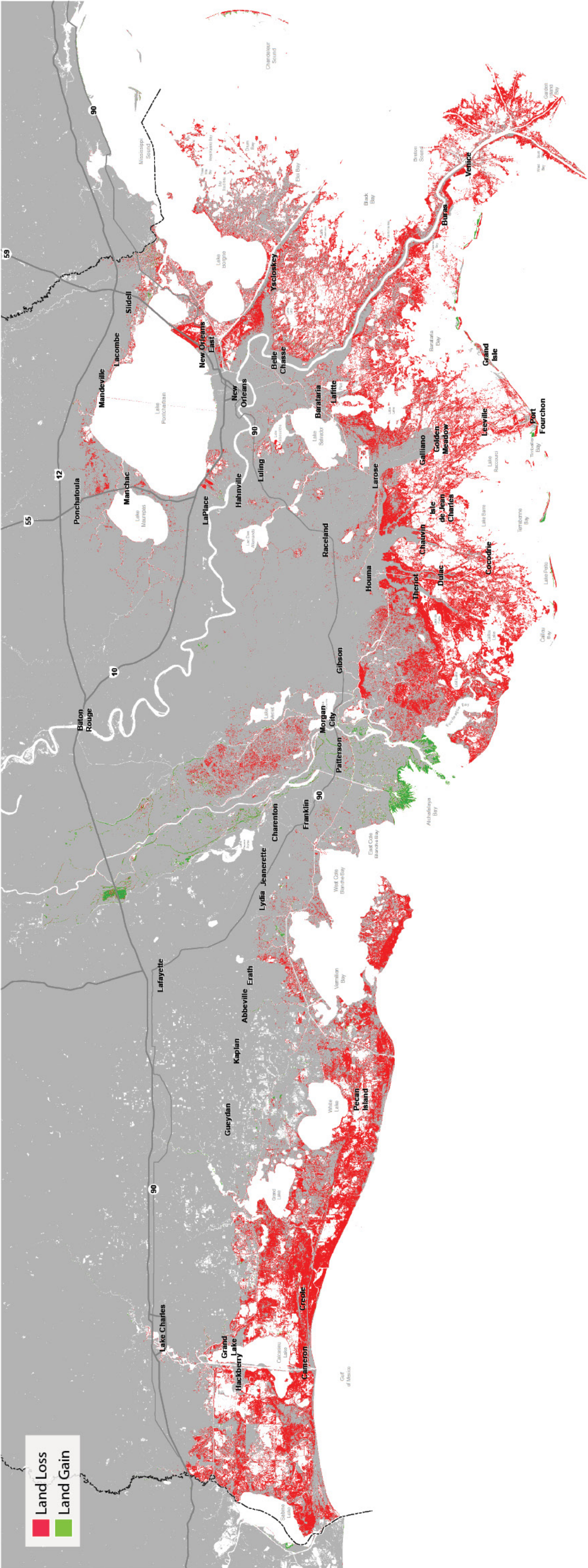
Fig1.pdf **Potential Annual Rates of Land Change Over the Next 50 Years**  
Source: CPRA



