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# Hurricanes Katrina and Rita:

# The Unwatering of New Orleans



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# Hurricane Katrina



- Sheer size caused devastation over 100 miles from the center of the storm
- Storm surge caused major catastrophic damage
- Over \$75 billion in damages, with economic impact of \$250 billion
- Hurricane Protection System overwhelmed by sheer magnitude and strength of the storm



# Scope of Damages



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- 169 miles of levee and floodwall
- 66 pump stations
- 4 gated structures



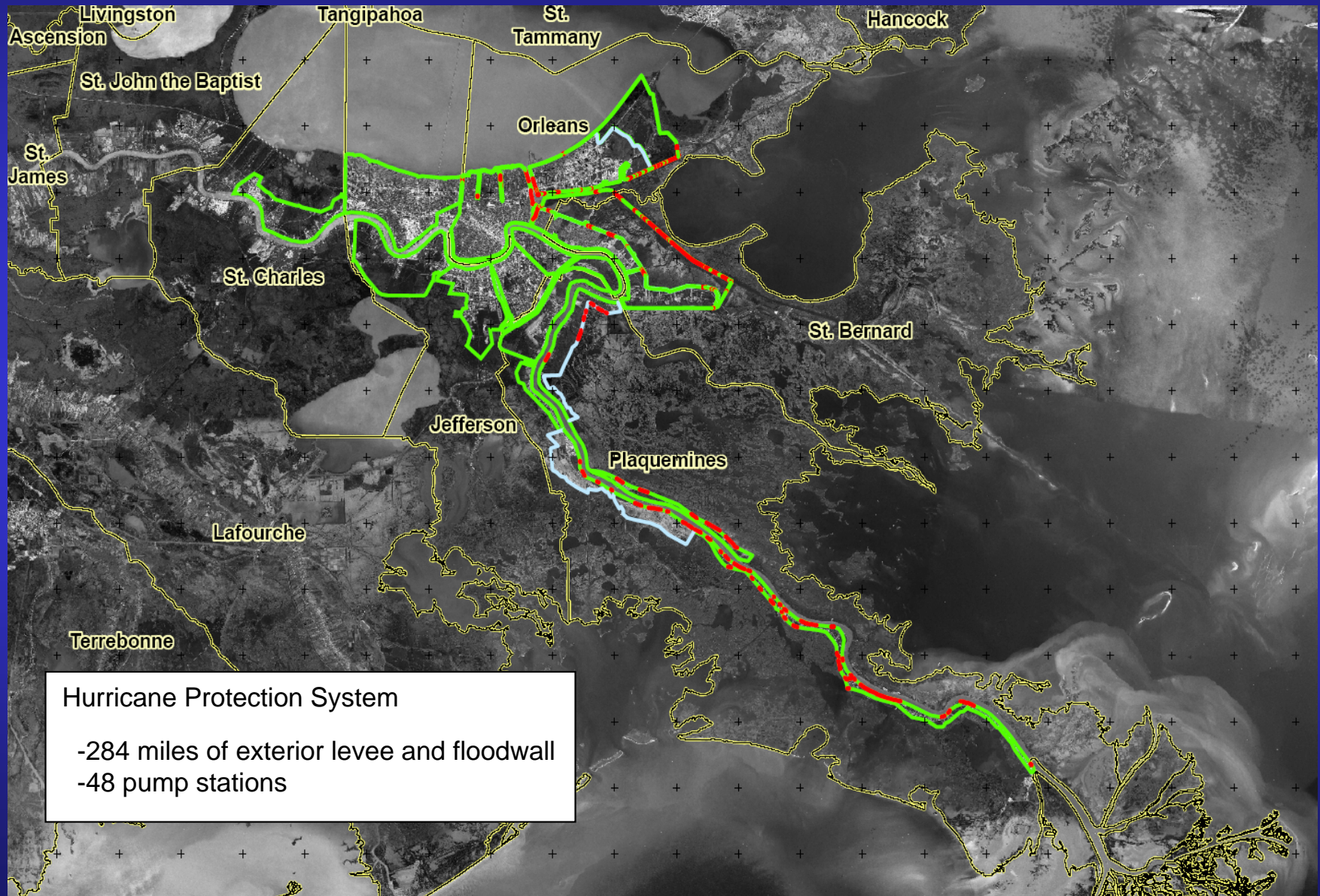
09/18/2005

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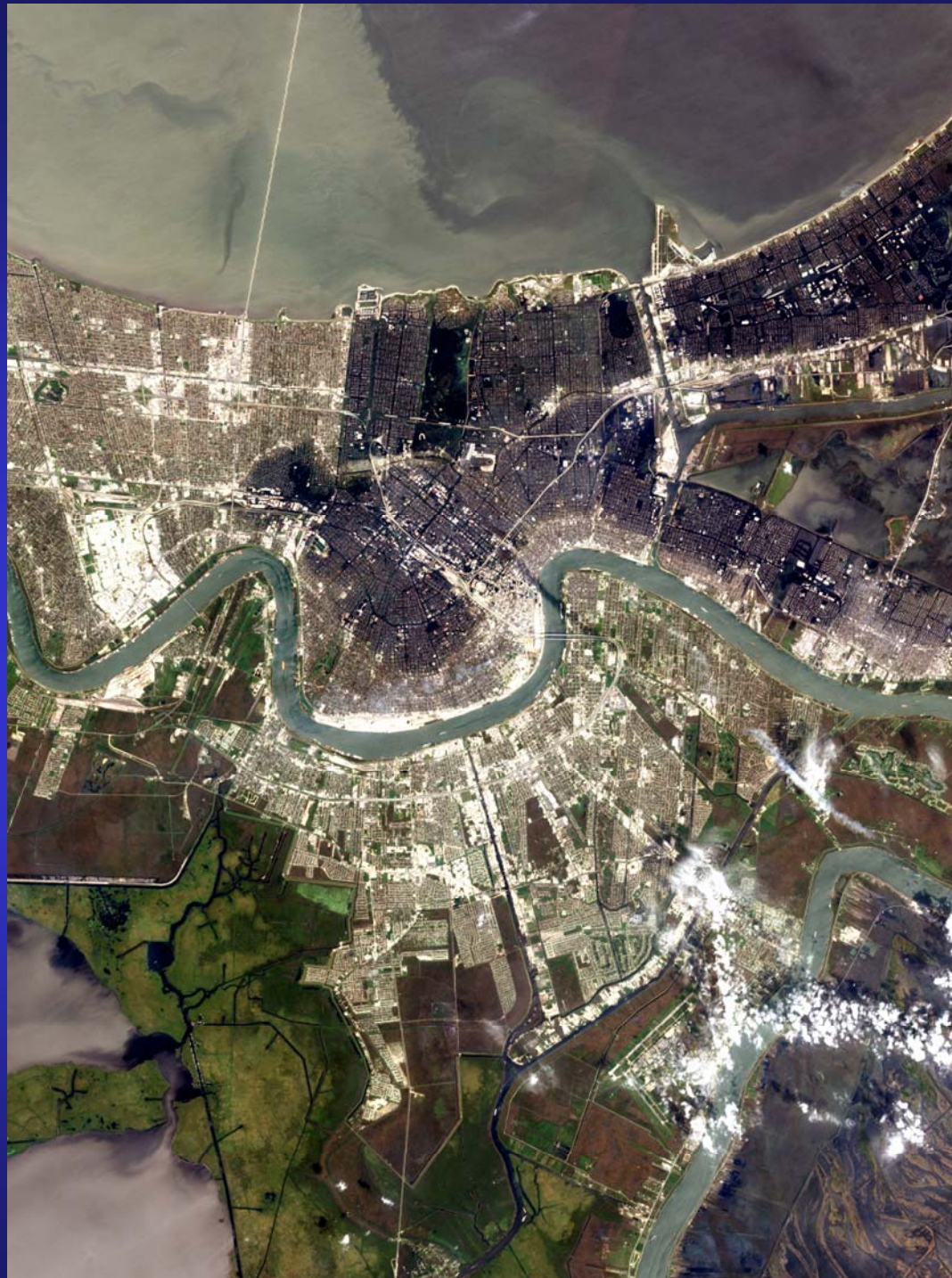
# Affected Area



