

Summary of LACPR Plan Formulation Considerations

LACPR Basic Plan Formulation Considerations by Planning Unit

Planning Unit 1	Planning Unit 2	Planning Unit 3a	Planning Unit 3b	Planning Unit 4
No Action - without project	No Action - without project	No Action - without project	No Action - without project	No Action - without project
Non-Structural Only	Non-Structural Only	Non-Structural Only	Non-Structural Only	Non-Structural Only
Coastal Features Only	Coastal Features Only	Coastal Features Only	Coastal Features Only	Coastal Features Only
Non-Structural + Coastal	Non-Structural + Coastal	Non-Structural + Coastal	Non-Structural + Coastal	Non-Structural + Coastal
Structural + Non-Structural	Structural + Non-Structural	Structural + Non-Structural	Structural + Non-Structural	Structural + Non-Structural
Structural + Coastal	Structural + Coastal	Structural + Coastal	Structural + Coastal	Structural + Coastal
Structural + NS + Coastal	Structural + NS + Coastal	Structural + NS + Coastal	Structural + NS + Coastal	Structural + NS + Coastal
Structural Only	Structural Only	Structural Only	Structural Only	Structural Only
* LP - 14	* GIWW Levee - 3	* GIWW Levee - 2	* GIWW Levee - 2	* Ring Levees
* HL - 2	* HWY 90 Alignment	* Morganza Levee - 2	* Franklin to Abbeville Alignment	* GIWW Levee
* Plaquemines Parish - 4	* Swamp Alignment	* Backwater Ring levees		* 10-ft Contour
	* W Bank Interior - 2			
	* Ring Levee - Larose to Golden Meadow			
State Master Plan	State Master Plan	State Master Plan	State Master Plan	State Master Plan
Comprehensive (multiple combinations)	Comprehensive (multiple combinations)	Comprehensive (multiple combinations)	Comprehensive (multiple combinations)	Comprehensive (multiple combinations)
Plans by Others	Plans by Others	Plans by Others	Plans by Others	Plans by Others
Comprehensive coast wide alternative(s) to be developed from various combinations of screened ("Best") measures from each planning unit.				

**Louisiana Coastal Protection and Restoration
Planning Unit 1 (PU1) – Coastal Restoration Measures**

Measure Description	Measure Type	Alt 1	Alt 2	Alt 3	Alt 4
MRGO environmental restoration features (bank stabilization)	Bank Stabilization	X	X		
Close MRGO at Bayou LaLoutre Ridge	Earthen plug			X	X
Diversion at Hope Canal (~1,000 cfs)	Diversion	X	X	X	X
Diversion at Convent/Blind River (~1,000 cfs)	Diversion	X	X	X	X
Add bankline stabilization along Maurepas Landbridge (Lake Maurepas and Lake Pontchartrain)	Shoreline Stabilization			X	
Increase Amite River Diversion Canal Influence by Gapping Banks	Bank Gapping	X	X		X
Diversion at White's Ditch (5,000-10,000 cfs)	Diversion	X	X	X	
Modification at Caernarvon Diversion (~200,000 cfs in State Plans and ~15,000 cfs in Alt. 4)	Diversion	X	X	X	X
Restore Chandeleur Islands	Barrier Island Restoration	X	X		
Maintain and restore Biloxi Landbridge and Barrier Reefs—South	Marsh Creation/Ridge Restoration	X	X	X	X
Maintain and restore Biloxi Landbridge and Barrier Reefs—North	Marsh Creation/Ridge Restoration		X	X	X
Restore Bayou LaLoutre Ridge	Ridge Restoration	X	X	X	X
Construct Jefferson Parish Fringe Marsh Buffer/ Establish shoreline protection on southshore of Lake Pontchartrain in Jefferson Parish	Marsh Creation/Shoreline Protection	X	X	X	
Maintain Lake Borgne Landbridge	Marsh Creation/Shoreline Stabilization	X	X	X	X
Sediment delivery by pipeline @ American/California Bay	Sediment Delivery via Pipeline	X			
Sediment delivery by pipeline @ Central Wetlands	Sediment Delivery via Pipeline/Marsh Creation	X		X	X
Sediment delivery by pipeline @ Golden Triangle	Sediment Delivery via Pipeline/Marsh Creation	X		X	X
Sediment delivery by pipeline @ LaBranche	Sediment delivery via Pipeline/Marsh Creation	X			
Maintain critical marsh shorelines and ridges of the East Orleans landbridge	Shoreline Protection/Marsh Creation		X	X	X
Marsh Creation/Protection at MRGO Jetties	Marsh Creation				X
Construct the Violet Reintroduction to Maintain Target Salinity in LA and MS (~1,000 cfs in State Alt.2 and ~15,000 cfs in Alt. 4)	Diversion		X	X	X
Diversion at American/California Bay with sediment enrichment (~200,000 cfs in State Alt.2)	Diversion	X	X		
Benney's Bay Sediment Diversion (~20,000 cfs)	Sediment Diversion	X	X		X
Restore Main Pass Ridge with Dredge Material	Ridge Restoration/Bank Stabilization	X			
Add new bankline stabilization (Lake Borgne Corner at GIWW to Verret)	Bank Stabilization	X			
Goose Point/Pointe Platte Marsh Creation	Marsh Creation	X			
Add Breakwater (in Lake Borgne from Southwest Corner to Biloxi Wildlife Management Area)	Breakwater		X		
St. Tammany Marsh Restoration and Shoreline Protection with Dredge Material and Vegetative Planting	Marsh Creation/Shoreline Protection		X	X	X
Maintenance of existing crevasses and construction of new crevasses	Crevasse Management	X	X		X
MRGO Jetty Realignment	Jetty Realignment				X
LaBranch/Bonnet Carre Diversion	Diversion				X
Medium Diversion at Bayou Lamoque	Diversion			X	X
Construct Inner Harbor Navigation Channel Lock Replacement	Navigation			X	
Maintain and restore Breton Landbridge with Marsh Creation	Marsh Creation	X		X	X

