Greater New Orleans Hurricane and Storm Damage Risk Reduction System

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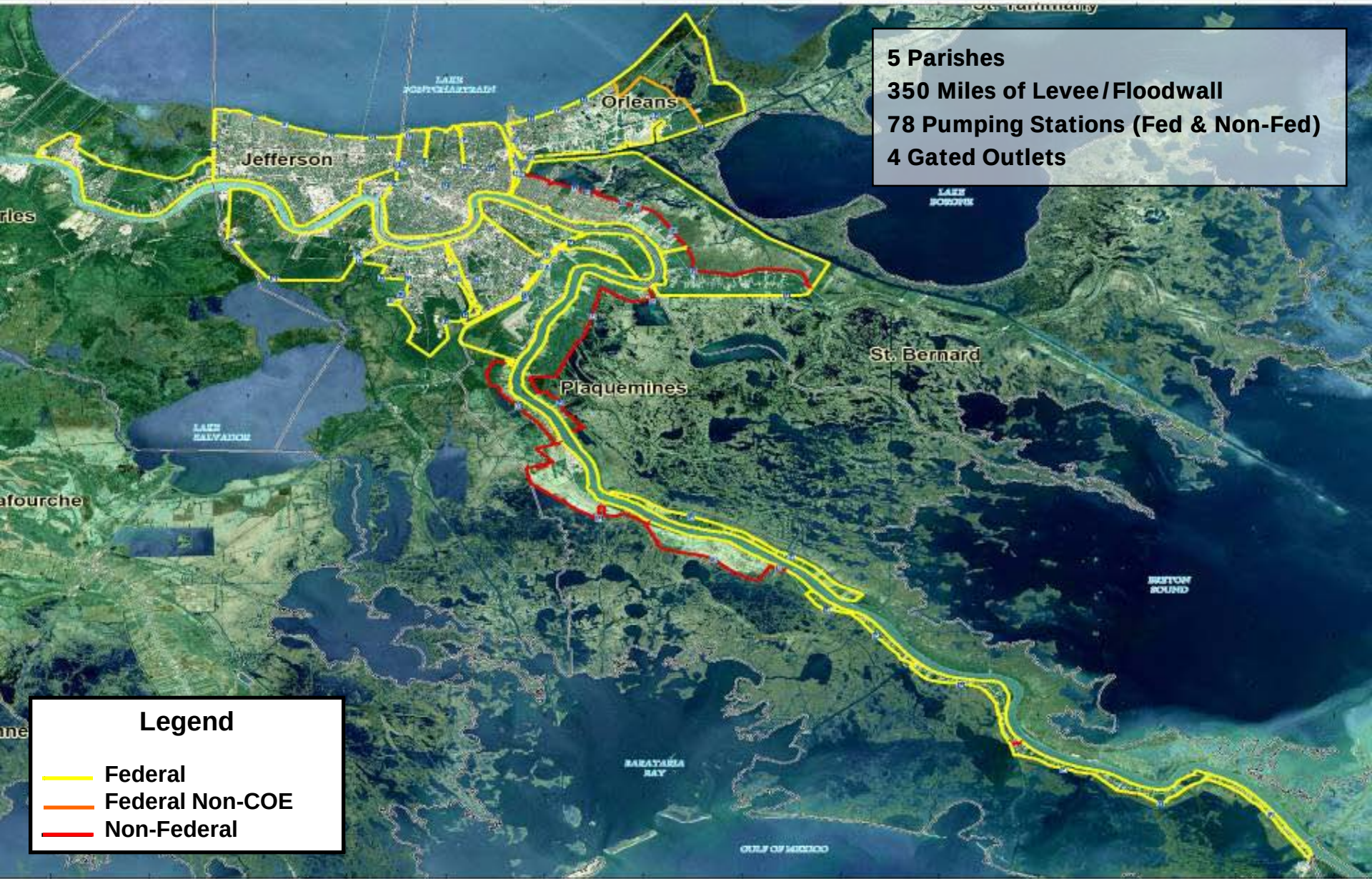
U.S. Army Corps of Engineers

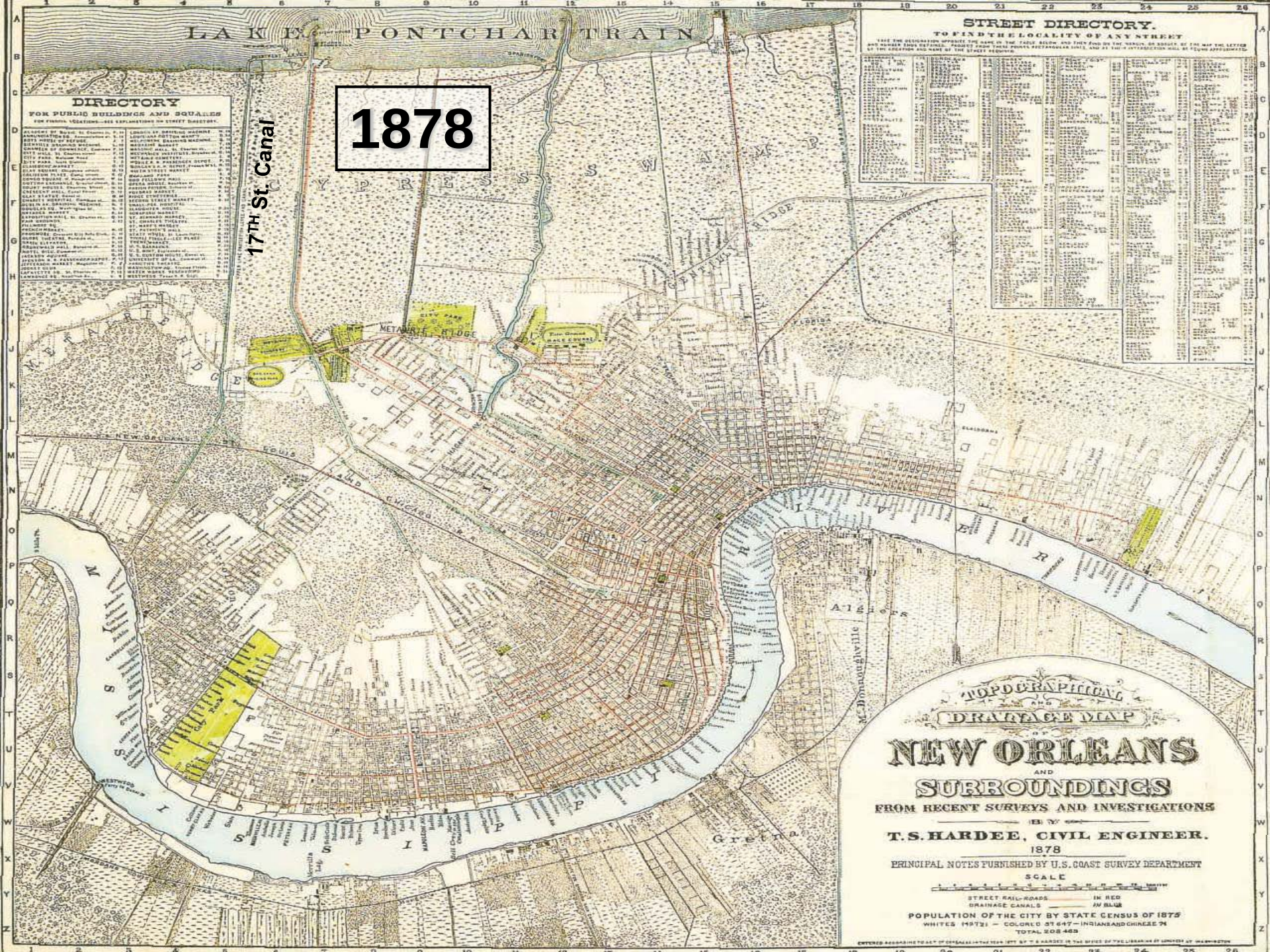
April 1, 2011

US Army Corps of Engineers
BUILDING STRONG®

New Orleans Area

Hurricane and Storm Damage Risk Reduction System




1878
17TH St. Canal
LAKE PONTCHARTRAIN
DIRECTORY
FOR PUBLIC BUILDINGS AND SQUARES
STREET DIRECTORY.
TO FIND THE LOCALITY OF ANY STREET
CYPRESS SWAMP
METAIRIE RIDGE
NEW ORLEANS
ST. LOUIS
CANAL
MISSISSIPPI RIVER
TOPOGRAPHICAL AND DRAINAGE MAP OF
NEW ORLEANS
AND
SURROUNDINGS
FROM RECENT SURVEYS AND INVESTIGATIONS
BY
T.S. HARDEE, CIVIL ENGINEER.
1878
PRINCIPAL NOTES FURNISHED BY U.S. COAST SURVEY DEPARTMENT
SCALE
STREET RAIL-ROADS IN RED
DRAINAGE CANALS IN BLUE
POPULATION OF THE CITY BY STATE CENSUS OF 1875
WHITES 191731 — COLORED 87 647 — INDIANS AND CHINESE 74
TOTAL 208 465

New Orleans Topography

City of New Orleans Ground Elevations

From Canal St. at Mississippi River to the Lakefront at U.N.O.