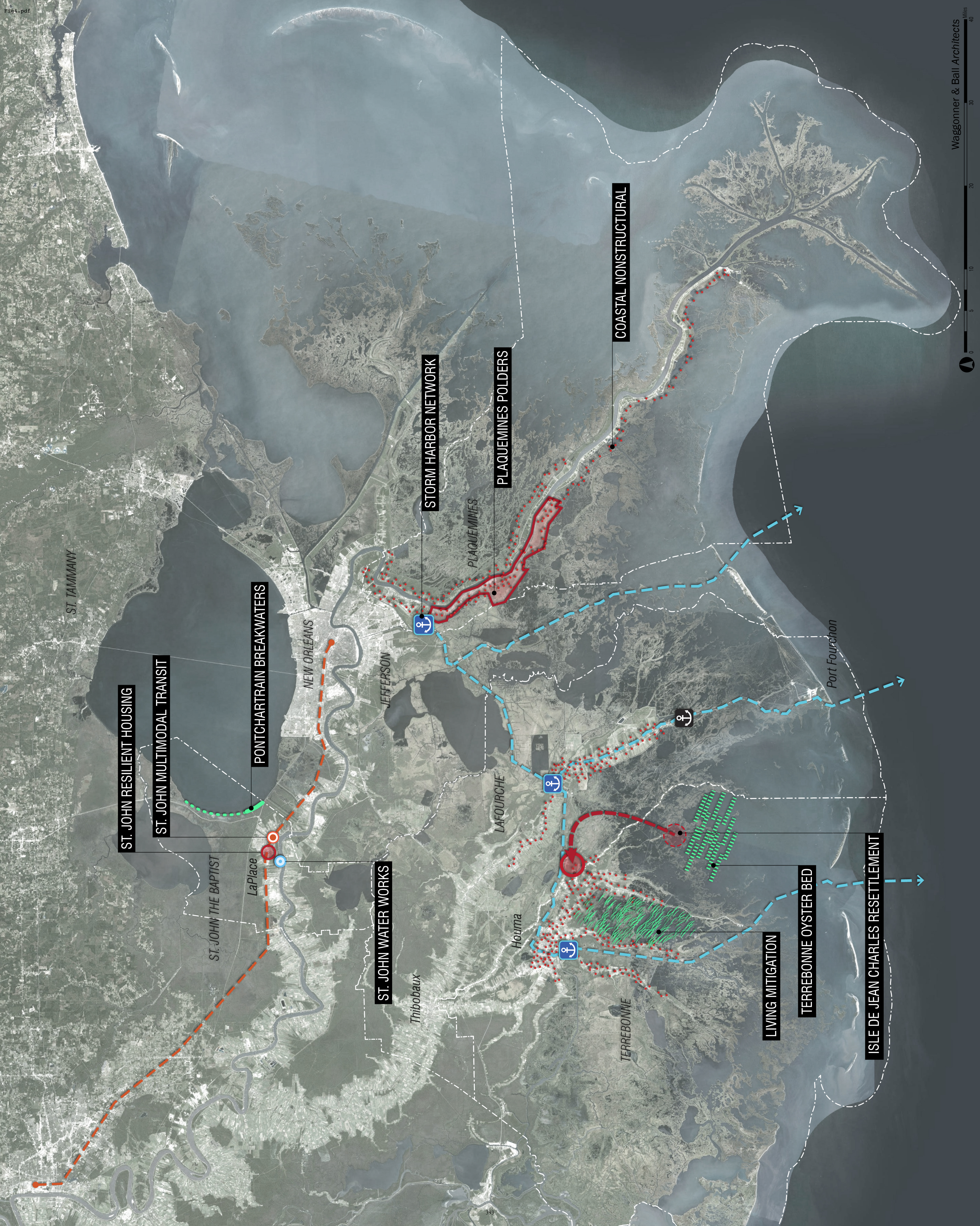




# Predicted Land Change over the Next 50 Years







ST. JOHN RESILIENT HOUSING

ST. JOHN MULTIMODAL TRANSIT

PONTCHARTRAIN BREAKWATERS

ST. JOHN WATER WORKS

STORM HARBOR NETWORK

PLAQUEMINES POLDERS

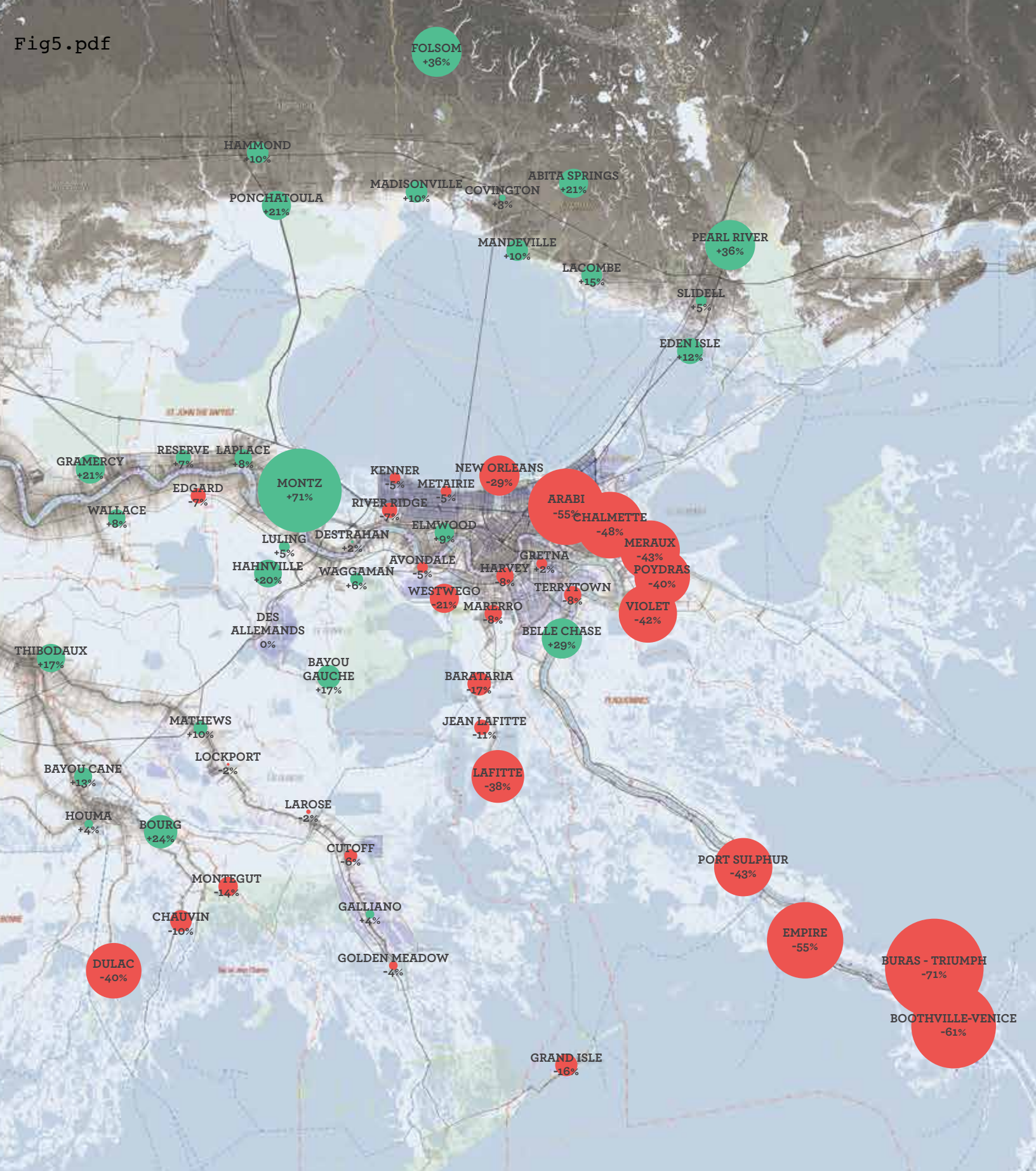
COASTAL NONSTRUCTURAL