**Louisiana Coastal Protection and Restoration
Planning Unit 2 (PU2) – Coastal Restoration Measures**

Measure Description	Measure Type	Alt 1	Alt 2	Alt 3	Alt 4
Grand Isle Shoreline Protection	Shoreline Protection	X		X	
Barataria Basin Barrier Shoreline Restoration Projects	Barrier Island Restoration	X	X	X	X
Small Diversion at Bayou Lafourche	Diversion	X	X	X	
Medium Diversion with Dedicated Dredging at Myrtle Grove (~10-15,000 cfs in State Plans and ~5,000 cfs in Alt. 4)	Diversion	X	X	X	X
Modify Authorization of Davis Pond Diversion (~10,000 cfs)	Diversion	X	X	X	X
Adaptive management through maintenance of West Bay crevasse	Crevasse Management	X	X		
Marsh creation in the Barataria Basin	Sediment Delivery via Pipeline/Marsh Creation	X	X	X	X
Small Diversion at Port Sulphur (~2,000 cfs)	Diversion		X		
Ridge restoration in the Barataria Basin	Ridge Restoration		X	X	X
North Barataria Bay Shoreline Wave Breaks	Breakwaters		X		
Move Freshwater to Terrebonne Basin from Barataria Basin via GIWW	Diversion			X	
Medium Diversion at West Point a la Hache	Diversion			X	
North Barataria Bay Marsh Creation Strips	Marsh Creation				X
Diversion at Fort Jackson	Diversion				X
Small Diversions at Strategic Locations in Upper Barataria Basin	Diversion	X	X	X	
Upper Barataria Basin Hydrologic Improvements at Hwy 90	Drainage Improvements			X	
Modification to West Bay	Diversion				X
Elevated road	Elevated road			X	
Bankline Protection for the GIWW	Navigation/Bank Protection			X	

**Louisiana Coastal Protection and Restoration
Planning Unit 3a (PU3a) – Coastal Restoration Measures**

Measure Description	Measure Type	Alt 1	Alt 2	Alt 3	Alt 4
Small Diversion at Bayou Lafourche	Diversion	X	X		
Multi-purpose operation of the Houma Navigation Canal (HNC) Lock	Navigation/Salinity Control	X	X	X	X
Terrebonne Basin Barrier Shoreline Protection	Barrier Island Restoration	X	X	X	X
Maintain land bridge between Caillou Lake and Gulf of Mexico	Marsh Creation	X	X	X	X
Increase Atchafalaya River Water to Terrebonne Marshes via the GIWW	Diversion	X	X	X	X
Pipeline conveyance of sediment for marsh creation	Sediment Delivery via Pipeline/Marsh Creation	X	X	X	X
Freshwater Introduction via Blue Hammock Bayou	Diversion		X	X	X
Freshwater introduction to south of Lake Decade and shoreline protection	Shoreline Protection		X		X
Stabilize/maintain northern shoreline of Terrebonne/Timbalier Bay	Shoreline Protection		X		X
Short-term freshwater redirections to nourish and sustain intermediate marshes that are being affected by salt water	Diversion		X		X
Protect and maintain ridges	Ridge Restoration		X	X	X
Bankline protection for the Houma Navigation Canal (HNC)	Navigation/Bank Protection	X	X	X	X
Bankline protection for the GIWW	Navigation/Bank Protection	X	X	X	
Bankline protection for the GIWW (critical areas only)	Navigation/Bank Protection				X
DuLarge to Grand Caillou landbridge marsh creation	Marsh Creation				X
Houma Bypass Channel	Bypass Channel				X
Implement Chacahoula Basin Plan and other projects to alleviate inundation issues in the Verret Sub-Basin	Watershed Management Plan (Pump Stations)	X	X	X	X
Plug and backfill canals to restore hydrology (twin pipelines)	Plug/Backfill Canals	X			

**Louisiana Coastal Protection and Restoration
Planning Unit 3b (PU3b) – Coastal Restoration Measures**

Measure Description	Measure Type	Alt 1	Alt 2	Alt 3	Alt 4
Stabilize Gulf shoreline at Pointe au Fer Island	Shoreline Stabilization	X	X	X	X
Increase Atchafalaya River Water to Terrebonne Marshes via the GIWW	Diversions	X	X	X	X
Create marsh at Weeks Bay	Marsh Creation/Shoreline Stabilization?	X		X	
Restore marsh at Marsh Island south shoreline and Rainey Marsh via dedicated dredging	Marsh Creation by Dedicated Dredging	X		X	
Maintain north shore of East Cote Blanche Bay and Point Marone	Shoreline Stabilization	X			
Restore Vermillion Bay and West Cote Blanche Bay shorelines via beneficial uses of dredged material and/or detached breakwaters	Shoreline Restoration	X		X	
Increase sediment transport from the Atchafalaya River down Wax Lake Outlet	Sediment Transport		X	X	X
Stabilize banks of Southwest Pass off Marsh Islands	Bank Stabilization		X	X	
Stabilize banks of the GIWW	Bank Stabilization		X	X	
Stabilize shorelines from PU 4 boundary past Tigre Point to Southwest Point using dredged sediments and/or breakwaters	Shoreline Stabilization		X	X	
Stabilize shorelines across south shoreline of Marsh Island from Lighthouse Point to South Point (east of Mound Point) using dredged sediments and/or breakwaters	Shoreline Stabilization		X	X	X
Beneficial use of dredged material and dedicated dredging to rebuild marsh shorelines, historic reefs and barrier island	Marsh Creation		X	X	X
Pipeline conveyance of sediment to create strategic marsh platform, including beneficial use of dredged material from the Atchafalaya River Navigation Channel	Sediment Delivery via Pipeline/Marsh Creation			X	
Add Bayou Schaffer diversion for enhanced FW introduction into the Terrebonne marshes (per USFWS plan)- could also include gapping or degrading the existing Avoca Island Levee to increase Atchafalaya influence in western Terrebonne	Diversions				X
Sediment mining in Atchafalaya Bay (southeast of Atchafalaya River delta) provided it does not impact long-term delta growth or beneficial use opportunities.	Sediment Mining				X
Sediment mining offshore of Pointe au Fer Island	Sediment Mining				X
Add segmented barrier-reef like structure	Retention Structure				X
Freshwater Bayou Bank Stabilization—Belle Isle to Freshwater Lock	Bank Stabilization	X	X	X	
Penchant Basin Freshwater Management	Diversions			X	X