FLOODWALL ALONG MISSISSIPPI RIVER

A

23 FT

PROJECT DESIGN FLOWLINE (18 FEET)

B

LONDON AVENUE CANAL FLOODWALL

HURRICANE LEVEE / FLOODWALL (14.0 FEET)

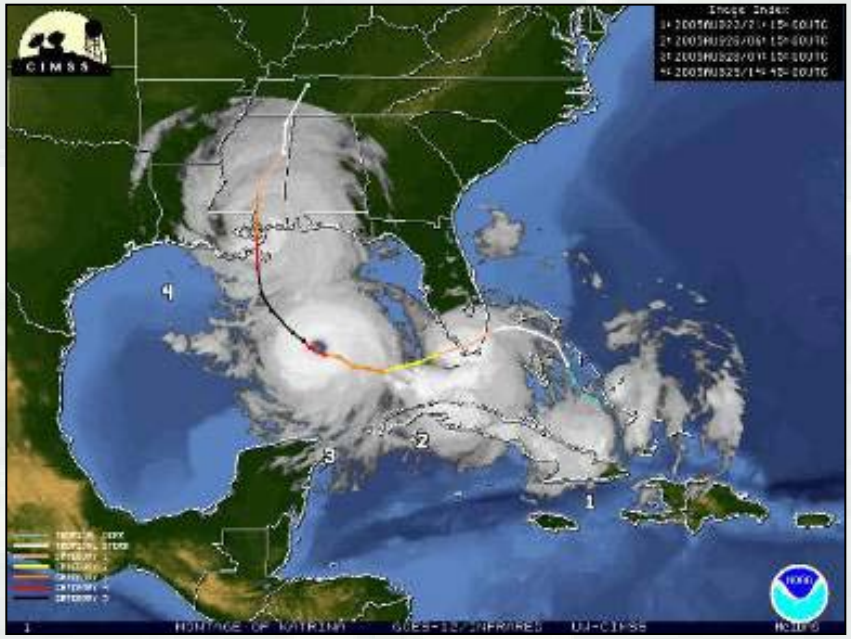
ELEVATIONS IN FEET NGVD

30
20
10
0
-10
-20

MISSISSIPPI RIVER BANK
CANAL ST AT RIVER
ST LOUIS CATHEDRAL
ESPLANADE AT ST. CLAUDE
DERBIGNY AT I-10
GENTILLY BLVD AT ALLEN
DILLARD UNIV CAMPUS
ST ANTHONY AT FILMORE AVE
WAINRIGHT DR AT L. C. SIMON
UNO SIDE OF WAINWRIGHT DR
LAKE PONTCHARTRAIN SHORE

Hurricane Katrina

Aug 29, 2005



- One of America's largest natural disasters
- Cat 5 less than 12 hrs before landfall
- 127 MPH wind at Louisiana landfall
- Maximum surge of 28 to 30 feet along Mississippi coast
- 80 percent of the city of New Orleans flooded

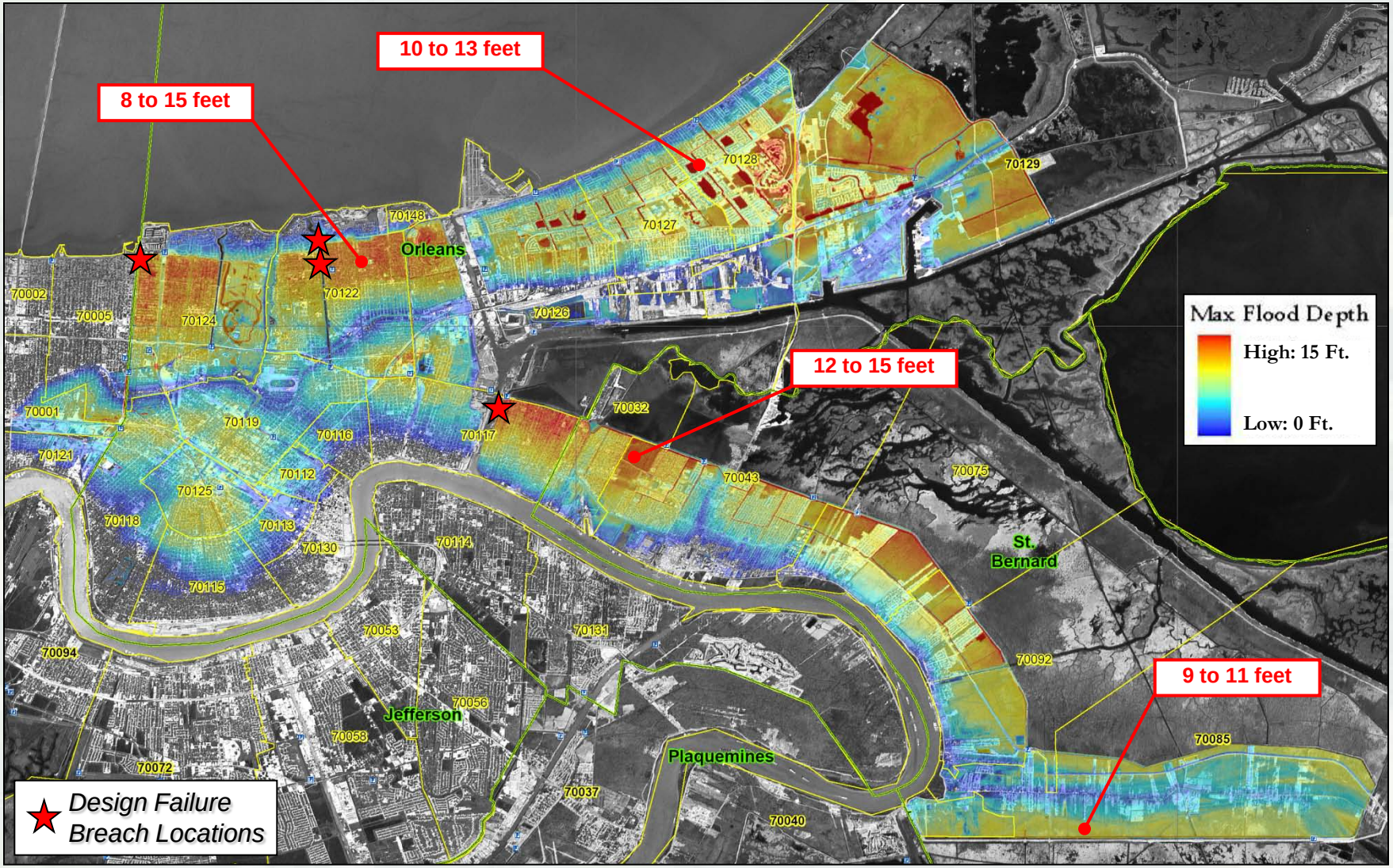
Hurricane Rita

Sep 24, 2005

- Cat 4 less than 12 hrs before landfall
- 175 MPH max sustained winds in Gulf of Mexico
- 120 MPH max sustained winds at landfall
- Cat 3 strength at landfall

New Orleans

Maximum Flooding Depth



HSDRRS:
Our Mission and Commitment

- *Repair the damages, making what was there before whole again.*
- *By 1 June 2011, strengthen and improve the system and provide 100-year level of risk reduction capable of withstanding the effects of a storm having a 1% chance of occurring each year.*
- *Current funding level $14.48 B (fully funded).*
- *Study and recommend solutions to provide higher levels of protection; restore and protect coastal wetlands (LACPR).*