LIVING MITIGATION

TERREBONNE OYSTER BED

ISLE DE JEAN CHARLES RESETTLEMENT





Percentage Change  
in Population, 2000 - 2010  
CDP of Southeast Louisiana

Base map: Waggoner & Ball Architects  
Data source: Census 2000, 2010





GEOLOGY

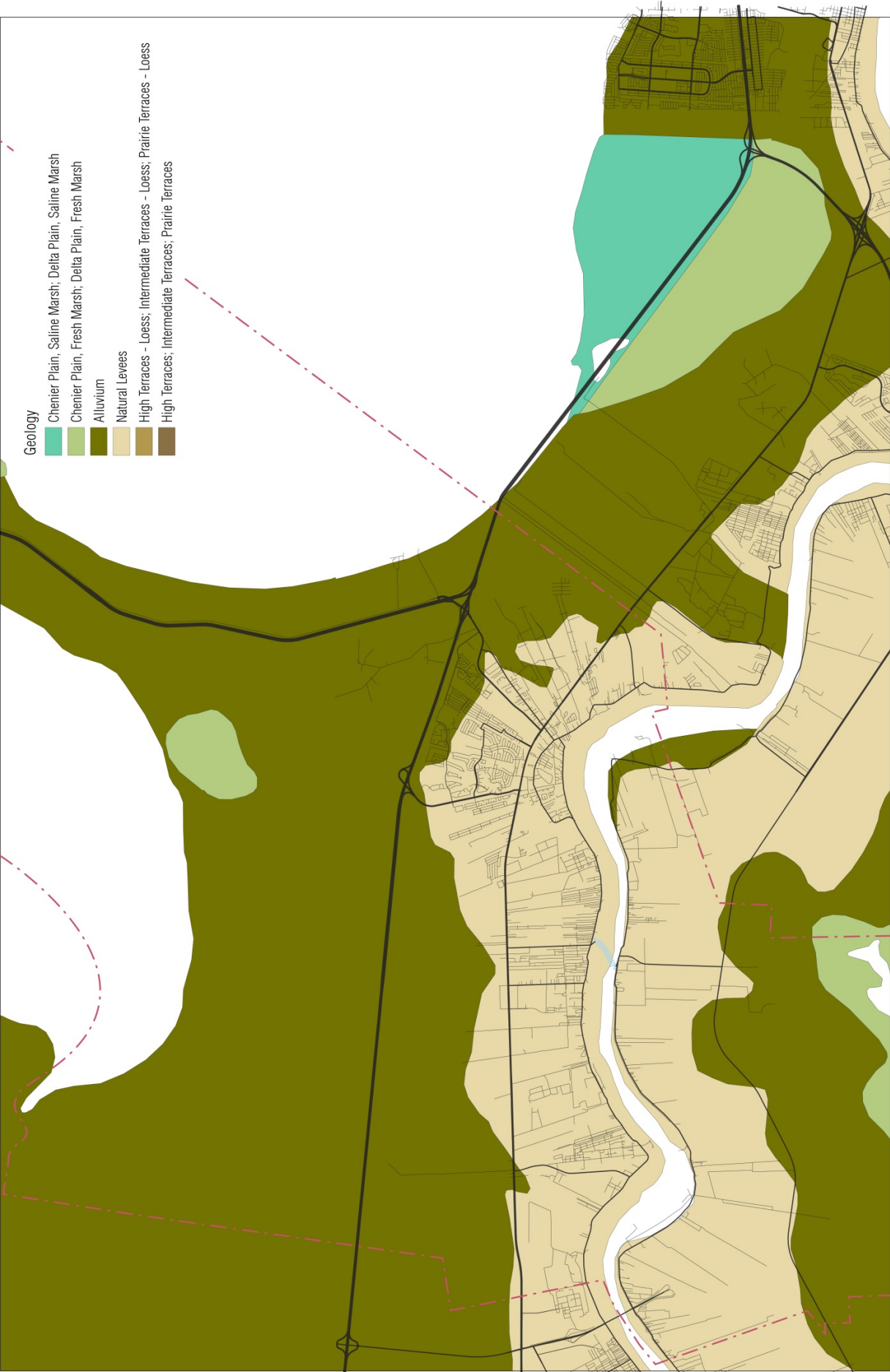
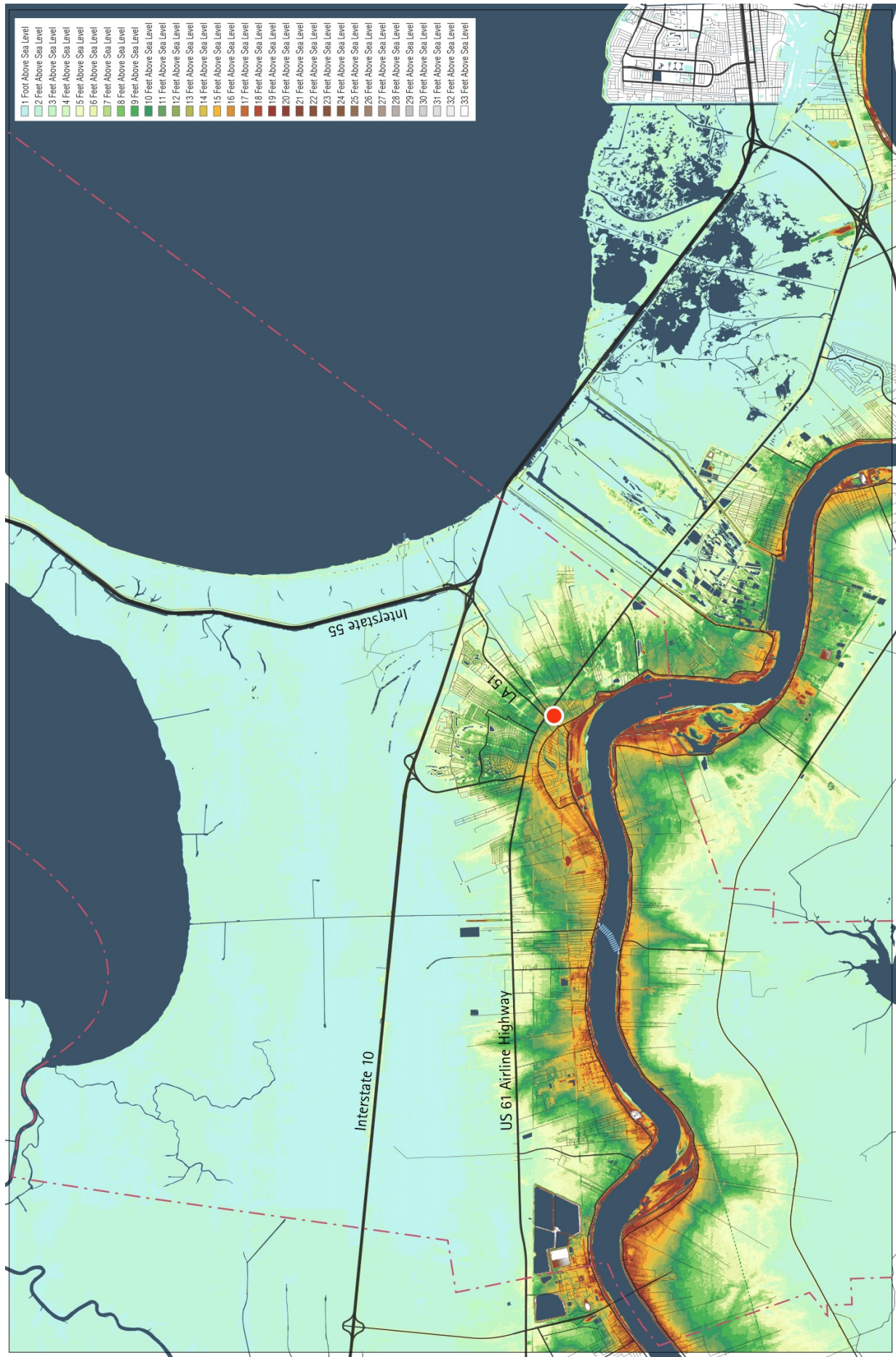