**Louisiana Coastal Protection and Restoration
Planning Unit 4 (PU4) – Coastal Restoration Measures**

Measure Description	Measure Type	Alt 1	Alt 2	Alt 3	Alt 4
Maximize freshwater inflow from Sabine River	Diversions	X	X		
Salinity control structures along the east shoreline of Sabine Lake near Blue Buck Point, Sabine Island and Black Bayou	Salinity Control Structures	X			
Beneficial uses of dredged material (For Alt. 1 and 2: utilize sediment from Sabine Ship Channel and dedicated dredging for marsh enhancement and construction of terraces; from Calcasieu Ship Channel and Atchafalaya River Navigation Canal for PD 4-15)	Marsh Creation	X	X	X	X
Allow Calcasieu Lake and surrounding area to become and remain brackish to saline	Salinity Control		X		
Maintain Hwy 82 for marsh protection	Elevated Road			X	
Salinity control structure at Hwy 82 Causeway	Salinity Control Structure	X		X	
Stabilize Gulf shoreline and beach west of Calcasieu River to Sabine River using dredged sediment or breakwaters	Breakwaters	X	X	X	X
Stabilize Gulf shoreline and beach east of Calcasieu River to Freshwater Bayou using dredged sediment or breakwaters	Breakwaters	X	X	X	X
Salinity control structure in Calcasieu Ship Channel near ferry	Salinity Control Structure	X		X	
Beneficial uses of dredged material program: utilize sediment and dedicated dredging for marsh enhancement and construction of terraces in Calcasieu Lake	Marsh Creation	X	X	X	X
Dedicated dredging from the Gulf of Mexico for marsh creation and enhancement	Marsh Creation		X	X	
Salinity control structures at points on east side of Calcasieu Lake	Salinity Control Structure	X			
Maximize freshwater inflow to tributaries of the Mermentau from outside sources	Diversions	X	X		
Maximize freshwater inflow to Mermentau from outside sources	Diversions	X	X		
Stabilize Grand Lake shoreline and landbridge	Shoreline Stabilization	X	X	X	X
Freshwater introduction/retention structure or sill on Little Pecan Bayou	Salinity Control Structure	X			
Freshwater introduction/retention structure or sill on Rollover Bayou	Salinity Control Structure	X			
Stabilize White Lake shoreline and land bridge	Shoreline Stabilization	X	X	X	X
Stabilize banks from Schooner Bayou to GIWW along Freshwater Bayou and along GIWW near White Lake	Bank Stabilization	X	X		
Salinity control structure on Black Lake Bayou near Hackberry	Salinity Control Structure	X			
Build new chamber for navigation at Calcasieu Lock on GIWW and use old lock to evacuate excess water	Water Management Structure (Lock)	X	X	X	X
Stabilize banks of Freshwater Bayou	Bank Stabilization	X	X	X	
Stabilize eastern shore of Lake Calcasieu	Shoreline Stabilization	X			
Provide water control structures at strategic locations along Hwys 82 and 27	Retention Structure	X	X	X	
Manage watershed to reduce rapid inflows into Mermentau Sub-basin	Watershed Management Plan	X			
Restore marsh by filling abandoned canals	Marsh Creation	X			
Utilize freshwater inflow from Atchafalaya River	Diversions	X	X	X	
Improve hydrology of the old Mermentau River Channel between Mud Lake and Gulf of Mexico	Drainage	X			
Fortify spoil banks on GIWW in St. Mary and Vermilion Parish, Freshwater Bayou Canal	Bank Stabilization			X	
Restore Chenier Forests	Chenier Restoration				X
Stabilize banks of the GIWW	Bank Stabilization	X	X	X	X

**LACPR Basic Plan Formulation Considerations
Non-Structural Measures Concepts**

Concepts for Universal Application				
<ul style="list-style-type: none"> • Collaboration with local, State and Federal agencies for application of all nonstructural measures • Incentive program to elevate above ABFE/BFE to + mean sea level for new construction and reconstruction/relocation in collaboration with other agencies • Technical assistance/information/workshops on implementation of nonstructural measures • Ringwalls/berms surrounding private property • Evacuation/Buyout of V zones • Flood Proofing Critical Facilities and Critical Economic Assets 				
Potential Near-Term Nonstructural Measures for Implementation				
Planning Unit 1	Planning Unit 2	Planning Unit 3a	Planning Unit 3b	Planning Unit 4
<p align="center">Concepts for Application Throughout</p> <ul style="list-style-type: none"> • Buyouts in areas of deep flooding > 13/15 feet • Raise-in-Place in areas of flooding < or = 13/15 feet • Ringwalls/Berms • Wet- and Dry-Flood proof for shallow, low velocity flooding • Relocation to flood-free sites • Cluster structures in flood free areas 	<p>Larose to Golden Meadow - Elevation of New Construction, Raising-in-Place Existing Structures</p> <p>Along Coast - Flood Proofing of Critical Economic Assets</p>	<p align="center">Along Coast</p> <ul style="list-style-type: none"> • Raising - in - place • Buyout • Relocation • Wet/Dry Flood Proofing of Structures 	<p align="center">Erath / Delcambre / Henry Nonstructural Pilot Communities Project</p> <ul style="list-style-type: none"> • Raising - in - place • Buyout • Relocation • Wet/Dry Flood Proofing of Structures 	<p align="center">Permanent Evacuation / Relocation of Residential Assets along Hwy LA - 82 for Risk Reduction and Ecosystem Restoration</p>

**LACPR Plan Formulation Considerations
Structural Measures (cont'd)**

Planning Unit 2 - Barataria Basin

Description of Primary Feature	PU2 Alignment Variations	Design Levels *				Other Considerations					
		100-year	Katrina	Low Cat 5	High Cat 5	Weir	Lafitte	Alliance Extension	MRT Levees	Larose to Golden Meadow	Add'l West Bank
GIWW Levee Alignment	G - 1	X	X	X	X			X	X	X	X
	G - 2	X	X	X	X		X	X	X	X	X
	G - 3	X	X	X	X		X	X	X	X	X
HWY 90 Levee Alignment	H	X	X	X	X	X		X	X	X	
Swamp Alignment											
	S	X	X	X	X			X	X	X	
West Bank Interior Alignment	WBI - 1	X	X	X	X			X	X	X	
	WBI - 2	X	X	X	X			X	X	X	
Preliminary State Master Plan (Nov 06)	State	X		500-year			X			X	X
		* With / 24 hour rainfalls of 10-year & 100-year rainfall events									