Cost Estimate Process

"STATE OF THE ART"

Repeatable & Sustainable

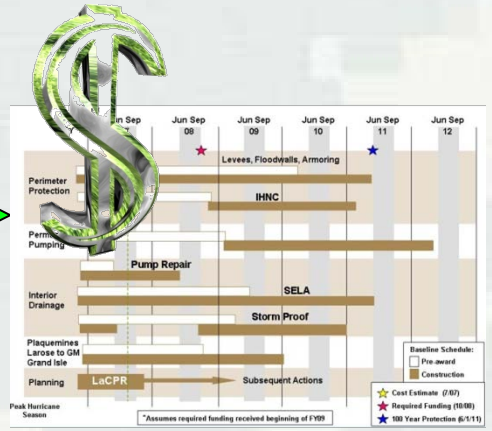
Design Material Quantities

Crew Production Rates

System Cost Estimate

Schedule

Risk Analysis



Validation of Unit Prices

Material & Labor Cost Variables

Risk Impacts

Market Analysis

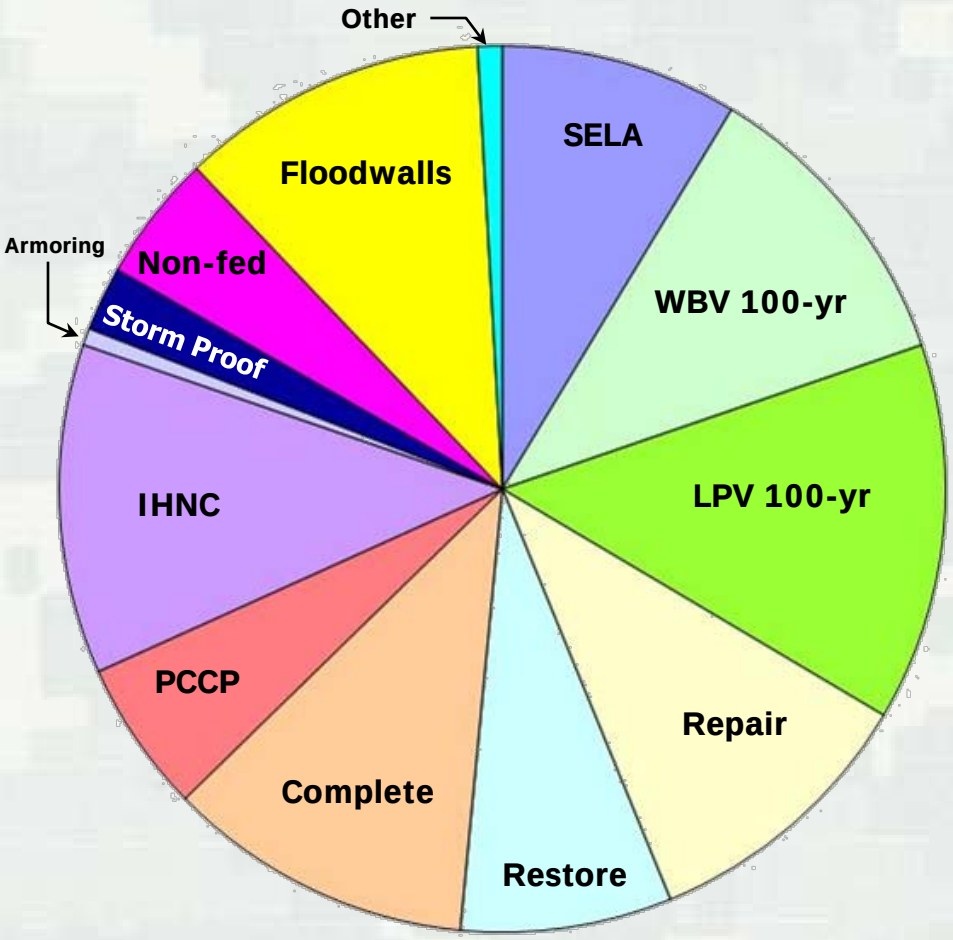
External Independent Technical Review

Market and Risk Analysis

- Performed by World Class industry experts
- Analyzed key materials, equipment and labor
- Researched market prices
- Projected future costs
- Assessed potential for supply constraints
- Cost & quantity uncertainties captured and analyzed
- Developed Risk Register (cost & schedule risk)
- Risk items linked to specific affected activities

HSDRRS Funding Breakdown

TOTAL APPROPRIATED FUNDS: $14.48 B



COMPONENT	$ (M)
SELA (Interior Drainage)	*$1,253*
WBV 100-year Level of Protection	*$1,605*
LPV 100-year Level of Protection	*$1,997*
Repair Existing System	*$1,491*
Restore to Design Height	*$1,116*
Complete Authorized System	*$1,619*
Permanent Pump Stations	*$804*
IHNC	*$1,743*
Selective Armoring	*$89*
Storm-proof Existing Pump Stations	*$340*
Incorporate non-Fed Levees in Plaquemines Parish	*$671*
Reinforce or Replace Floodwalls	*$1,626*
Other	*$130*

Construction Contract Status

	Total Contracts	100-Year Contracts
TOTAL	**392**	**109**
Awarded to date	314	103
Complete	197	42
Under Construction	117	61
Remaining Awards	78	6

as of 30 Mar 11

HSDRRS Remaining Awards

Project	CY11	CY12	CY13	CY14	CY15	Estimated Construction Completion Date
	~24	**26**	**10**	**8**	**1**	
WBV / LPV 100-yr	**6** (2 WBV, 4 MRL EAM)					December 2012
SELA	8	9	5			November 2017
Storm Proofing	2					October 2012
NOV / NFL		8	5	3	1	September 2016
MRL Resilient Features		6				December 2014
LGM	3					June 2012
Perm Pumps	1					October 2014
Environmental Mitigation	1	1		5		August 2014
Grand Isle		1				January 2014
Armoring	~3					October 2012

As of 30 Mar 11

*** SELA 28 scheduled to be awarded in early 2017**

Current Program Status

- **Total Program ➔ $9.7 B Obligated**
  $7.2 B Expended
- **100-yr System**:
  - Design about **99%** complete
  - All 100-yr NEPA Compliance/Project Description Documents complete
  - Lake Borgne Surge Barrier 84% construction complete
  - Seabrook Surge Barrier 26% construction complete
  - West Closure Complex 72% construction complete
  - LPV – 63 of 63 100-yr contracts awarded
  - WBV – 39 of 45 100-yr contracts awarded
    - MRL scheduled to award in March (4 Contracts pending ROE)
- SELA – 13 of 35 contracts awarded
- Pump Station Repair complete
- Storm Proofing 46% construction complete
- Armoring – Alternatives being developed, select alternative in May
- HSDRRS Environmental Mitigation – scoping ongoing
- HSDRRS Accreditation

1 June 2011 Status:

- A perimeter system capable of defending against a 100-year storm surge where:
  - 97% of the system perimeter will be constructed to 100-year design criteria
  - 2 % of the system will have Engineered Interim Structures in place
  - 1% of the system will have Engineered Construction Closures on site to close gaps should a hurricane threaten the area