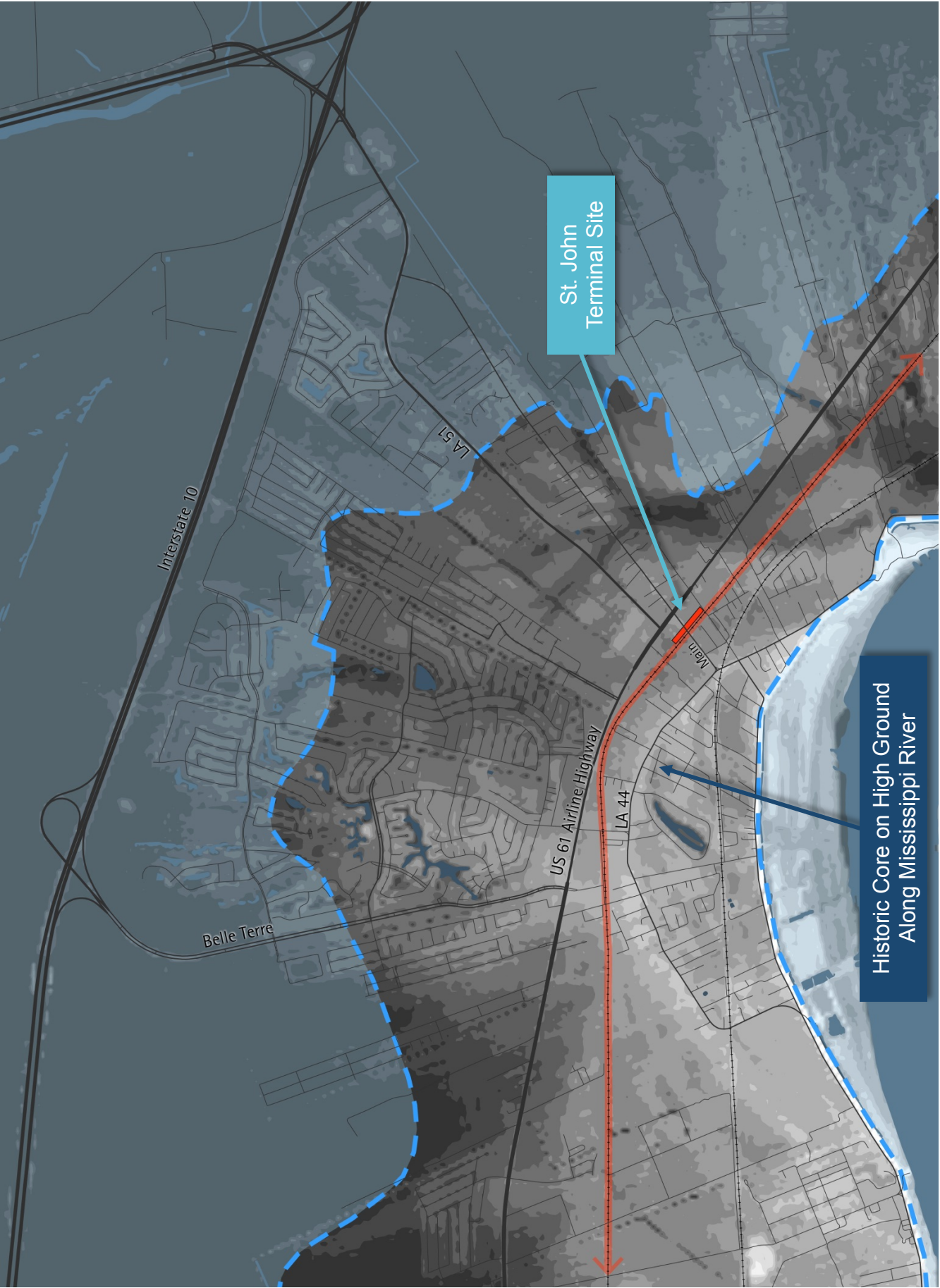
Fig7.pdf

# ELEVATION



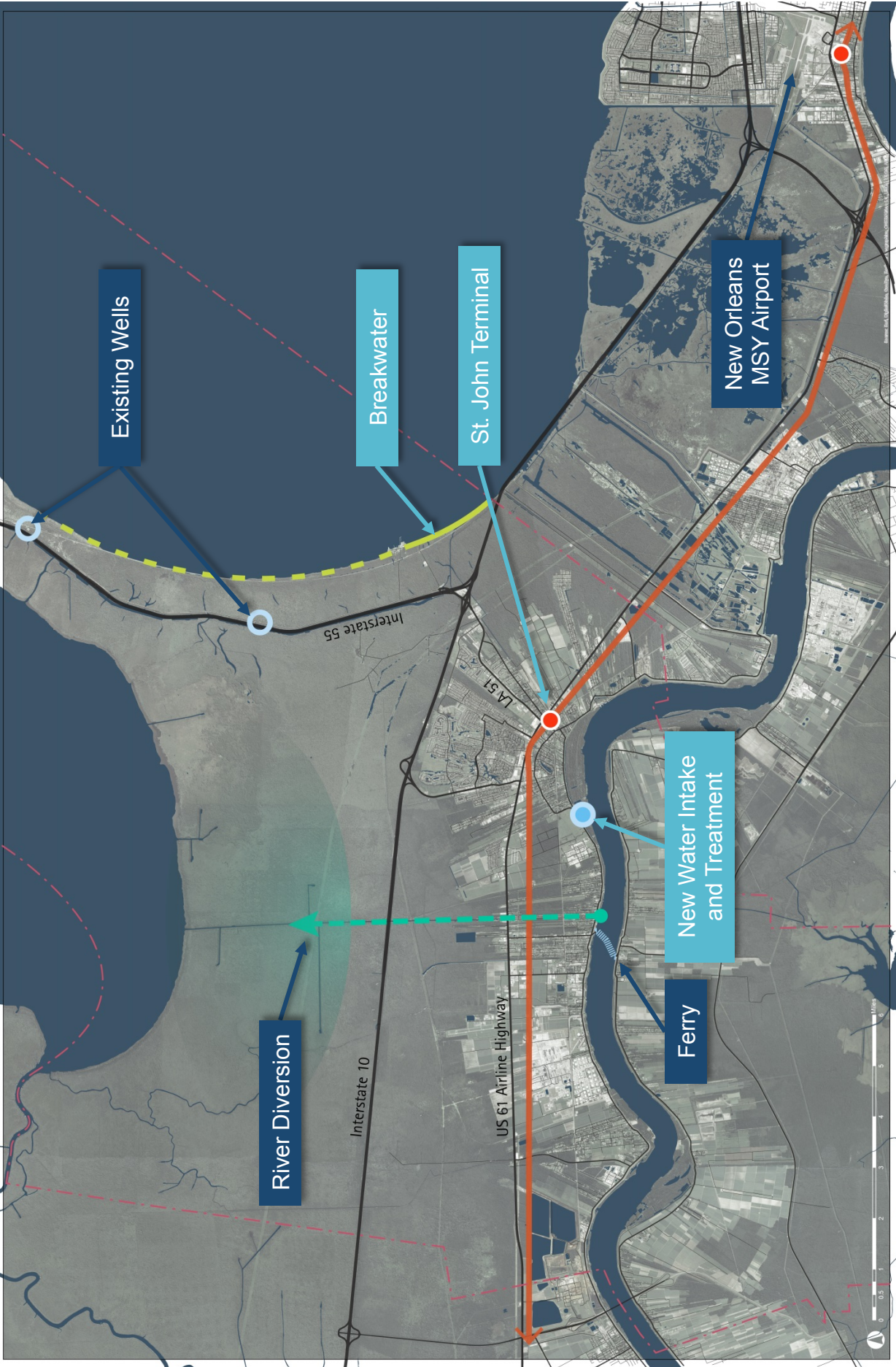


100 YEAR FLOOD ZONE



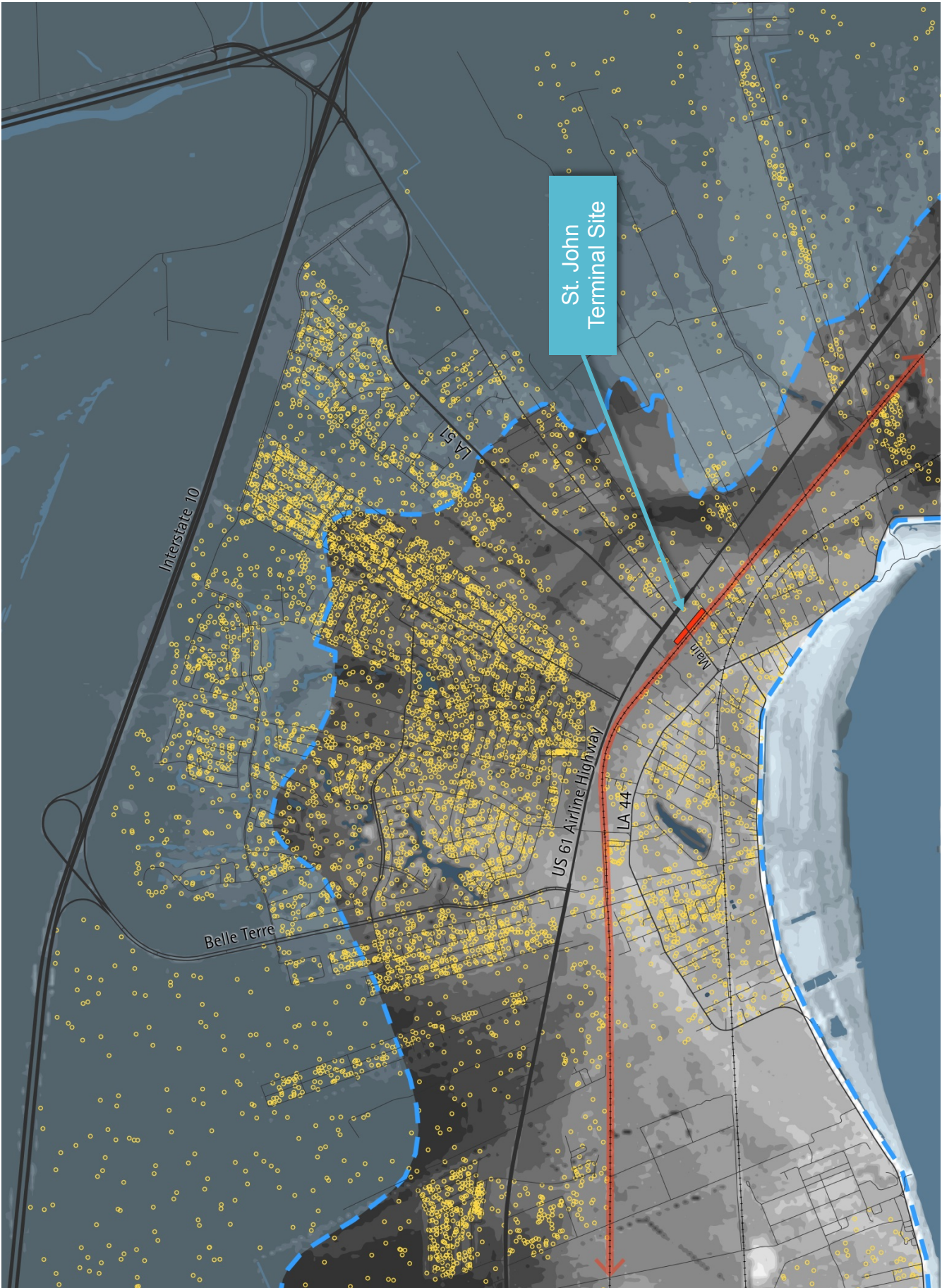


NDRC PROJECTS





POPULATION DENSITY





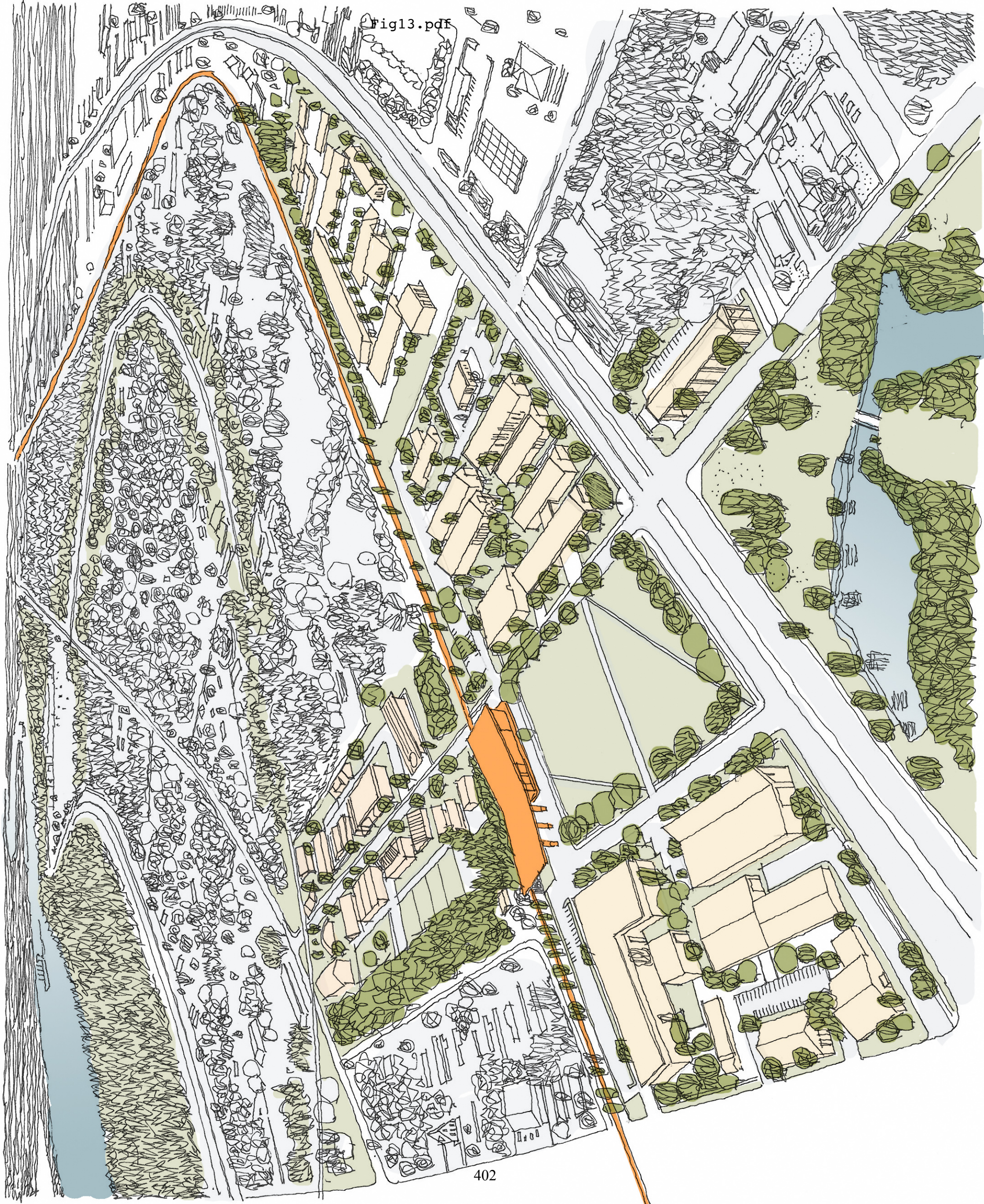