FUTURE SCENARIOS		
Local Relative Sea Level Rise	Low	High
Storm Cycles / Intensity	Low	High
Redevelopment Rates	Low	High

**LACPR Plan Formulation Considerations
Structural Measures (cont'd)**

Planning Unit 3a - East Terrebonne Basin

Description of Primary Feature	PU3a Alignment Variations	Design Levels *				Considerations							
		100-year	Katrina	Low Cat 5	High Cat 5	GIWW Levee	2010 Morganza Levee	Morganza Levee - High Level	Alternate Morganza Levee	Larose to Golden Meadow Ring Levee	Morgan City	Vicinity of Morgan City - 100-year	Atchafalaya River Levee
GIWW Levee Alignment	G - 1	X	X	X	X	X	X			X	X		Tie-Back
	G - 2	X	X	X	X	X	X			X	X		
Morganza Levee Alignment	M-1	X	X	X	X			X		X	X		Tie-Back
	M-2	X	X	X	X			X		X	X		
Atchafalaya Backwater Alignment	AB						X			X	X		+ Ring Levees
Preliminary State Master Plan (Nov 06)	State				500-year	X	Modified		X	X		X	Tie-Back
		* With / 24 hour rainfalls of 10-year & 100-year rainfall events											

FUTURE SCENARIOS		
Local Relative Sea Level Rise	Low	High
Storm Cycles / Intensity	Low	High
Redevelopment Rates	Low	High

**LACPR Plan Formulation Considerations
Structural Measures (cont'd)**

Planning Unit 3b - Atchafalaya Influence Area

Description of Primary Feature	PU3b Alignment Variations	Design Levels*				Considerations				
		100-year	Katrina	Low Cat 5	High Cat 5	GIWW Levee	Inland Alignment	Patterson / Berwick Area	Abbeville North Tie-Back	Abbeville - 100-yr Extension to GIWW
GIWW Levee Alignment	G - 1	X	X	X	X	X		X		
	G - 2	X	X	X	X	X	X	X	X	
Franklin to Abbeville Alignment	FA	X	X	X	X		X	X	X	
Preliminary State Master Plan (Nov 06)	State	X			500-year		X		500-year	X
		* With / 24 hour rainfalls of 10-year & 100-year rainfall events								

FUTURE SCENARIOS		
Local Relative Sea Level Rise	Low	High
Storm Cycles / Intensity	Low	High
Redevelopment Rates	Low	High

**LACPR Plan Formulation Considerations
Structural Measures (cont'd)
Planning Unit 4 - Chenier Plain**

Description of Primary Feature	PU4 Alignment Variations	Design Levels *				Considerations								
		100-year	Katrina	Low Cat 5	High Cat 5	GIWW Levee	Vinton Ring Levee	Lake Charles Area Ring Levee	Gueydan Ring Levee	Kaplan Ring Levee	Other	North Tie-Back SW LA	South Tie-in to GIWW- PU3b	South Tie-in to Abbeville - PU3b
Ring Levee Alignment	RL	X	X	X	X		X	X	X	X				
GIWW Levee Alignment	G	X	X	X	X	X						X	X	
10-Ft Contour Alignment	C	X	X	X	X		X	X		X	X		X	
Preliminary State Master Plan (Nov 06)	State	X		500-year		100-year	500-year					X		X
		* With / 24 hour rainfalls of 10-year & 100-year rainfall events												

FUTURE SCENARIOS		
Local Relative Sea Level Rise	Low	High
Storm Cycles / Intensity	Low	High
Redevelopment Rates	Low	High

Inner Levee Plan Proposed by Flood Protection Alliance (East Bank of Greater New Orleans)

Description: Containment system to inhibit flood waters from flowing unencumbered across portions of the city. Includes connecting natural ridges, drainage canal levees and elevated railway right of ways and gating sewer pipes, repairing roadways at Parish lines, constructing moveable gate at Bayou St. John and retrofitting underpasses (see photos to right).

Beneficial Considerations: Contains overtopping in confined areas; near term benefit – while perimeter strengthened; attractive time line; minimal environmental impacts; manageable construction; can be implemented in stages; pumps for over topping / interior drainage remain operational; personal & property safety; confidence builder.