100-yr Contracts Where Final Structure Is Projected Beyond 1 June 2011

100-yr Contract	Award Date	Interim 100-yr	Final 100-yr
IHNC-01 Seabrook Surge Barrier	15-Feb-10	30-May-11	30-Dec-11
PCCP-01 Permanent Canal Closures	**21-Apr-11**	**1-Jun-06**	**Oct-14**
LPV-17.2 Bridge abutment and Floodwall Tie-ins at Causeway Bridge -Phase 2	24-Aug-10	Closure	13-Jan-12
LPV-09.2 PS's #1, #2, #3 and #4 Mods, Fronting Protection, Positive Cutoff and Floodwall Tie-ins	15-Apr-10	15-May-11	01-Oct-11
LPV-03.2B West Return Floodwall (Northern Segment) - Phase 2	15-Jul-10	1-May-11	09-Dec-11
LPV-03.2A West Return Floodwall (Southern Segment) - Phase 2	30-Jul-10	1-May-11	06-Sep-11
LPV-3d.2 Airport Runway 10 Levee Phase 2	15-Sep-10	Closure	15-Aug-11
WBV-77 Western Tie- In UP Railroad Crossing	**1-May-11**	Closure	**2-Jan -12**
WBV-75 Western Tie- In BNSF Railroad Crossing	**7-Apr-11**	Closure	**2-Oct -11**
WBV-74 Western Tie-In Closure Structure	30-Apr-10	30-May-11	26-Jun-11
WBV-73 Western Tie-In Highway Crossing	06-Jul-10	Closure	17-Dec-11
WBV-15a.2 Lake Cataouche Pump Station to Segnette State Park	15-Feb-10	Closure	5-Aug-11
WBV-16b Segnette PS fronting protection and modifications	15-Jan-10	Closure	18-Dec-11
WBV-16.2 Bayou Segnette Complex	10-Feb-10	Closure	14-Jul-11
WBV-24 Segnette State Park Floodwall	23-Dec-09	Closure	27-Jul-11
WBV-37 Ames / Mt. Kennedy Pump Stations	23-Jun-10	1-May-11	17-Sep-11
WBV-90 GIWW - West Closure Complex	17-Apr-09	1-Jun-11	16-Aug-11
WBV-12 Hero Canal Reach 1, 2nd Enlargement	15-Apr-10	Closure	17-Jun-11
WBV-09b Hero Canal to Oakville – Structures	14-May-10	Closure	21-Jul-11
WBV-09a Hero Canal to Oakville – Levees	21-Jun-10	Closure	17-Jun-11
WBV-09c Hero Canal to Oakville - Highway Structures	09-Jul-10	Closure	02-Jul-11

Engineered Interim Structures
Engineered Construction Closure*
Unawarded contracts are in bold / underline

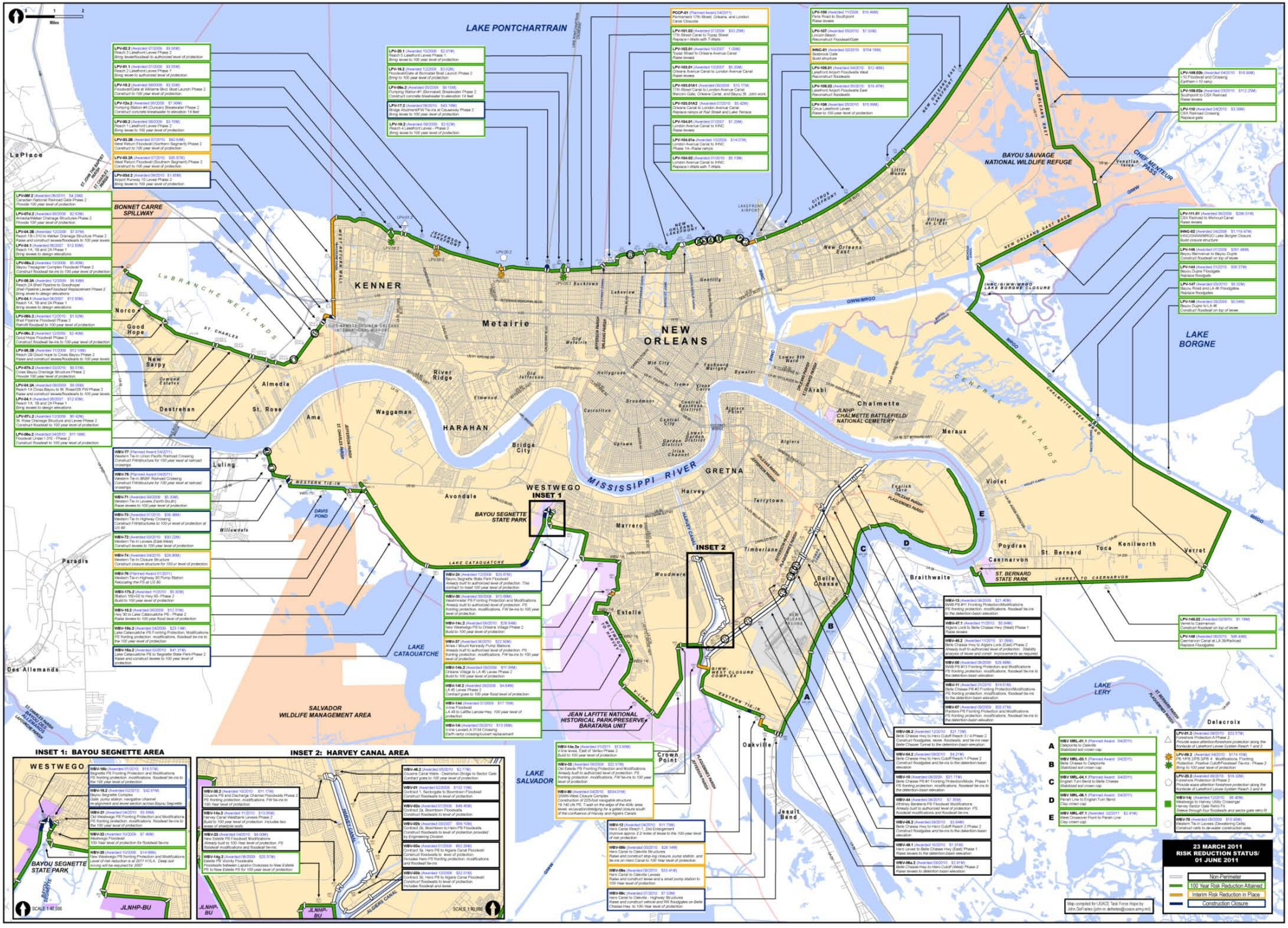
***deployed as needed prior to tropical events**

Definitions

- **Engineered Alternative Measures**
  - Meet hydraulic and structural/geotechnical design criteria
  - Meet criteria for Accreditation
  - Do not meet full HSDRRS design criteria
  - Example: MRL Co-located phase 1 levees
- **Engineered Interim Structures**
  - Meet 100-yr hydraulic and structural/geotechnical design criteria
  - Temporary in nature – to be replaced by permanent features for Accreditation
  - Example: Cofferdams at Seabrook Surge Barrier, ICS at Outfall Canals
- **Engineered Construction Closures**
  - Rapidly deployed measures
  - Used to close discrete access points, railroad / highway crossings under construction
  - Does not meet criteria for Accreditation
  - Example: HESCO Bastions / Temporary sheet pile

GREATER NEW ORLEANS HURRICANE STORM DAMAGE RISK REDUCTION SYSTEM (HSDRRS)

Lake Pontchartrain and Vicinity (LPV)/Westbank and Vicinity (WBV) 01 June 2011 Risk Reduction Status: 23 March 2011



Deliver the Greater New Orleans HSDRRS Mission

Challenges

- Mandate to deliver $14.6B construction program within budget and on schedule
- Form design criteria, program cost estimate, acquire funding
- Intense scrutiny / oversight
- New governances
- NEPA compliance
- Deliver a comprehensive system