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# Metropolitan New Orleans



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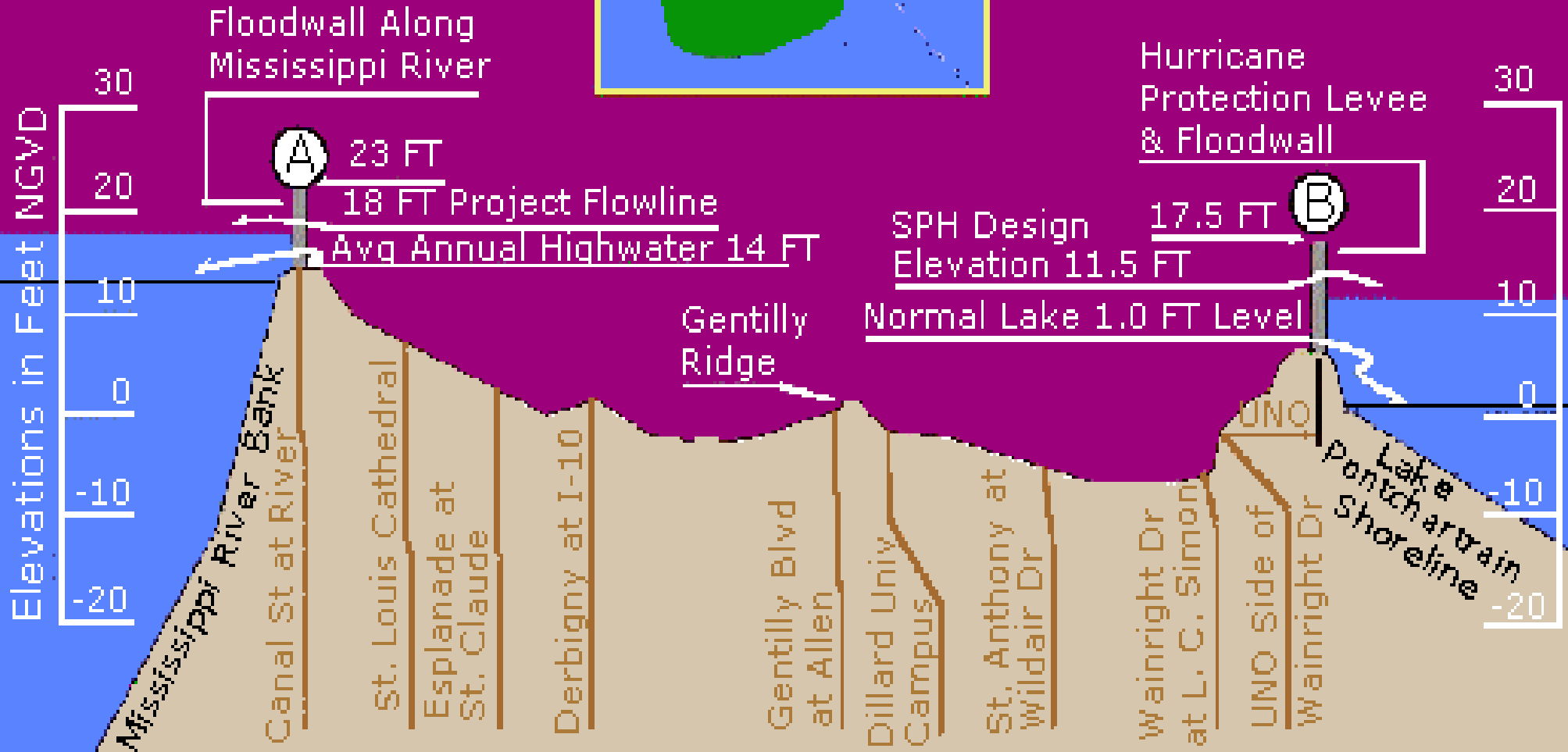
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# City of New Orleans Ground Elevations