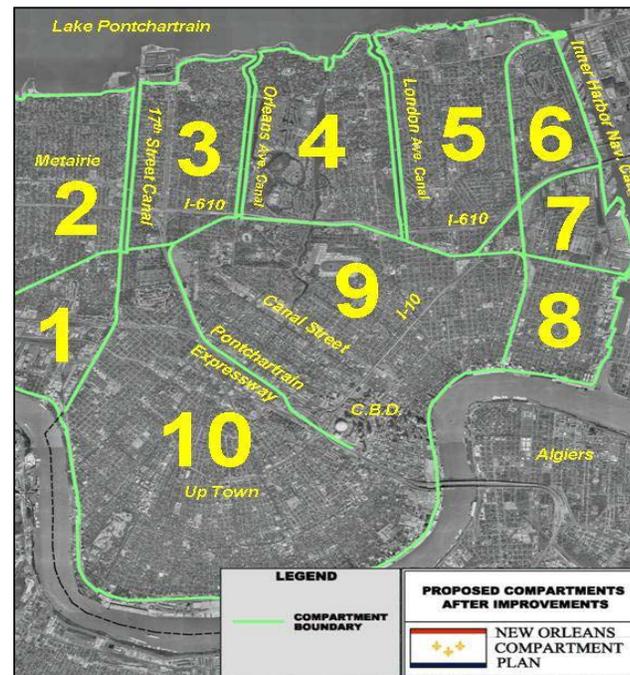
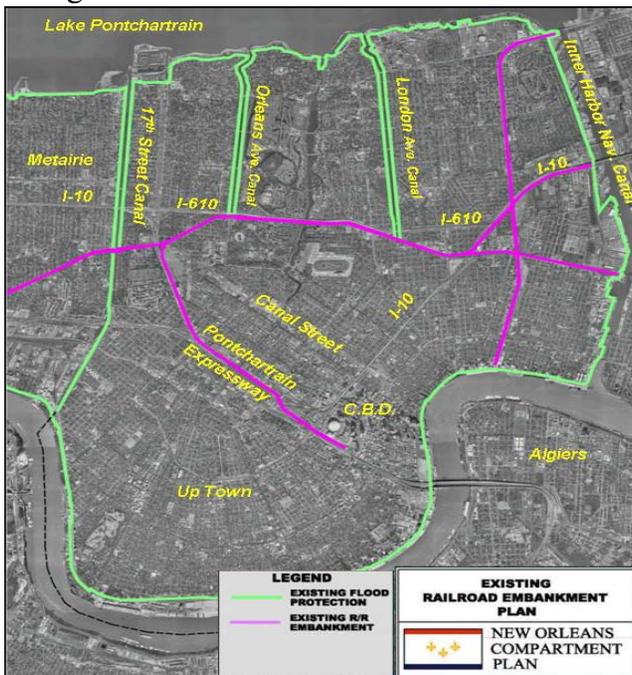
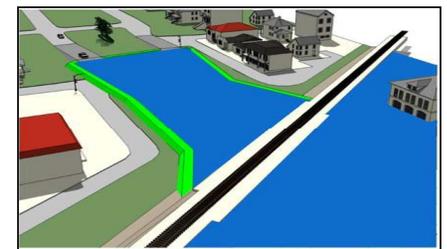
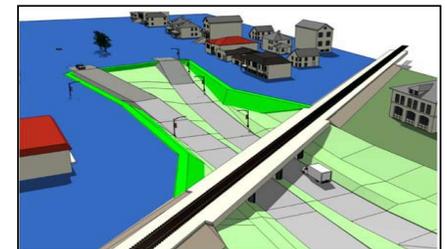
Challenges: Engineering; elevating railroad beds; numerous closure structures; authority or jurisdiction challenges.



Typical Railroad Underpass



Railroad Underpass – “U” Levee Added



LAKE PONTCHARTRAIN

LAKEFRONT AIRPORT

METAIRIE

CITY PARK

17th STREET CANAL

MOUNES STREET UNDERPASS

ORLEANS AVE. PUMP STA.

ORLEANS AVE. CANAL

GOLF DR. UNDERPASS

ST. BERNARD UNDERPASS

PARIS AVE. UNDERPASS

GENTILLY ROAD UNDERPASS

LONDON AVE. CANAL

BROAD STREET UNDERPASS

FRANKLIN AVE. UNDER.

GENTILLY UNDERPASS

INNER HARBOR NAVIGATION CANAL

I-10

I-610

I-610

I-10

CANAL BLVD. UNDERPASS

MAREONI UNDERPASS

BAYOU ST. JOHN

METAIRIE ROAD UNDERPASS

STUDY AREA

AIRLINE DR.

CHESTERFIELD ST

CAROLLTON UNDERPASS

PONTCHARTRAIN EXPRESSWAY

CANAL ST.

I-10

Inner Levee Plan (East Bank Greater New Orleans)

LEGEND

- EXISTING LEVEE
- RAILROAD EMBANKMENT
- PROPOSED LEVEE
- PROPOSED "U" LEVEE
- PROPOSED RAISED ROAD BED
- STUDY AREA

Miscellaneous Measures Identified

Measures and features were gathered from several sources including other coastal area plans and programs; local, parish, and landowner plans; study workshops; the NEPA scoping process; and other public input. Representatives from coastal parishes, levee districts, state and federal agencies, nongovernmental organizations (NGOs), and academia, as well as concerned citizens provided guidance and ideas.

Other Coastal Area Plans and Programs

To address the challenges facing South Louisiana, the LACPR plan is being coordinated with other planning efforts through a continuous exchange of ideas and information. In addition, the Corps of Engineers is working to consider and coordinate other water resources plans and projects including navigation, flood control, and ecosystem restoration. These other planning efforts and programs are listed below:

- Louisiana Recovery Authority Regional Visioning Team - "Louisiana Speaks" Initiative
- Coastal Protection and Restoration Authority (CPRA) Master Plan
- Mississippi Coastal Improvements Program (MsCIP)
- Coastal Wetlands Planning, Protection and Restoration Act
- Coast 2050: Toward a Sustainable Coastal Louisiana
- Louisiana Coastal Area Ecosystem Restoration Plan
- Coastal Impact Assistance Program (CIAP)
- Comprehensive Habitat Management Plan for Lake Pontchartrain Basin
- Barataria-Terrebonne National Estuary Program
- Rebuilding New Orleans Report by Bring New Orleans Back Commission
- St. Bernard Parish Hurricane Protection and Coastal Restoration Plan
- The Biloxi Marsh Stabilization and Restoration Plan
- The Unified New Orleans Plan
- Flood Protection Alliance
- Interagency Performance Evaluation Task Force (IPET) Study
- Lake Pontchartrain, Louisiana, and Vicinity, Hurricane Protection Project
- New Orleans to Venice Project
- West Bank and Vicinity, New Orleans, Louisiana, Hurricane Protection Project
- Larose to Golden Meadow, Louisiana, Hurricane Protection
- Grand Isle and Vicinity, Louisiana
Morgan City and Vicinity, Louisiana, Hurricane Protection Project
- Flood Control, Mississippi River & Tributaries, Mississippi River Levees Project
- Flood Control, Mississippi River & Tributaries, Atchafalaya Basin, Louisiana
- West Shore – Lake Pontchartrain
- Braithwaite Park, Louisiana, Continuing Authorities Program Section 205
- New Orleans to Venice, Louisiana, Post Authorization Change Study, La Reussite to St. Jude