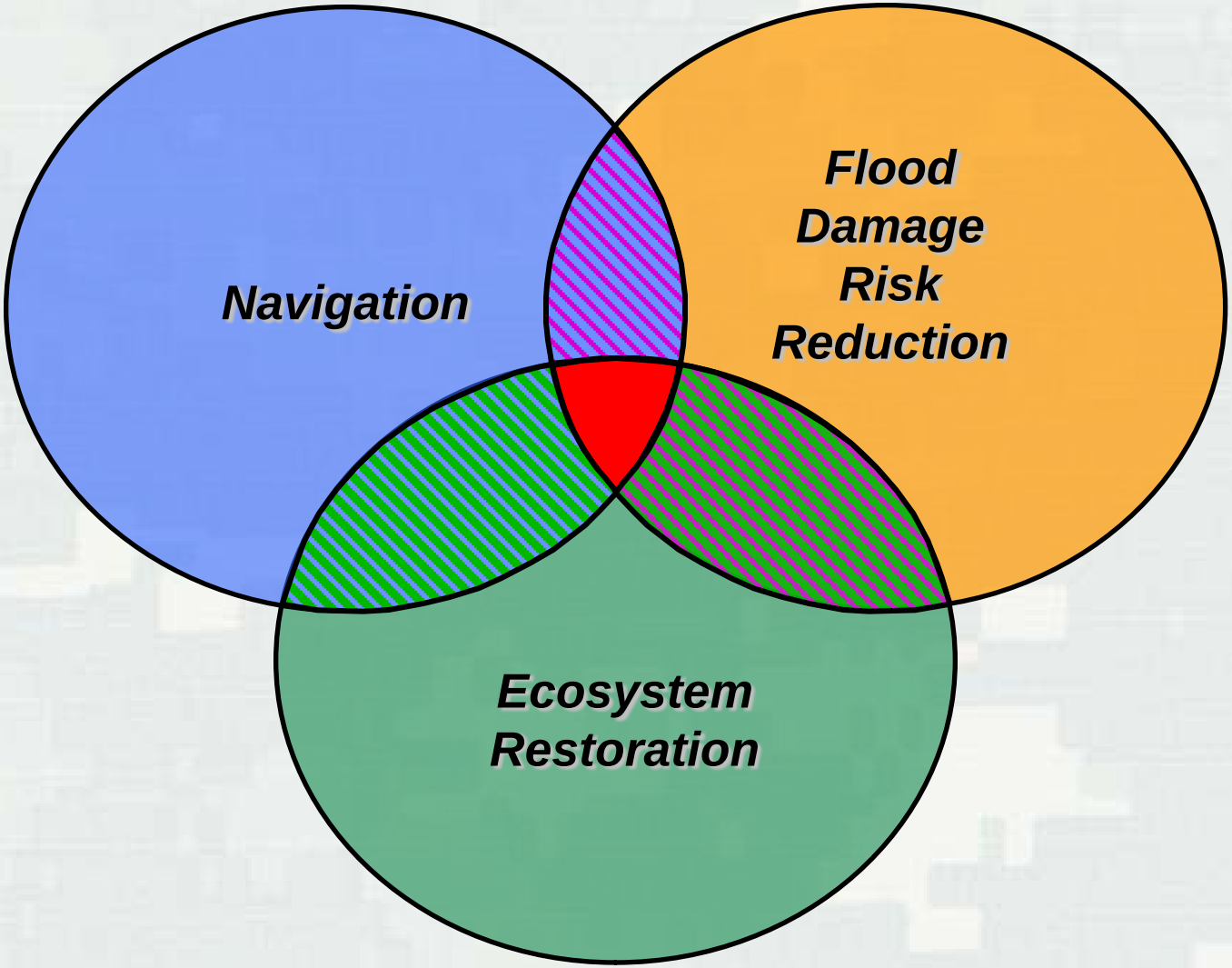
Enablers

- Administration / Congressional commitment
- Fully funded program
- National/Regional Corps capabilities
- Local partners and stakeholders capabilities
- NEPA Alternate Arrangements
- Full host of acquisition strategies
- Favorable bidding climate

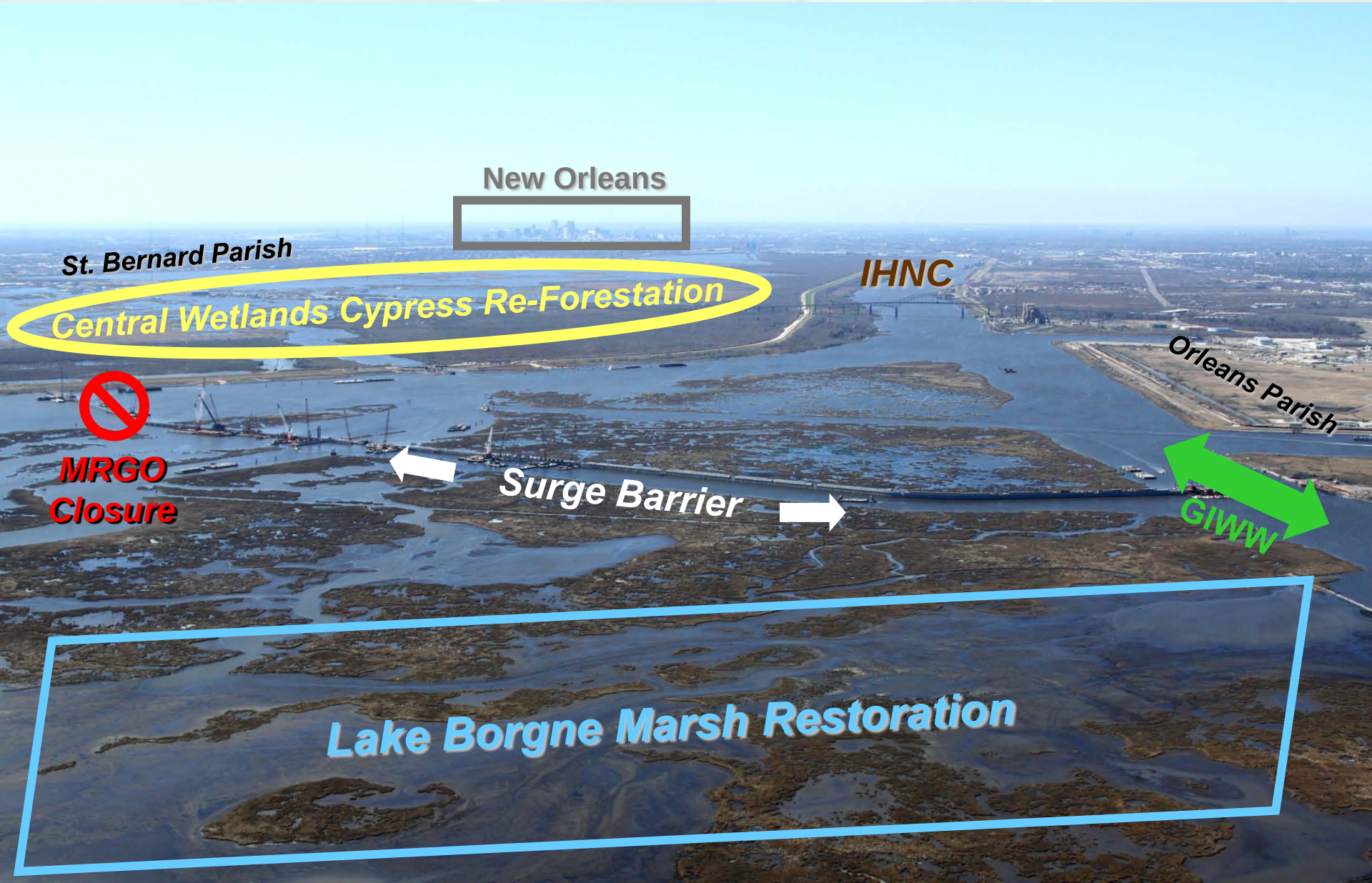
Best Practices:
System Program Management

- Acquisition Strategy
  - Design Build / Cost Plus Contracts
  - Best Value Source Selection
  - Early Contractor Involvement (ECI)
  - Program Management Support Contract
- Construction Materials
  - Government Furnished Borrow
  - Supply Contracts for Sheet Piles and Borrow
- Improved Techniques
  - Value Engineering – systems study complete
  - Pile Load Tests – in advance of contract award
  - Press Pile, Spiral welded piles
  - Deep soil mixing, sand blanket and wick drains
- Earned Value Management System (EVMS)
- Leverage National & Regional Resources