Area Map

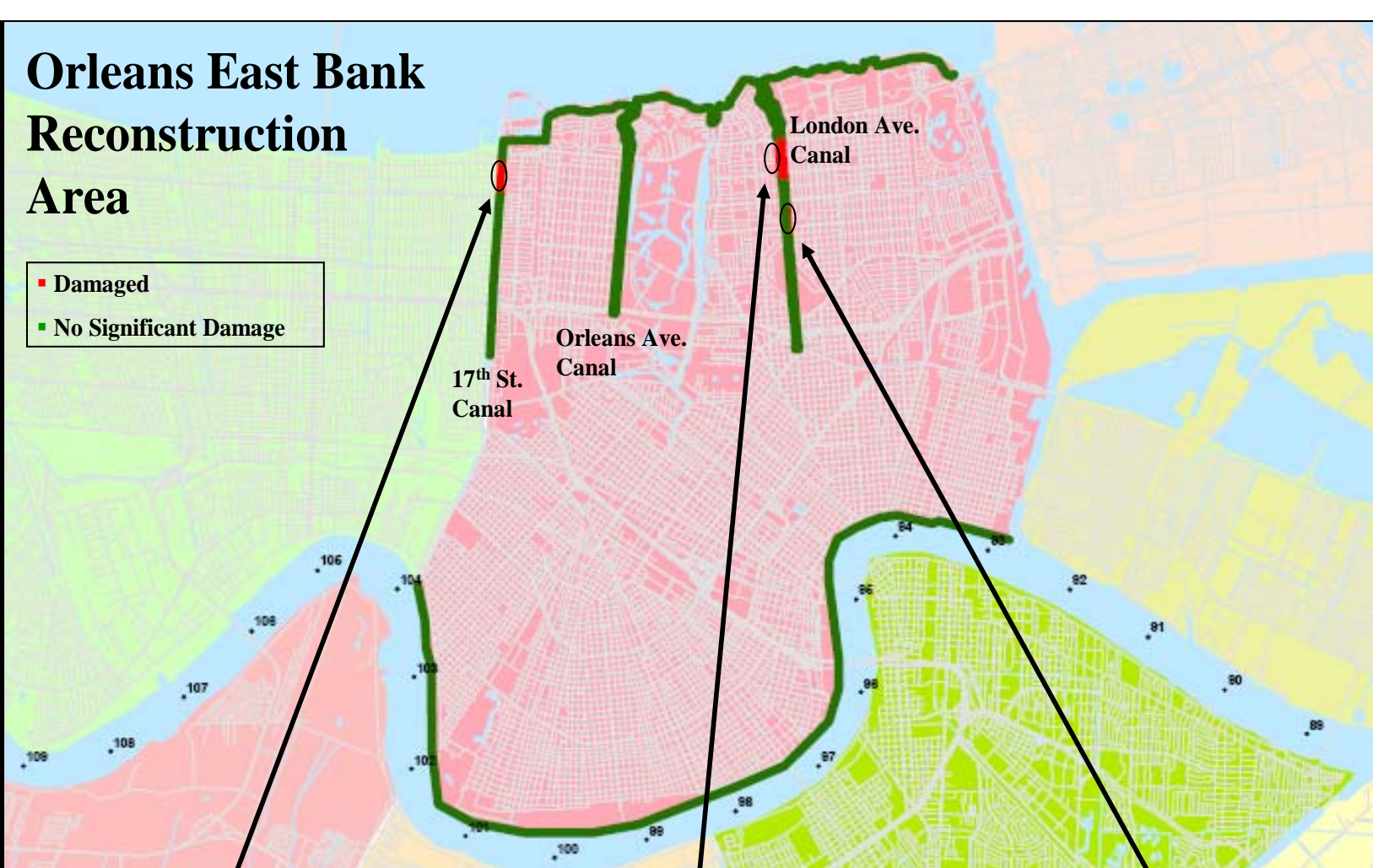


From Canal St. at Mississippi River to the Lakefront at U.N.O.



# Orleans East Bank Reconstruction Area

- Damaged
- No Significant Damage



17th St. Canal I-wall Breach



London Ave. Canal Breach



Canal Breach at Mirabeau

## Local Authorities

- Orleans Levee District
- Orleans Parish Government
- N.O. Sewerage and Water Board
- Louisiana DOTD

## Hurricane Protection System

- 19.2 miles of levee and floodwall
- 13 pump stations
- 15 roadway floodgates

## Damage

- 1.1 miles of levee and floodwall
- 13 pump stations

## Reconstruction Schedule

Construction	Start	Complete
Temp. Repairs	Oct.	Nov.
Hurricane Protection	Oct.	May
- Anticipate 9 construction contracts		
1 HZ/8(a)		~\$1M
8 Unrestricted		~\$88M



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# Orleans East Bank



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17<sup>th</sup> St Canal I-wall



London Ave.  
Canal Breach at  
Robert E. Lee  
Blvd.

London Ave. Canal Breach  
at Mirabeau Ave.









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## Orleans East Bank - London Avenue Outfall Canal

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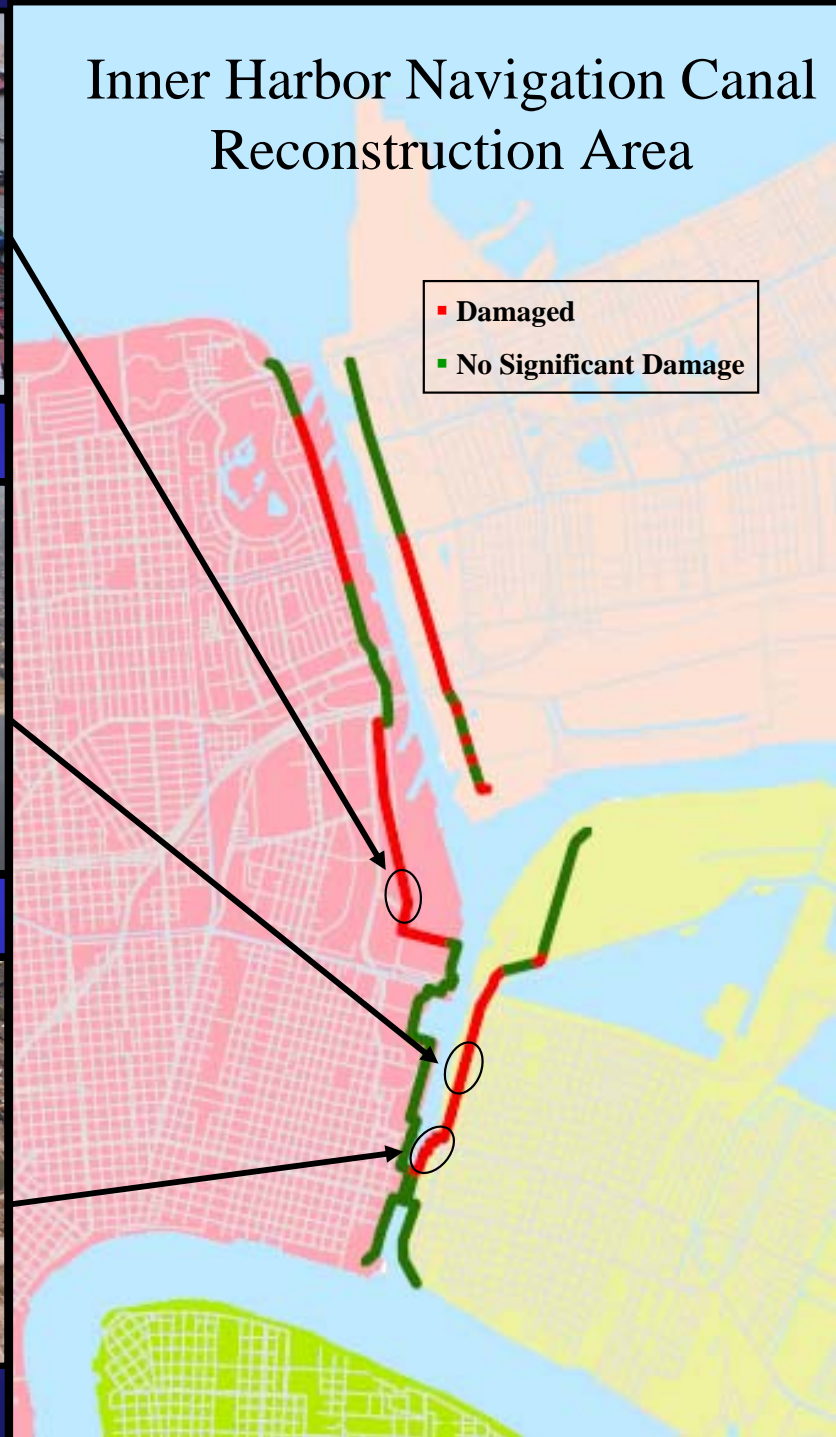
Flooding of Container Storage Yard