# MULTI-MODAL TERMINAL SITE













LA PLACE FOCUS AREA

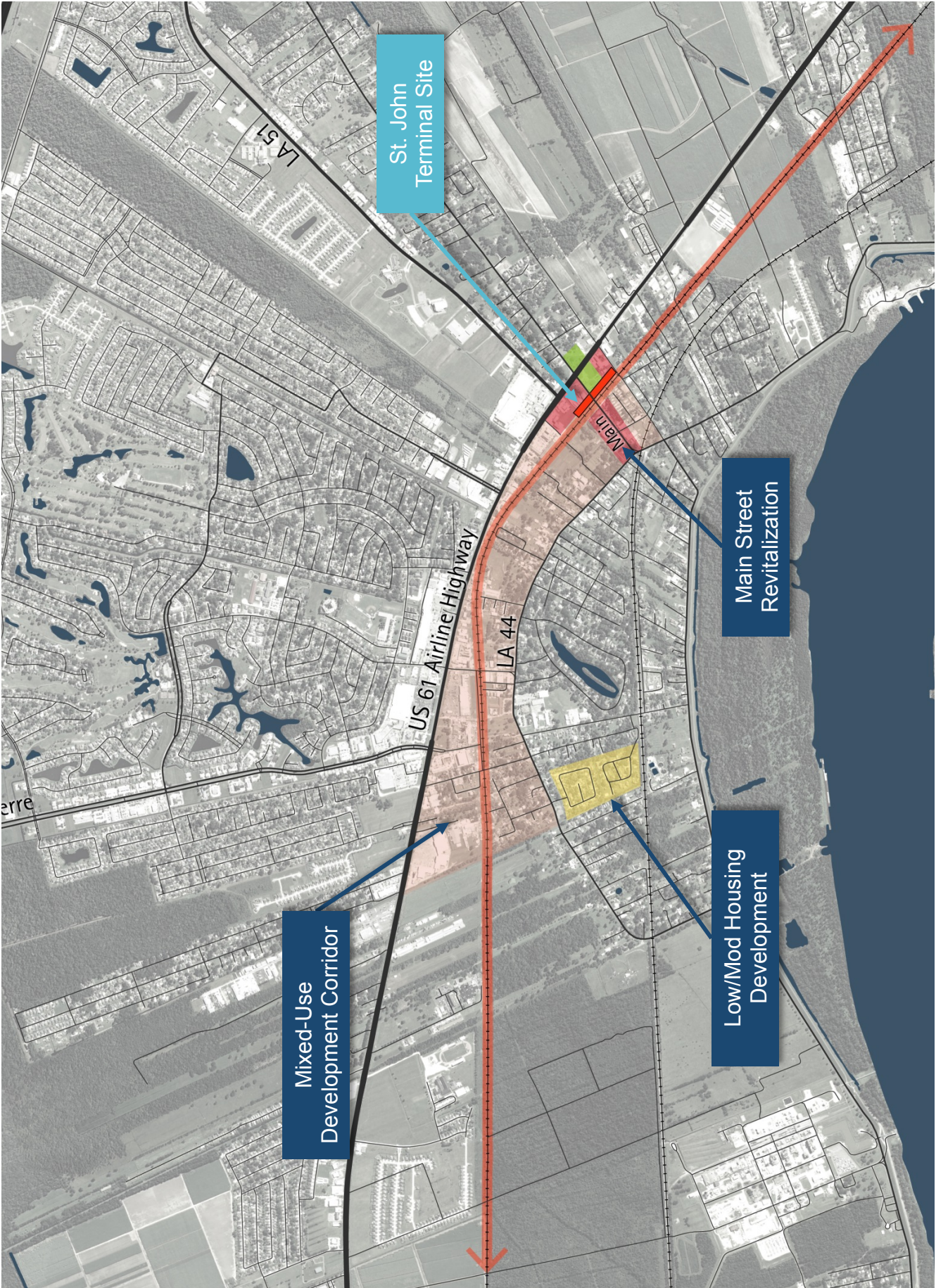




Fig15.pdf



P R O J E C T   D A T A			
Units:	Type A	48 Units (37.5%)	128 Units
	Type B	48 Units (37.5%)	
	Type C	24 Units (19%)	
	Type D	8 Units (6%)	