- Oakville to La Reussite, Louisiana, Continuing Authorities Program Section 205
- Southwest Louisiana Hurricane Protection Reconnaissance Study
- Flood Control, Mississippi River & Tributaries, Donaldsonville, Louisiana, to the Gulf of Mexico, Hurricane Protection Study
- Flood Control, Mississippi River & Tributaries Morganza, Louisiana, to the Gulf of Mexico, Hurricane Protection Study (feasibility complete)
- Flood Control, Mississippi River & Tributaries, Atchafalaya Basin, Louisiana, Lower Atchafalaya Basin Reevaluation Study

Scoping Report

The Scoping Report summarizes the comments received from the public, as well as local, State, and Federal agency representatives during a series of public meetings that occurred from 9 March 2006 to 16 March 2006 in four cities in southern Louisiana. Meetings were conducted in New Orleans, Thibodaux, Lake Charles, and Lafayette. The comments were used to inform the alternatives development process for the LaCPR program and to identify the major issue areas to be addressed in the DPEIS. An analysis of the comments identified the following 20 themes, with the five themes in bold accounting for nearly 60 percent of the comments:

- **There is a need for comprehensive, multidisciplinary, and efficient planning.**
- The Mississippi River Gulf Outlet (MRGO) needs to be closed due to flood protection, safety, and environmental concerns.
- **The restoration of marshes, wetlands, and natural coastal barriers is a key protection feature.**
- Evacuation planning needs to be improved.
- CEMVN should use existing studies, such as the Coast 2050 Plan, and consult international engineers.
- There is a general lack of trust in CEMVN and/or government entities.
- There is a need for clearer and more effective outreach and information sharing.
- **The LaCPR plan should incorporate local knowledge and concerns.**
- **Coastal protection should address saltwater intrusion, subsidence, and sediment delivery.**
- There is a need for independent oversight.
- Regional economic viability needs to be considered as part of the planning process.
- **CEMVN should use innovative technology and consider creative solutions when developing alternatives.**
- It is important to upgrade the levee system to Category 5 protection.
- CEMVN needs adequate funding for the LaCPR projects.
- CEMVN should use a phased approach for implementing the LaCPR plan.
- Communities in the lower parts of Terrebonne Parish should be given full consideration during the levee placement planning process.
- It is important for CEMVN to expedite the LaCPR plan.

Miscellaneous Measures Identified

- There needs to be a balance between structural and non-structural alternatives.
- The community's cultural and historical values need to be factored into decision-making.
- Recreational and fishing values need to be factored into decision-making.

Plan Formulation Workshop

An initial Plan Formulation Workshop was held on February 13 -14, 2006 in Lafayette, LA. This workshop provided a valuable initial input step in the formulation of alternative plans. More than 125 coastal restoration and risk reduction ideas were offered, both structural and nonstructural. Coastal risk reduction alignments were developed from input received at the workshop. The following list shows a ranking (with highest score from 1-20 being the most preferable). The list below shows the number of times each alternative was selected by 36 workshop participants with each participant having 20 votes.

Team Selections	Structural Alternative		
18	Large-scale marsh creation and ridge restoration using a dedicated infrastructure of pipelines for sediment delivery, then nourish marshes with small freshwater diversions and plant ridges with woody species	9	Apply the multiple lines of defense strategy to the entire coast
17	More pipelines to move sediment	9	Navigation weirs on MRGO
17	All dredged material from navigation channels should be used beneficially.	9	Use the existing levees and levee alignments(Morganza-Gulf, Donaldsonville-Gulf, etc.) as much as possible
13	Utilize Sediment Conveyance (through pipelines or other mechanism) to build marshes in landbridge areas to maintain buffers.	8	Rebuild Bayou Perot / Rigolets landbridge
13	Consider using existing navigation channels (GIWW, MRGO, etc) for freshwater and sediment conveyance. Atchafalaya FW and sediment could be transported into Terrebonne Basin for beneficial use.	8	Minimize total levee length (Van Heerden plan)
12	Ring Levees around population centers	8	Re-create lost reefs using both natural and artificial materials
12	Restore cypress forests	8	Install effective storm surge control structures on navigation channels in the coastal zone.
12	Rebuild the New Orleans Landbridge	8	Close MRGO
12	Develop Ridges (natural and man-made)	8	3 lines of defense (barrier islands & marsh, major barrier, existing levees)
11	Accelerate marsh building	8	Flood Control Structure on Industrial Canal at Lake Ponchartrain
11	Re-route Mississippi River to maximize sediment deposition on coastal shelf, thereby maximizing land building and land-sustaining capacity of the system	8	Locate offsite borrow material that can be used in levee construction and marsh creation site other than adjacent borrow canals.
11	Construct major diversions on the Mississippi River and Atchafalaya River	8	Levees should be built on the wetland nonwetland interface.
11	Create sediment traps in the Mississippi/Atchafalaya to serve as renewable sources for pipeline sediment delivery infrastructure	7	Nonstructural alternatives, such as elevation of structures, relocation (individuals and communities), and evacuation.
11	"Harden" existing pumping stations in SE LA so that they can be manned or automated during hurricane conditions	7	Rebuild natural ridges of Barataria and Terrebonne regions to 1955 landscape
11	3 lines of defense (in-water structure, marsh & ridges, levees)	7	Propagate and plant live oaks and other woody plants on restored ridges.
11	Multiple lines of natural defense with restoration	7	Utilize/enhance existing landscape and landscape features for coastal protection
10	Build the lock complex on the HNC	7	Relocate communities or how communities are rebuilt. Establish guidelines that will ensure structure will be above the expected surge height (cat 3 or cat 5?) if rebuilding in the low laying areas.
10	Implement Barataria Landbridge Project	7	Implement river reintroduction at Myrtle Grove and LaRosusette with river sediment
9	Enhance sediment delivery of river diversions	7	Enact a state easement/purchase program to ensure protection of natural areas and their hurricane buffering capacity while avoiding (at least in some cases) property rights issues
9	Maintain landbridges	7	Implement Lake Ponchartrain Barrier Plan
		7	Fund Short term projects which can be completed for '07 hurricane season
		7	Remove Mississippi Levee south of Point la Hache.
		7	Develop inventory including profile of Levees - Fed, State, Parish, Local, Private.
		6	Incorporate and build upon existing projects LCA, Morganza etc.
		6	Mississippi river spillways(for surge relief and river diversions)
		6	No levees where possible
		6	Include navigation interests in planning process
		6	Open Several needles of the Bonnet Carre until Hope Canal Project comes on line
		6	Maximize use and transfer of Atchafalaya Basin sediment
		6	Armor levees
		6	Increase Hope Canal project capacity to enhance Manchac Landbridge
		5	Endorse structures in Calcasieu and Sabine ship channels to protect and