Northern 9<sup>th</sup> Ward Breach



Sheetpile Floodwall Collapse



#### Local Authorities

- Orleans Levee District
- Port of New Orleans
- Louisiana DOTD

#### Hurricane Protection System

- 12.3 miles of floodwall and levee

#### Damage

- 5 miles of floodwall and levee



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# IHNC



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Flooding of  
Container Storage  
Yard near France  
Road

Florida Ave. Bridge  
Northern 9<sup>th</sup> Ward  
Breach (east side)



Sheetpile Floodwall  
Collapse – 9<sup>th</sup> Ward  
(East Side)





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# Basic Strategy



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## Orleans Parish - Inner Harbor Navigational Canal

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## Orleans Parish - IHNC Floodwalls

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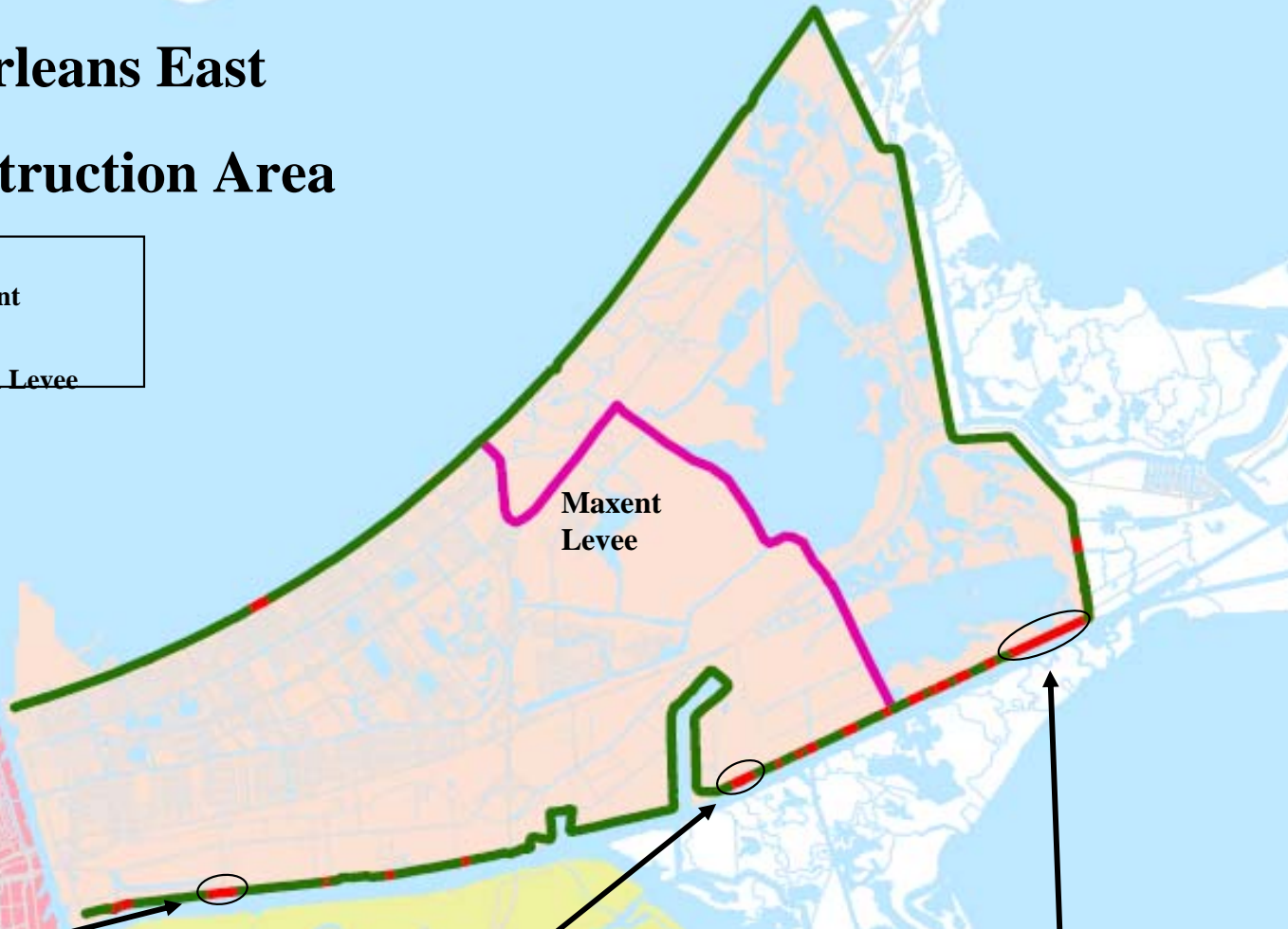


## Orleans Parish - Inner Harbor Navigational Canal

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# New Orleans East Reconstruction Area

- Damaged
- No Significant Damage
- Non-Federal Levee



## Local Authorities



- Orleans Levee District
- Orleans Parish Government
- N.O. Sewerage and Water Board
- Louisiana DOTD

## Hurricane Protection System

- 39 miles of exterior levee and floodwall (I-wall)
- 8 miles of interior levee
- 8 pump stations
- 2 highway floodgates
- 1 railroad floodgate

## Damage

- 4.6 miles of exterior levee and floodwall
- 8 pump stations



Citrus Back Levee



Air Products Breach



Intracoastal Waterway Breach

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# New Orleans East

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Citrus Back Levee –  
NOE04



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## Project Damages for New Orleans East Hurricane Protection Levee and Floodwall – NOE01

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## New Orleans - East Reach A NOE02