Total Net Square Footage:		441,800 s.f.	
Parking Needed: (2 per unit)		256 spcs	
Parking Provided:		256 spcs	
Site Area:		10.1 acres	
Density:		12 units/acre	



10.23.2015	2015053.00	vd
Copyright © JHP 2015 Not for Regulatory Approval, Permit or Construction: Michael L. Abour Registered Architect of State of Louisiana, Registration No. 7598		

LaPlace Site Plan  
Scale= 1" - 100'



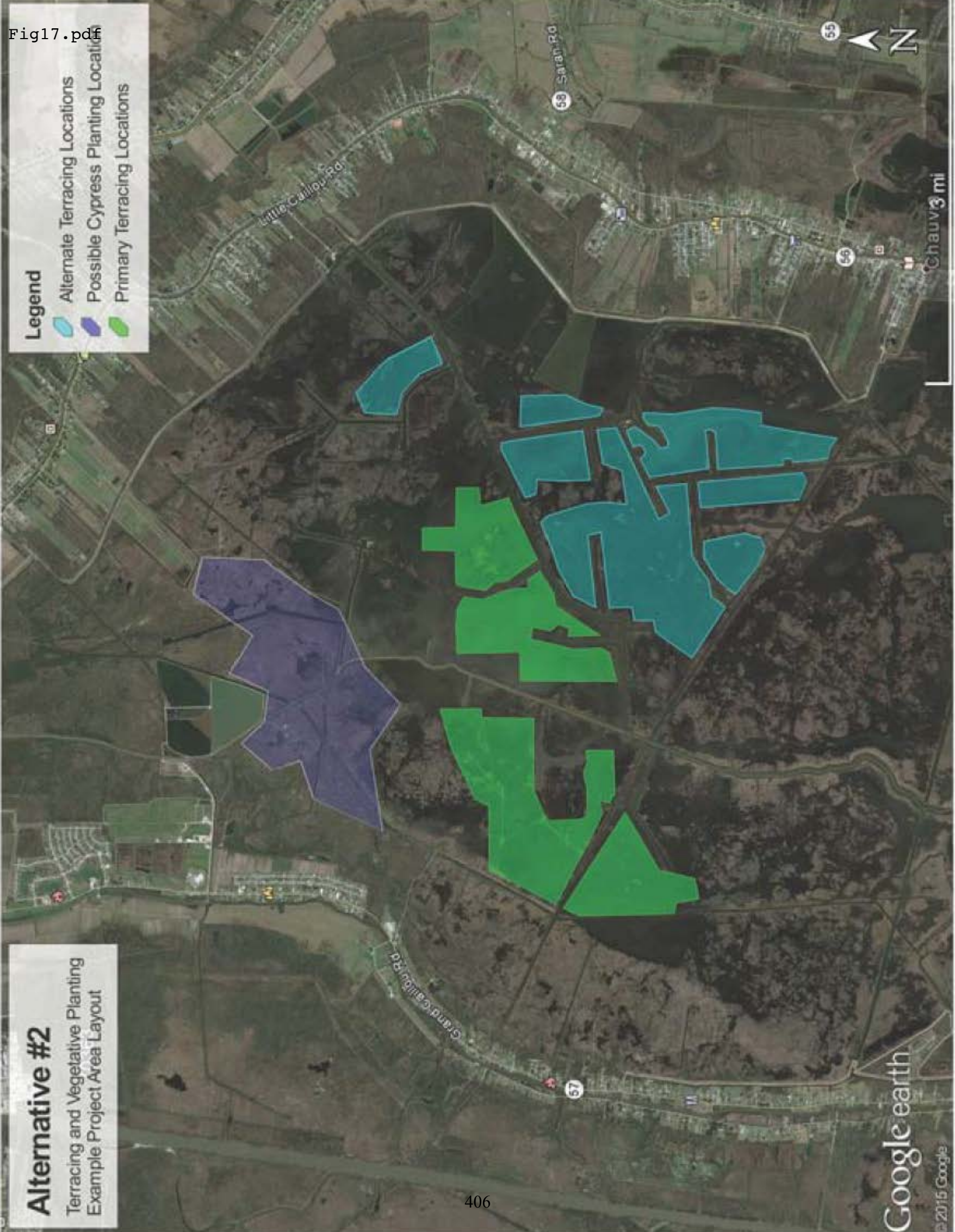
St. John's - LaPlace  
St. John the Baptist Parish, Louisiana