Miscellaneous Measures Identified

5	maintain the Calcasieu/Sabine Basin marshes	4	Use GIWW as levee alignment coast wide
5	Use Morganza to the Gulf Alignment currently under construction and remaining portions to be authorized	4	Poll private and public land owners to solicit participation in land reclamation and marsh restoration projects. The Port of Lake Charles has initiated such an effort. Consider statewide polling. The aggregate of such beneficial use of dredged material might significantly help the flood protection and hurricane mitigation effort
5	Large surge structures on MRGO/Rigolets		
5	Establish - encourage development of trees & substantial vegetation (more than just grasses) in coastal barriers		
5	Start "levee school" at Louisiana University (e.g., LSU Hurricane Center) required for Levee commissioners state coordinated with Corps - 4-5 day	4	Reconfigure MRGO
5	Protection of the La citizens, life, critical economic resources must not be delayed or restricted environmental concerns. Hurricane protection must be built with the environmental issues addressed	4	Uniform La. Spatial Reference Frame to support all projects construction.
5	Prevent loss of large forested areas by purchasing for mitigation	4	Reauthorize IHNC at Miss River to act a diversion of river water into the New Orleans Landbridge and down MRGO in conjunction with the flood control structure at lake Ponchartrain
5	Armor all levee in high population area to prevent failure if overtopped - e.g., MRGO levee behind St Bernard	4	Non structural measures in Donaldsonville basin
5	Barge fill from the Midwest	4	Rebuild barrier islands to 1955 geomorphology.
5	Implement the Third Branch Delta Building Channel as included in Coast 2050 Plan	4	Greatly expand plant materials production, (public and private growers) to ramp up the capacity for vegetative plantings
5	Maintain the chef, Seabrook, Rigolets, and Bayou Boeuf open as possible except during storms	3	Construct survivable overtoppable levees
5	Use local zoning to establish growth corridors in protected areas and prohibit development in buffer and conservation areas	3	Do not relocate barrier islands farther northward
5	Structures that protect against CAT 1-3 (most common/most likely) vs. CAT 4-5	3	Prioritize restoration projects above other public works projects until the coast is protected
5	What about the use of earthen terraces, which may break down during a storm but are relatively easy to create and will add structure to the coast and resistance to hurricane surge?	3	River diversions should meet specified habitat goals
5	Use lower, armored levees, combined with ability to evacuate after overtopping, in favor of higher (cat.-5) levees. This may be a more economical approach.	3	Purchase privately owned barrier shoreline habitats for public use and protection (Elmer's Island)
4	There needs to be coordination between scientists, engineers, NGO's, government agencies and the private sector (business) in all phases of planning and implementation of restoration and protection work.	3	Restoration should begin with and be firmly based on scientific principals, then passed through the filter of public acceptability.
4	Design barriers to allow overtopping.	3	Armor the barrier islands
4	Design and implement a comprehensive GIS data system to include complete inventory of all levees with profile grade, pump stations, locks, gates and other features with elevation (finished grad), latitude /longitude, cross section, and other appropriate design elements, if possible. This should be made available to your partners first, and eventually posted on COE web page.	3	Planning is easy, implementation is what's needed
4	Get serious about marsh restoration and build a spillway thru Violet for a 1/2 mile width and get water and sediment into area east of St Bernard and flow thru LaLoutre	3	Specifically endorse storm barriers in Chef and Rigolets (with no reduction in cross section in passes)
4	Use alternative means of protecting outlying communities, reducing levee construction cost and improving ability to sustain wetlands.	3	Navigation gates/water control structures on MRGO.
4	Investigate features of Plans that were presented on Monday for areas of overlap and consistency to use as a starting point.	3	Reconfigure MRGO to reduce salt water intrusion, while allowing commerce and recreation and storm surge reduction as well
		3	Elevate and relocate infrastructure rather than levees
		3	Create green spaces in high flood risk areas of N.O. for storm water retention, etc.
		3	Navigation channels need to have rock armoring. The Corps has an authorized bottom width, this would establish a top width that the Corps would be responsible for maintaining. It would provided areas behind the rock as marsh creation sites increasing protection.
		3	Restrict passes between barrier islands
		3	There needs to be serious consideration to which areas we will try to save and which we can no longer support
		3	Develop measures of effectiveness for all layered coastal defense features.
		3	Protection of existing natural resources (through regulatory programs, voluntary measures, financial incentives, and other tools) must be the highest

Miscellaneous Measures Identified

- priority.
- 3 Barrier islands represent sand rivers, armoring them doesn't work
- 2 Move barrier islands inward
- 2 Restoration should be firmly based on scientific principles, but should not be dictated by scientists alone.
- 2 Ensure that any diversion structures or spillways can be closed in the future if necessary. No open, uncontrolled diversions or spillways.
- 2 Can we promise to start implementing and stop this endless planning?
- 2 Consider outermost barrier consisting of enhanced barrier islands with hydraulic and navigational control structures.
- 2 Unrealistic suggestions for restoring our coast are only delaying progress.
- 2 Define exactly what it is we are trying to protect against before we design protection features.
- 2 Use shoreline wave breaks in large open bodies of water, i.e. lakes and bays
- 2 ADCIRC modeling showed effectiveness of marsh creation within the "funnel"
- 2 Any structural plan must be coupled with a regulatory change.
- 2 Swamp alignment then the HWY90 alignments should be considered higher than the GIWW alignment
- 2 Streamlining the review and permit process is a critical component of any successful effort
- 2 Develop tax incentives to get the fill to the area
- 2 Restoration projects, strategies, etc. should not interfere with critical water uses (drinking water sources)
- 2 No discussion of community relocation should occur without the involvement of community leaders.
- 2 Surge breakwaters across Lake Borgne
- 2 Use academic and research institutions to help develop structures plans that will accomplish protection and conservation goals. Some critical review of these ideas is required.
- 2 Identify the ratio of the length of the proposed levees to the length of the hydrological openings (gates)
- 1 Need a larger strategic plan that acknowledges our time and financial limitations.
- 1 Ask Santa to bring us a 1925 Coastline
- 1 Maintain navigation channels at no more than authorized widths
- 1 Move everybody north of I-10
- 1 Control structure at Gum Bayou
- 1 Use recon and modified recon for Morganza to the Gulf reaches in Terrebonne
- 1 Generate revenue by creating dive sites that use artificial reefs (airplanes, automobiles) . The area gets revenues from a new tourism sector and the citizens get a reduction in storm surge
- 1 Enhance drainage from Barataria
- 1 Design and implement a comprehensive data system, say GIS, to include levees with finished grade, say every 100 ft , latitude and longitude and make the data available first to your partners with ID and password and eventually