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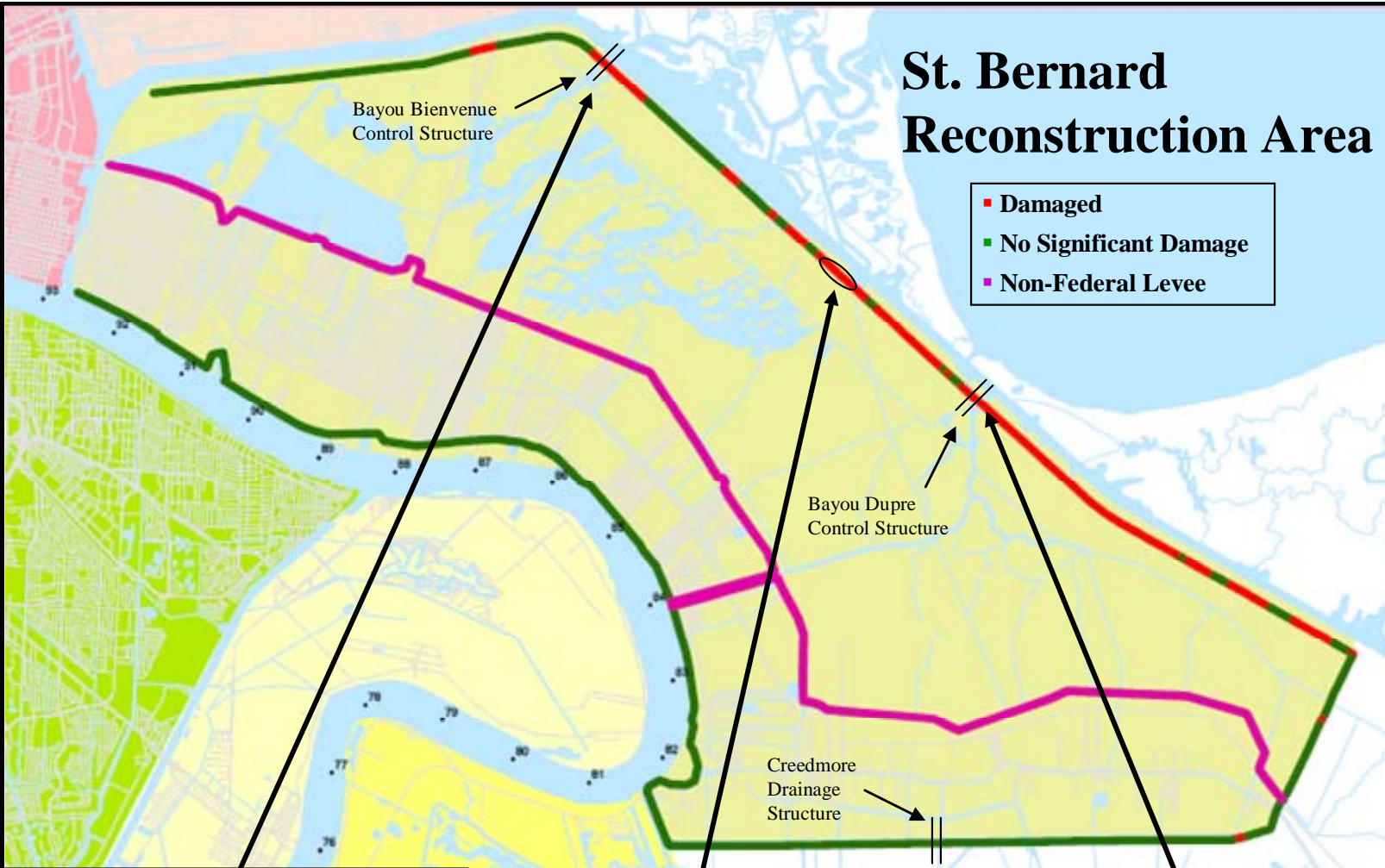
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New Orleans - East Reach A – NOE03

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# St. Bernard Reconstruction Area



## Local Authorities

- Lake Borgne Basin Levee District / Orleans Levee District
- St. Bernard Parish Government
- Louisiana DOTD

## Hurricane Protection System

- 30 miles of exterior levee and floodwall
- 22 miles of non-federal interior levee
- 8 pump stations
- 2 control structures
- 6 floodgates

## Damage

- 8 miles of exterior levee and floodwall (I-wall)
- 1.4 miles of non-federal interior levee
- 8 pump stations
- 2 control structures
- 4 floodgates

Construction	Start	Complete
Prep Levee/Borrow	Oct.	Oct.
MRL	Oct.	May
Hurricane Protect.	Nov.	May
Creedmore Structure	Dec.	May
Bayou Dupre	Nov.	May
Bayou Bienvenue	Nov.	May



Bayou Bienvenue Control Structure

Breach near Pipeline Canal

Bayou Dupre Control Structure



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## St. Bernard Parish - Bayou Bienvenue to Bayou Dupre

STB04



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**St. Bernard Parish - Bayou Dupre to STA. 1007+91 - STB03**

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## St. Bernard Parish - Bayou Dupree Control Structure

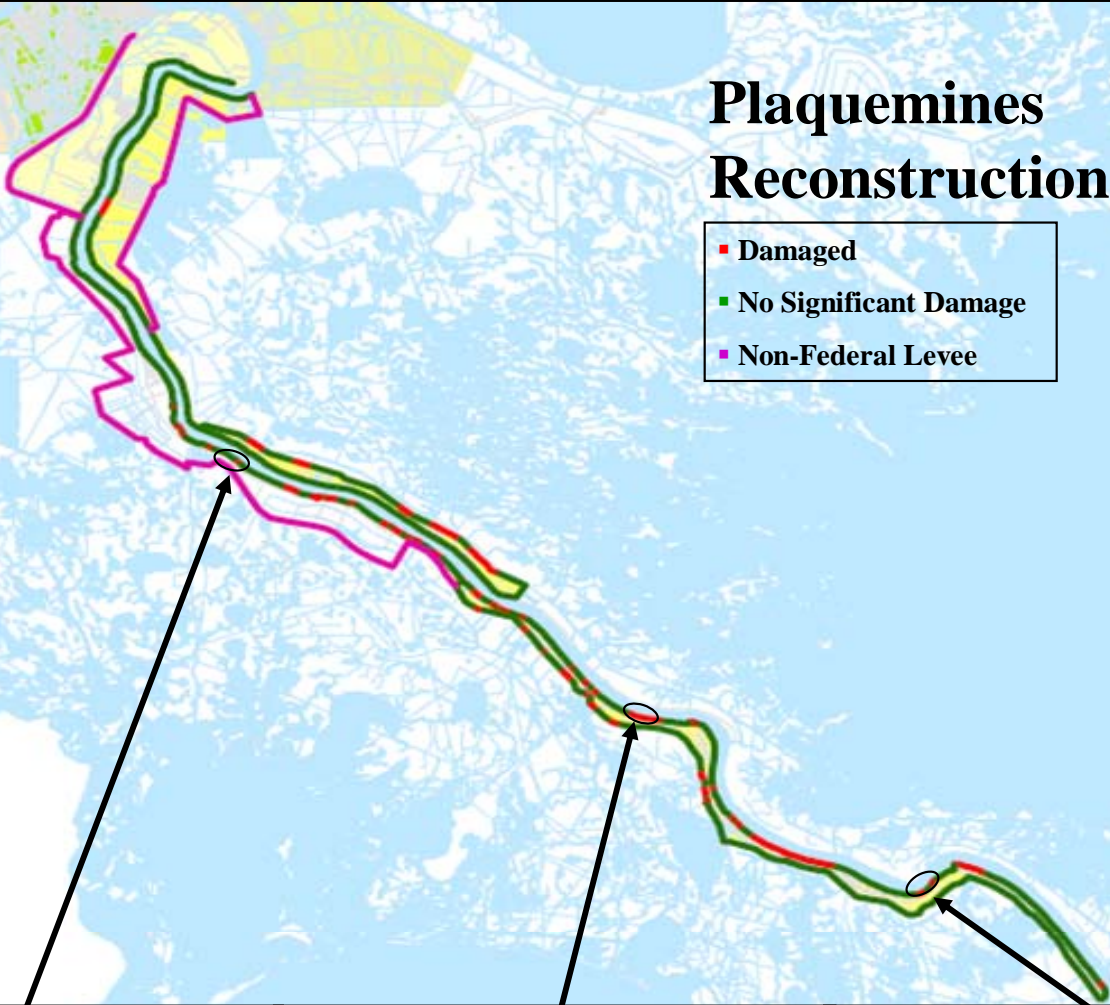
STB06





# Plaquemines Reconstruction Area

- Damaged
- No Significant Damage
- Non-Federal Levee



## Local Authorities

- Plaquemines Parish Government (Buras, Grand Prairie, and Plaquemines Parish West Bank Levee Districts)
- Louisiana DOTD