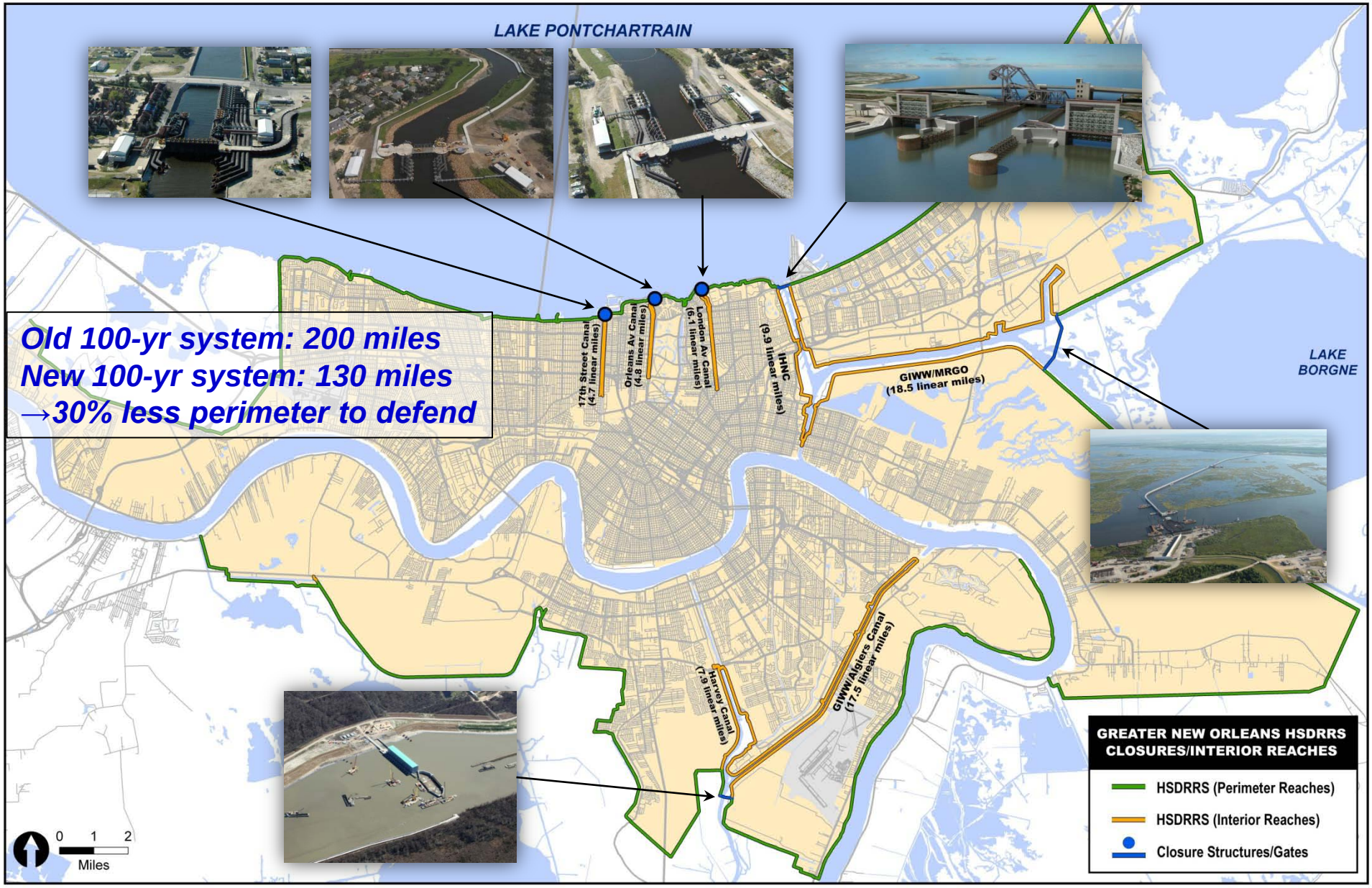
Integrated Systems Approach



The Big Picture

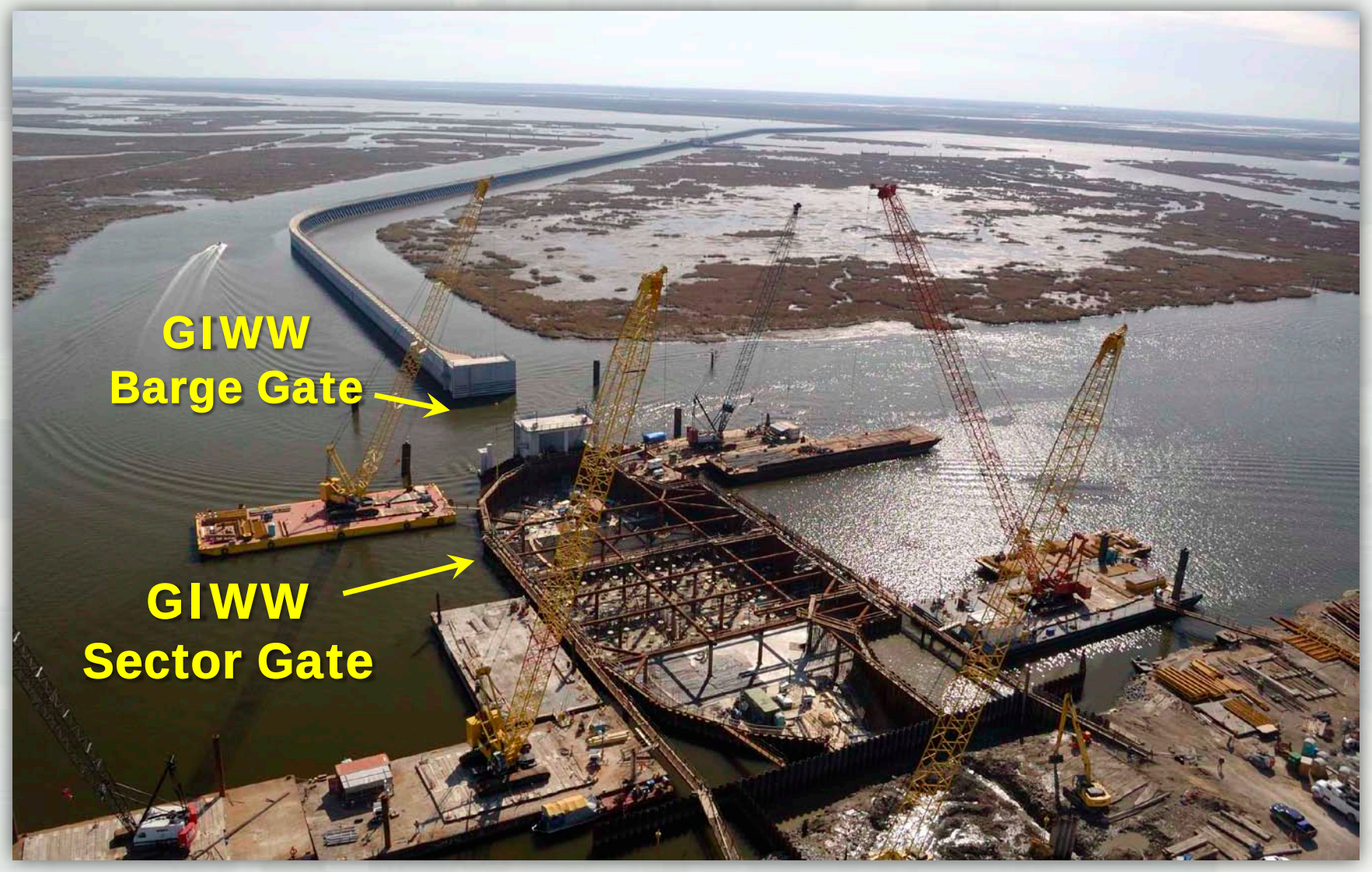


Perimeter Risk Reduction



Lake Borgne Surge Barrier

Lake Borgne Surge Barrier Gates



Lake Borgne Surge Barrier

Lake Borgne Surge Barrier

Lake Borgne Surge Barrier Sector Gate Fabrication

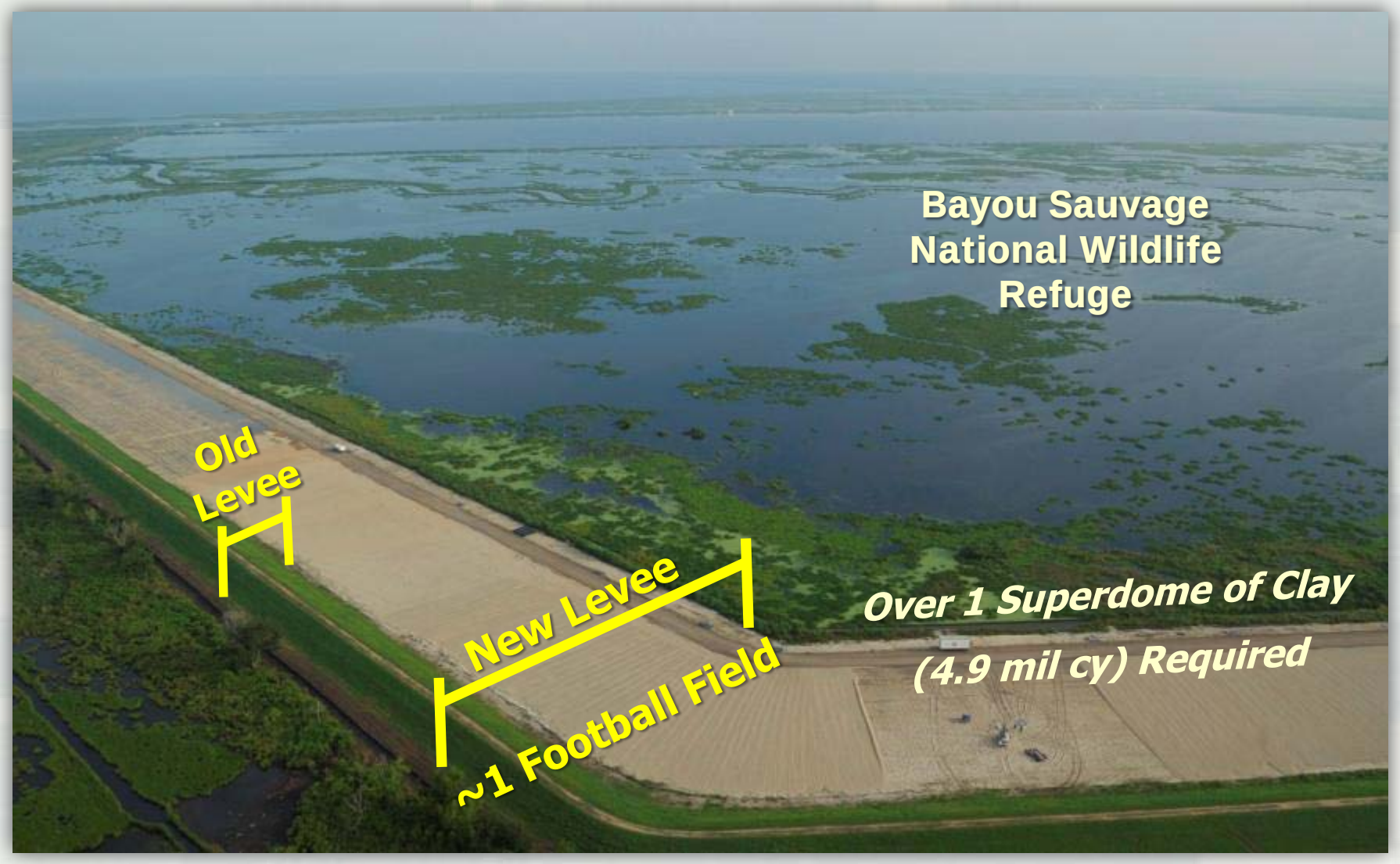
Lake Borgne Surge Barrier Sector Gate Fabrication