- to be posted on COE's web page.
- 1 Raise gasoline tax to discourage automobile use and help fund restoration projects, expand regional public transportation, use rail.
- 1 128. amalgamate the repetitive ideas into a reasonable number of choices
- 1 Include adequate number of environmental water control structures to remain open except storms for drainage and fisheries as determined by stakeholders
- 0 Match the natural soils blending the best soils and ridgeline combinations
- 0 Consider dual purpose structures which could produce energy and which might be sold back to the grid to fund future projects.

Engineering Technical Approaches and Innovations Workshop

An Engineering Technical Approaches and Innovations Workshop was held at the Engineer Research and Development Center (ERDC) in Vicksburg, MS, on March 2 - 3, 2006. More than 100 geotechnical and structural engineers and experts from industry, academia, and government agencies participated in the workshop. The workshop produced a variety of recommendations on the cost-effective construction of hurricane risk reduction barriers in South Louisiana which are listed below:

Barriers - Reduce the mass of the barrier system by:

- Improving Foundation Conditions
- Using geotextiles to build levees with steeper slopes
- Using lightweight materials such as geofoam products in the core of levees
- Building levees with a hollow core using precast concrete sections
- Building "pop up" barriers
- Utilize cellular structures

Construction Methods

- Hydraulic dredging and hydraulic transport
- Deep soil mixing
- Market availability and pricing
- Sunk barges for shoreline protection and wave breaks
- Soil improvements methods such as electro-osmotic or vacuum assisted consolidation
- Steep reinforced slopes buried in a toe berm

Planning Strategies

- Multiple lines of defense
- Allow overtopping of the main line levee
- Examine Factors of Safety used in hurricane protection design
- Wiser storm water management
- Avoid creating funnel or "pinch points"
- Avoid very high levees in areas of poor foundation soils
- Place wave breaks away from the levees
- With a healthy marsh, levees would not require wavebreaks
- buildings might be incorporated into the flood protection

Miscellaneous Measures Identified

- Utilize oyster baskets with shell bags containing oyster cultch to encourage and nourish oyster growth and reefs
- Research fault movement and subsidence caused by tectonic activity
- Programmatic approach to borrow sources

Operation and Maintenance

- Incorporate geotechnical field instrumentation to monitor performance during construction
- Automated advanced warning and monitoring system
- The crown width of levees might be constructed wider than typical in anticipation of future lifts
- Concern over maintenance of steeper side slopes

Quality Control and Quality Assurance

- Provide funding for adequately trained and qualified personnel to conduct QC/QA functions
- Keep all design and construction records in an electronic database
- Adopt common data delivery and storage formats
- Build full-scale test sections to investigate the design assumptions

Design Examples

- Adding elevation to existing levees
- Step and wire basket walls
- Lightweight pipe on top of levee
- Tilt-up panels
- Concrete arch wall
- Offshore barriers
- Lightweight structure on top of levee
- Self-raising wall
- Pop-up concrete wall
- Parallel concrete panel walls
- Hollow concrete barrier that fills and drains
- Geofoam core levee
- Hydraulically pumped levee construction

Wind, Waves and Water Workshop

A Hurricane Protection Design Workshop, also referred to as the "Wind, Waves and Water Workshop" held on December 20 – 21, 2005 in Vicksburg, Mississippi was the first of three technical workshops conducted during the 6-month development of the Preliminary Technical Report. The Wind, Waves and Water Workshop was held to establish design teams and to discuss issues related to estimating the maximum hurricane for design comparison and analysis. Participants included the Corps of Engineers, National Hurricane Center, Louisiana State University, and other universities including the Delf University in the Netherlands.

Letters from Concerned Citizens

- Concrete barrier reefs (floatable boxes, WW2 "Mulberry Harbour" Style – drawing included)
- Learn from the Dutch
- Pump out the sand and mud from the bottom of Lake Pontchartrain and deposit it in the sound
- Pump sand from the Gulf around the shallows to build up the marshland
- Create barrier islands
- Create sand bars to the east of and parallel to the Chandeleur Island
- Alternative levee design (reinforced concrete "egg cartons") with roadway on top (drawings included)
- Elevate all major roadways 20'-30' above surrounding ground level on top of new levees to form "flood compartments" within metro-New Orleans
- Sink old Liberty ships as reefs or breakwaters
- Mississippi River diversions
- Rebuild the New Orleans levees
- Elevate existing
- Fill behind the levees to raise ground level above sea level
- Second line of defense (or back-up) levees
- Use Illinois River mud to create marsh
- Prevent Mississippi River silt from falling off the continental shelf; pipe it from the River's mouth to create marsh in the Deltaic area
- Design better levees with better soil
- Dredge the River to raise the land
- Mix water glass with concrete in levee designs to make the concrete last longer
- Implement Levees East of Morgan City (LEMC "Barrier Plan") as shown on the Flood Control, Mississippi River and Tributaries, Lower Atchafalaya Basin Reevaluation Study by the USACE April 2002 Plate #22
- Raise New Orleans at least 10' above sea level with dredged material from Lake Pontchartrain
- Open Lake Pontchartrain to the Gulf by a sea-level passage to reduce lake level to sea level
- Replace earthen levees with steel-reinforced concrete ones, 30 feet high and 6-10 feet wide
- Utilize landfill material in hurricane and flood protection