## Hurricane Protection System

- 109 miles of Mississippi River levee and floodwall (34 miles part of NoV)
- 53 miles of Hurricane Protection back levee
- 6.5 miles of floodwall
- One marine floodgate
- Non-Federal/Private: 19 pump stations

## Damage

- 20 miles of Mississippi River and Hurricane Protection levee
- 2 miles of floodwall
- Non-Federal/Private levees and pump stations – continuing to evaluate

## Reconstruction Schedule

Construction	Start	Comp.
MRL	Oct.	Nov.
NOV	Oct.	May

- Anticipate 11 construction contracts
  - 5 HZ/8(a) ~\$19M
  - 6 Unrestricted ~\$60M



Breach at Pointe A La Hache



Breach at Nairn



Failed Floodwall at Triumph



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## Plaquemines - Hurricane Protection Back Levees West Bank - St. Jude to City Price Reach - P19



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## Plaquemines - Hurricane Protection Back Levees West Bank - Reach A - P19

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## Plaquemines - Hurricane Protection Back Levees West Bank - Reach B1 - P18

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# Sunrise Pump Station





Plaquemines - Hurricane Protection Back Levees West Bank - Reach B1  
- P18



## Plaquemines - West Bank River Levee (WBRL) - across from Reach A - P19





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## Plaquemines - Hurricane Protection Back Levees East Bank - Reach C





## Plaquemines - Hurricane Protection Back Levees East Bank - Reach C – P03

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***One Team: Relevant, Ready, Responsive, Reliable***



SEA WOLF

SEA FALCON

8  
7  
6  
5

8  
7  
6  
5







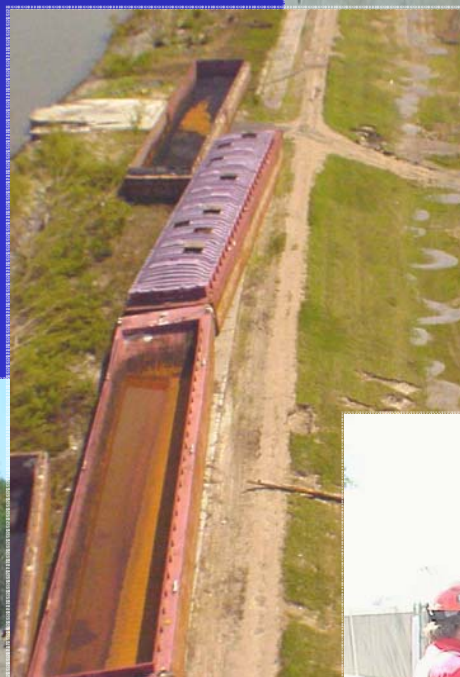


# Program Statistics



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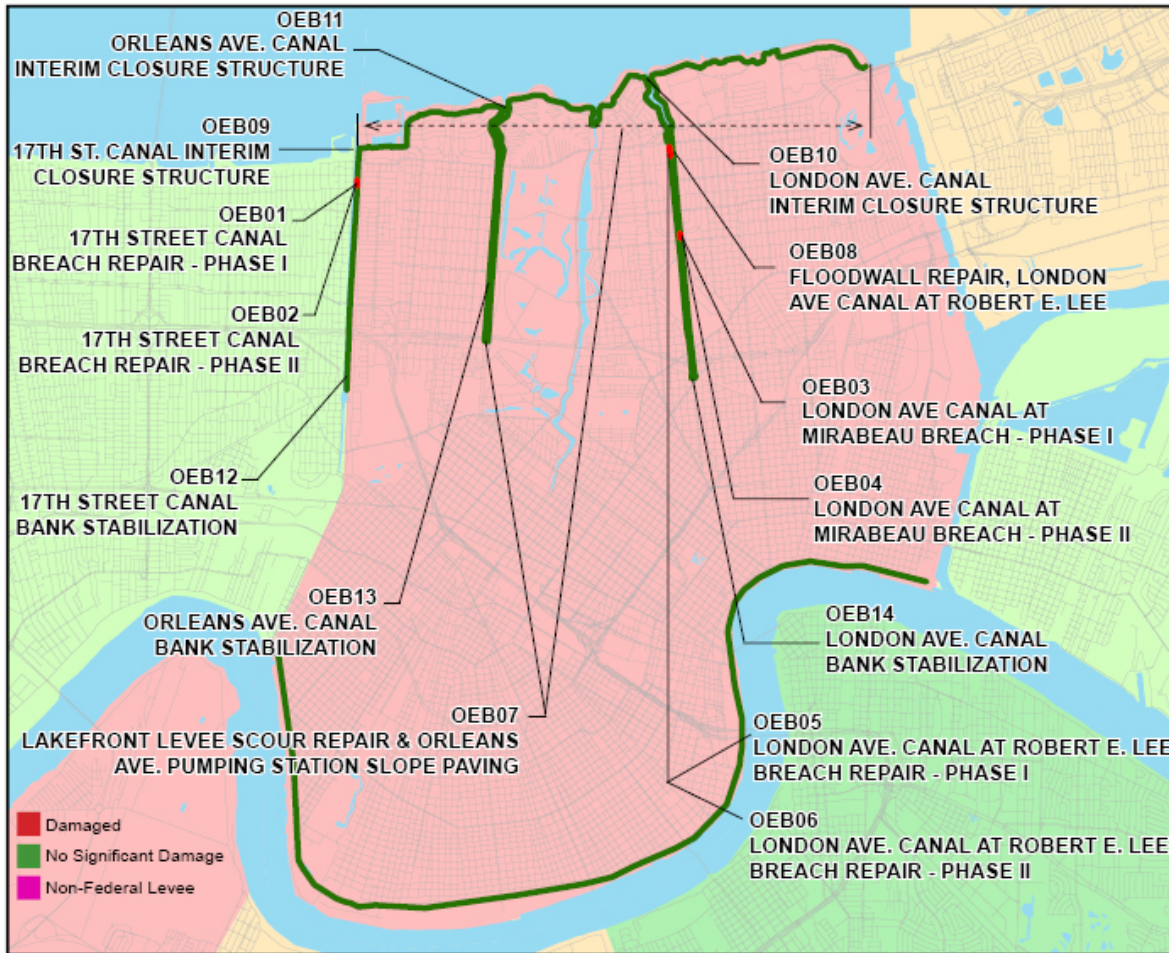
- \$798 million execution
- 5 million cy borrow material
- 155 vessels removed
- 59 Contracts
- 9 months to deliver