Lake Borgne Surge Barrier Barge Gate

St. Bernard Floodwall

St. Bernard Floodwall Construction – Southern Reach

New Orleans East Levee



New Orleans East

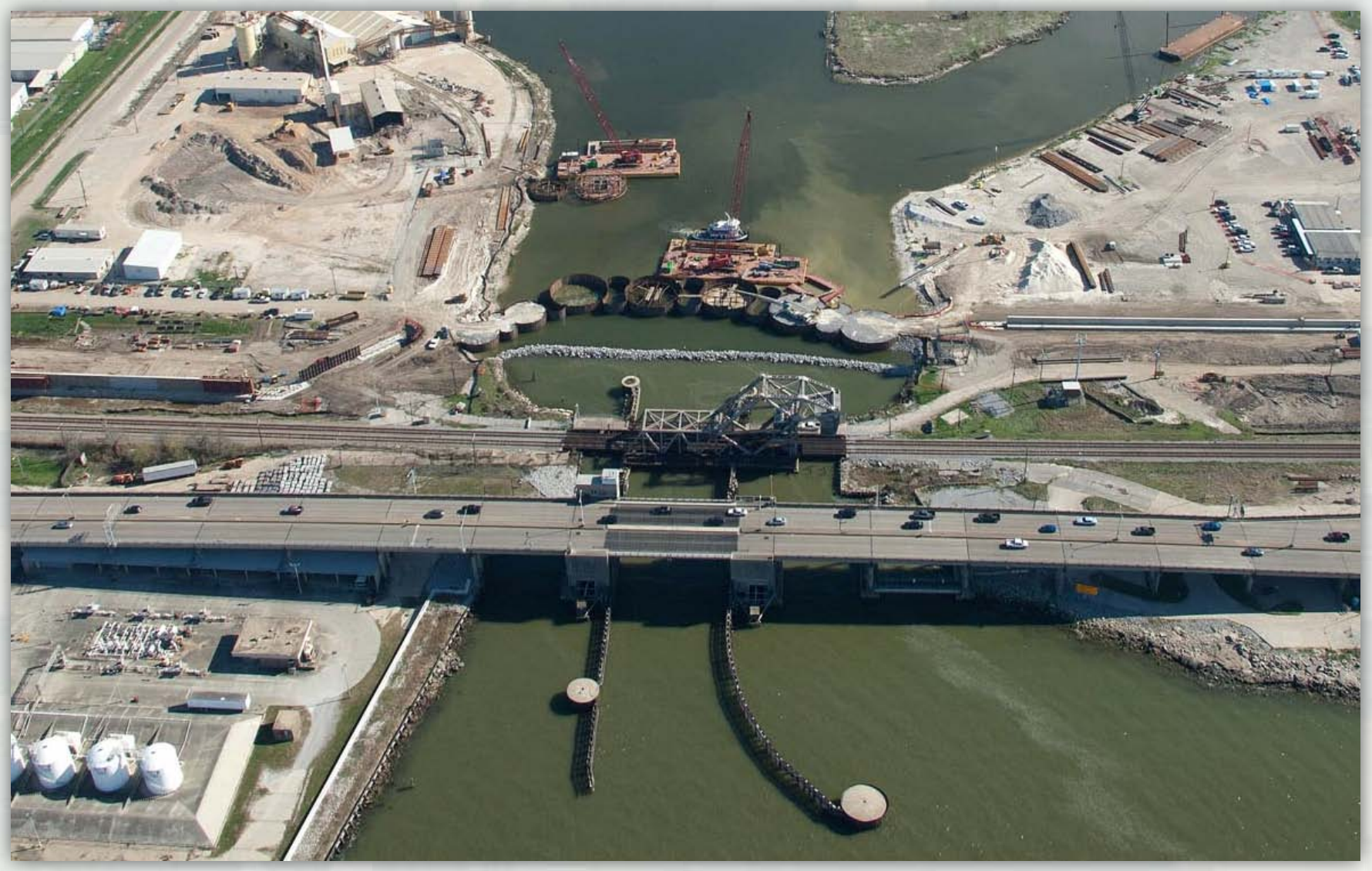
Surge Barrier Tie-In

New Orleans East

Tie-In Floodwall

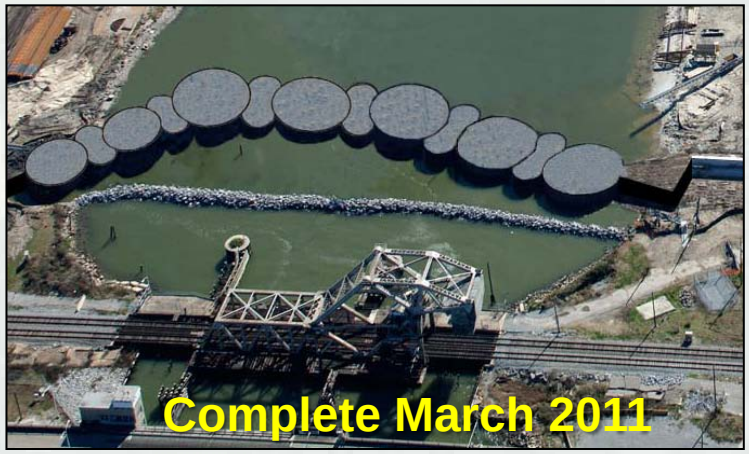
Seabrook Surge Barrier

Seabrook Surge Barrier



Orleans Parish
2011 Interim Closure Structures

Seabrook (IHNC)