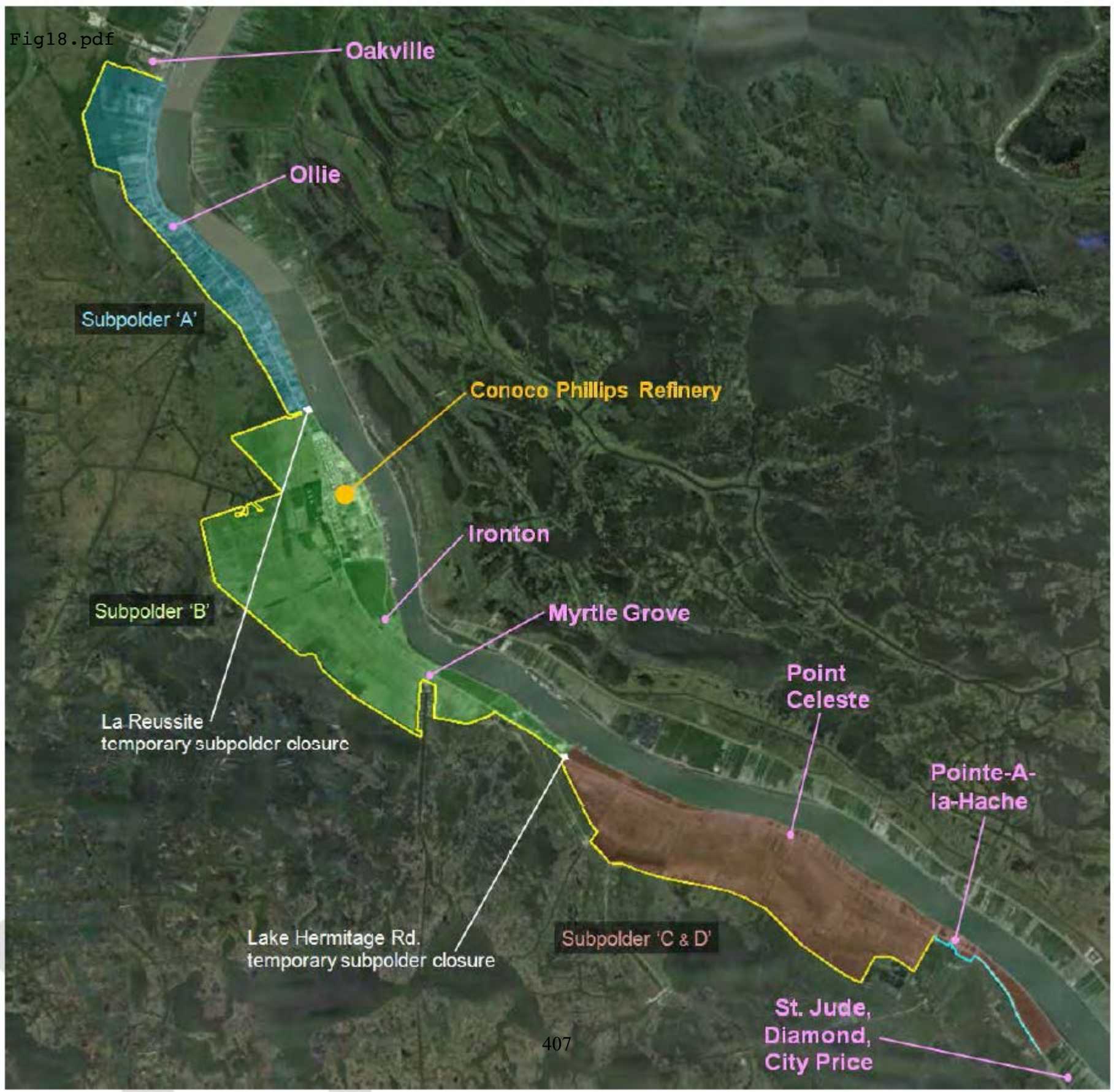
## Alternative #2

Terracing and Vegetative Planting  
Example Project Area Layout

### Legend

- Alternate Terracing Locations
- Possible Cypress Planting Locations
- Primary Terracing Locations













Map Layers

Community  
PlanningFlood &  
Sea Level  
RiseFuture  
HabitatRestoration  
Explorer

Switch To Map 2



Split View



Save &amp; Share



Export Page



Map Layers

Filter Map Layers

Clear All

Island Road

Site 2

Site 1

Fig20.pdf

Public Seed Ground Area



Oyster Leases



Current distribution



Map Legend

Topographic ▾

BAYOU JEAN  
LACROIX OIL  
AND GAS FIELDLake  
ChicotLake  
Chicot