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# TASK FORCE GUARDIAN

## Orleans East Bank - Project Summary



### Local Authorities

- Orleans Levee District
- City of New Orleans
- N.O. Sewerage and Water Board
- Louisiana DOTD

### Hurricane Protection System

- 19.2 miles of levee and floodwall
- 13 pump stations
- 15 roadway floodgates

### Damage

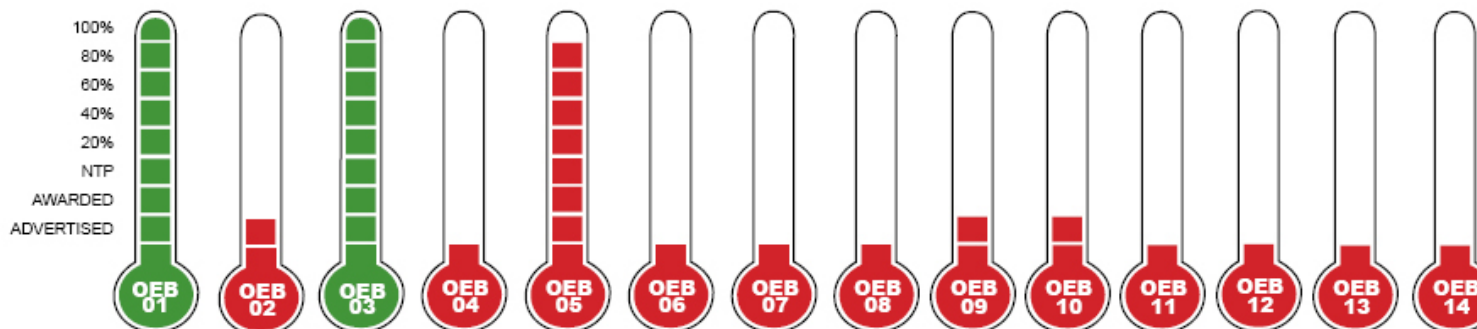
- 1.1 miles of levee and floodwall
- 13 pump stations

Project	Awarded/ Planned Amount (\$000)	Awarded Contracts		Contractor HQ Location
		Solicitation Method	Large/Small Business	
OEB01	\$ 6,198	Unrestricted	Large	LA
OEB02	\$18,500			
OEB03	\$ 4,161	Unrestricted	Large	LA
OEB04	\$ 9,200			
OEB05	\$ 5,897	Hub Zone	Small	LA
OEB06	\$11,000			
OEB07	\$ 250			
OEB08	\$ 5,000			
OEB09	\$30,000			
OEB10	\$30,000			
OEB11	\$30,000			
OEB12	\$ 5,000			
OEB13	\$ 5,000			
OEB14	\$ 5,000			

## Contract Progress

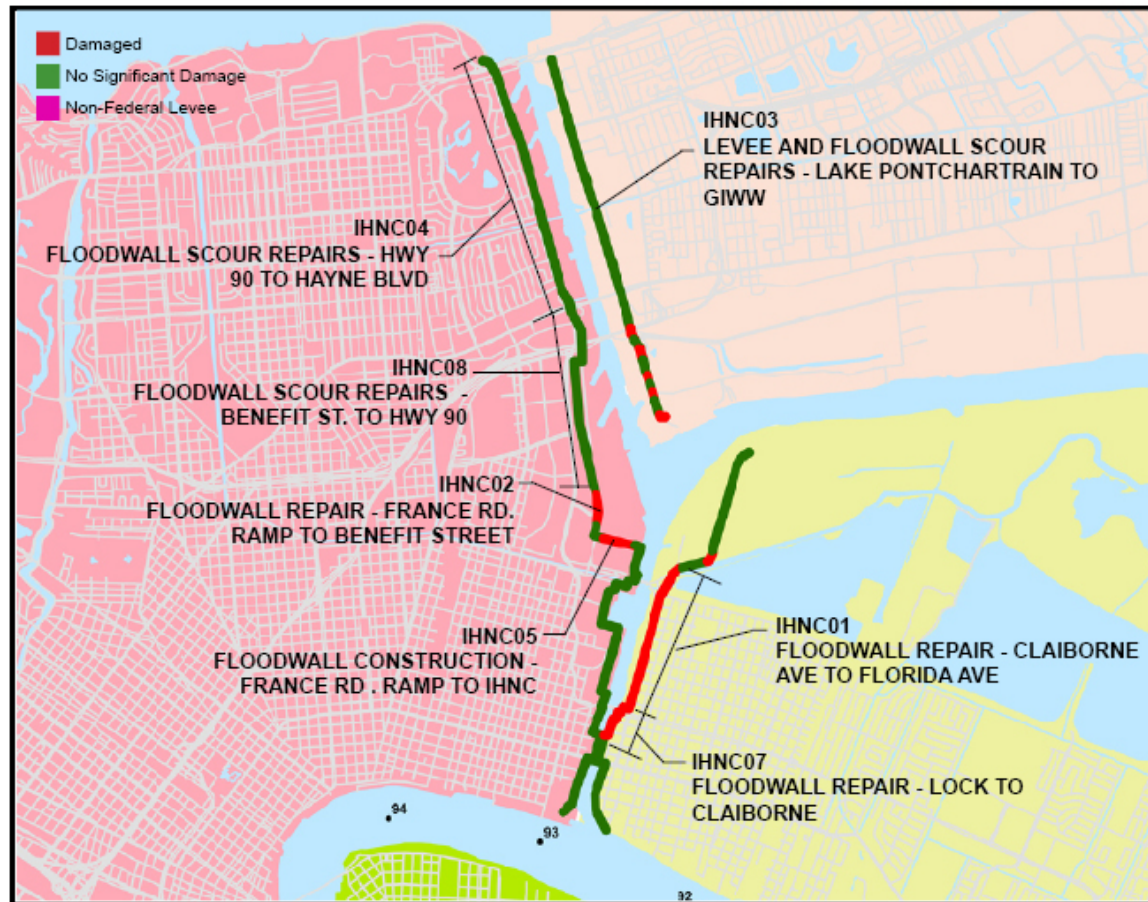
As of Jan. 17, 2006

<b>TOTALS</b>	<b>\$ 16,256</b>	<b>Actual</b>
	<b>\$148,950</b>	<b>Planned</b>
	<b>\$165,206</b>	<b>TOTAL</b>