London Ave. Canal

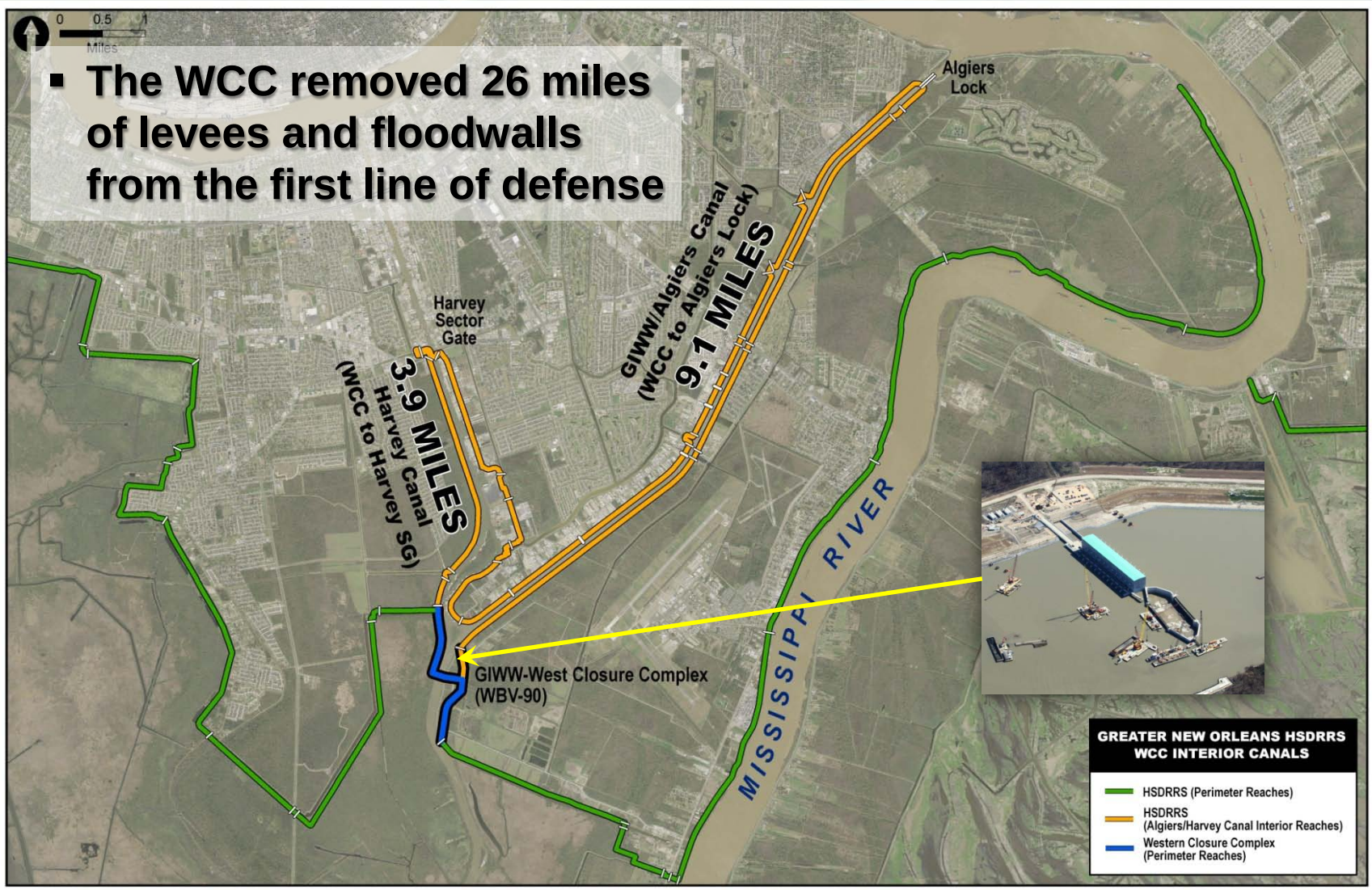
17th St. Canal

Orleans Ave. Canal

Provides interim 100-year level of risk reduction

West Closure Complex

West Closure Complex



West Closure Complex

West Closure Complex

Pump Station

Pump Station Repairs

Motor at Orleans Drive Pump Station

Repair $102.7 M Program

Repairs for all 61 pump stations are complete.

Vertical Drive Pump – Elaine Pump Station

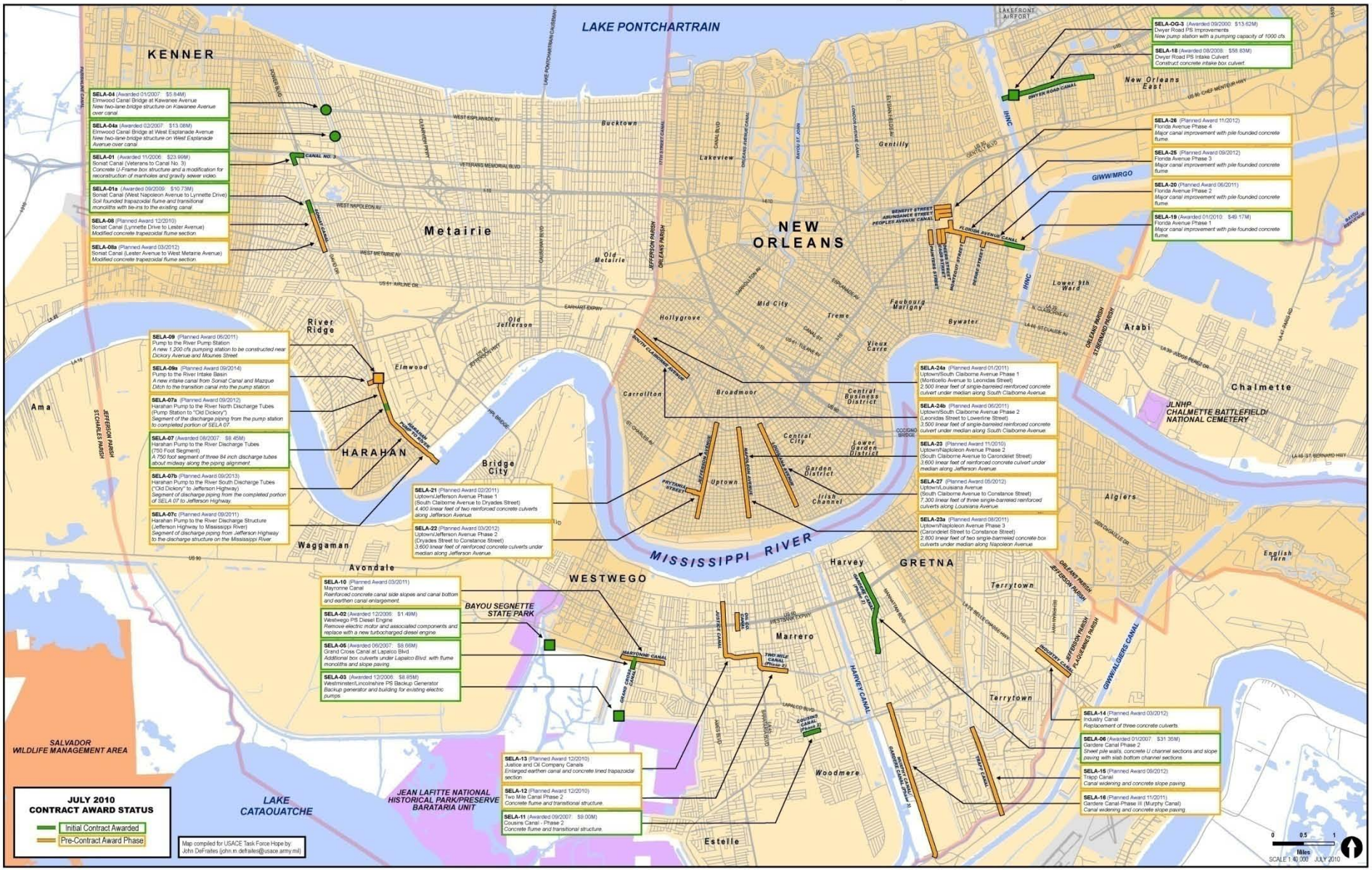
Pump Station Storm Proofing

Contract Status	Orleans Parish	Jefferson Parish
TOTAL	18	16
In Design	1	2
Awarded	7	8
Complete	2	3
Pending	8	2

SELA Interior Drainage

Contract Status	Orleans Parish	Jefferson Parish
TOTAL	11	24
In Design	9	13
Awarded	2	11
Complete	0	9

SELA Interior Drainage



Questions / Discussion