# TASK FORCE GUARDIAN

## IHNC - Project Summary



### Local Authorities

- Orleans Levee District
- Port of New Orleans
- Louisiana DOTD

### Hurricane Protection System

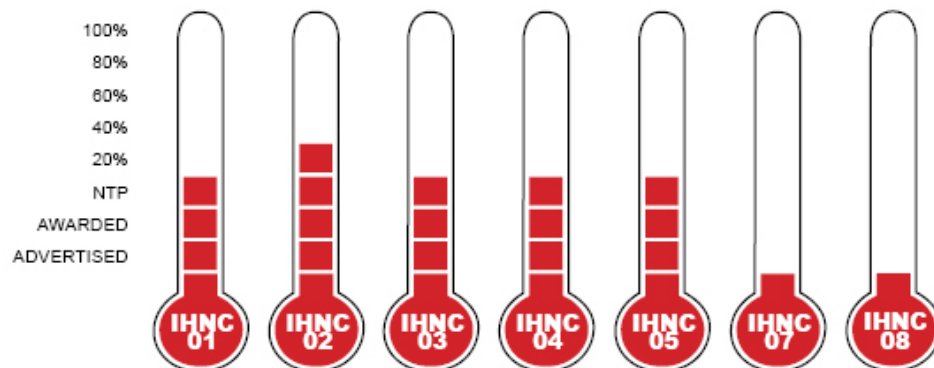
- 12.3 miles of floodwall and levee

### Damage

- 5 miles of floodwall and levee

### Awarded Contracts

Project	Awarded /Planned Amount (\$000)	Solicitation Method	Large/Small Business	Contractor HQ Location
IHNC01	\$23,942	Unrestricted	Large	LA
IHNC02	\$ 4,562	Unrestricted	Small	LA
IHNC03	\$ 1,080	Unrestricted	Large	LA
IHNC04	\$ 6,898	Hub Zone	Small	LA
IHNC05	\$ 5,060	Unrestricted	Large	LA
IHNC07	\$10,000			
IHNC08	\$ 1,000			
<b>TOTALS</b>	<b>\$41,542</b>	<b>Actual</b>		
	<b>\$11,000</b>	<b>Planned</b>		
	<b>\$52,542</b>	<b>TOTAL</b>		



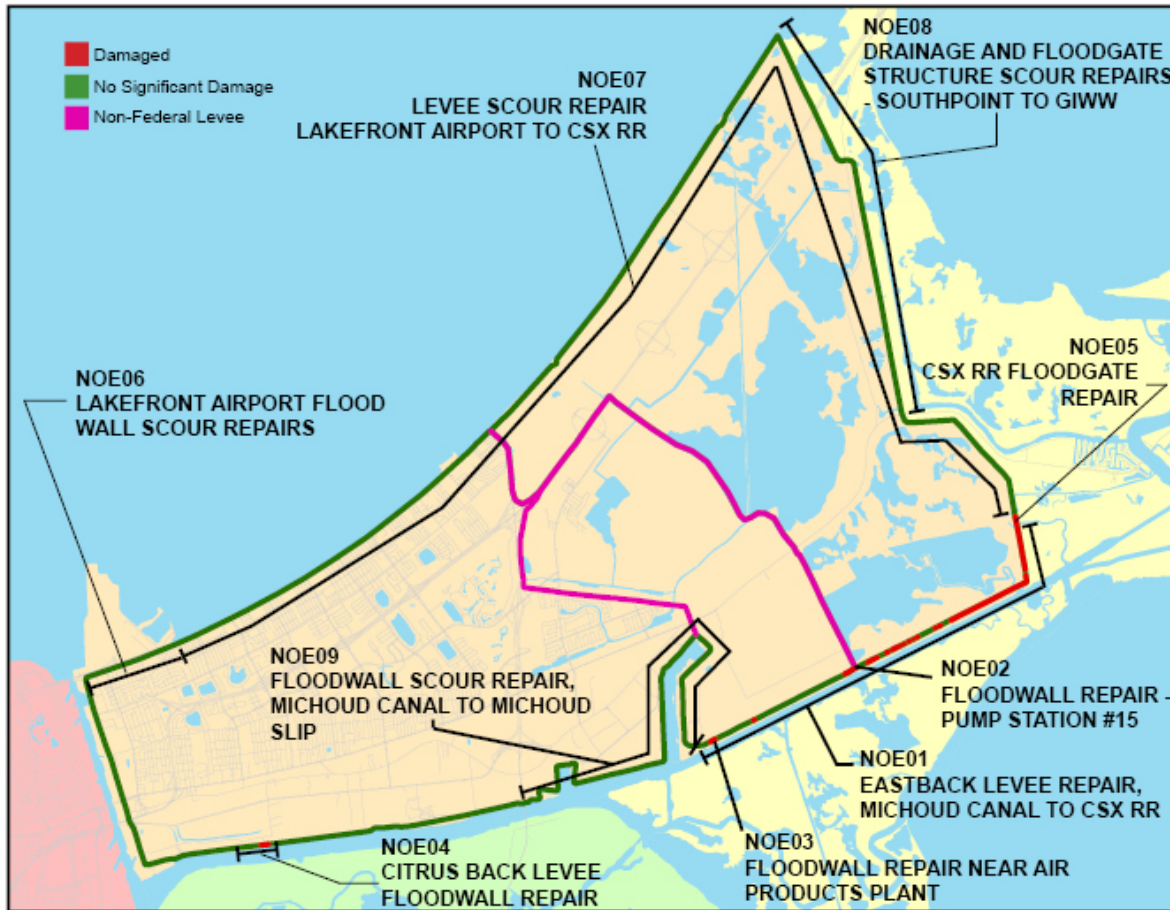
### Contract Progress

As of Jan. 18, 2006



# TASK FORCE GUARDIAN

## New Orleans East - Project Summary



### Local Authorities

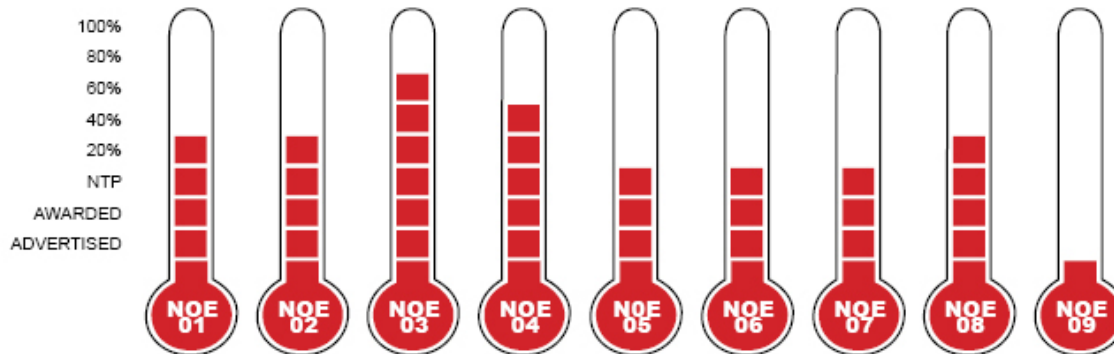
- Orleans Levee District
- Orleans Parish Government
- N.O. Sewerage and Water Board
- Louisiana DOTD

### Hurricane Protection System

- 39 miles of exterior levee and floodwall (I-wall)
- 8 miles of interior levee
- 8 pump stations
- 2 highway floodgates
- 1 railroad floodgate

### Damage

- 4.6 miles of exterior levee and floodwall
- 8 pump stations



### Contract Progress

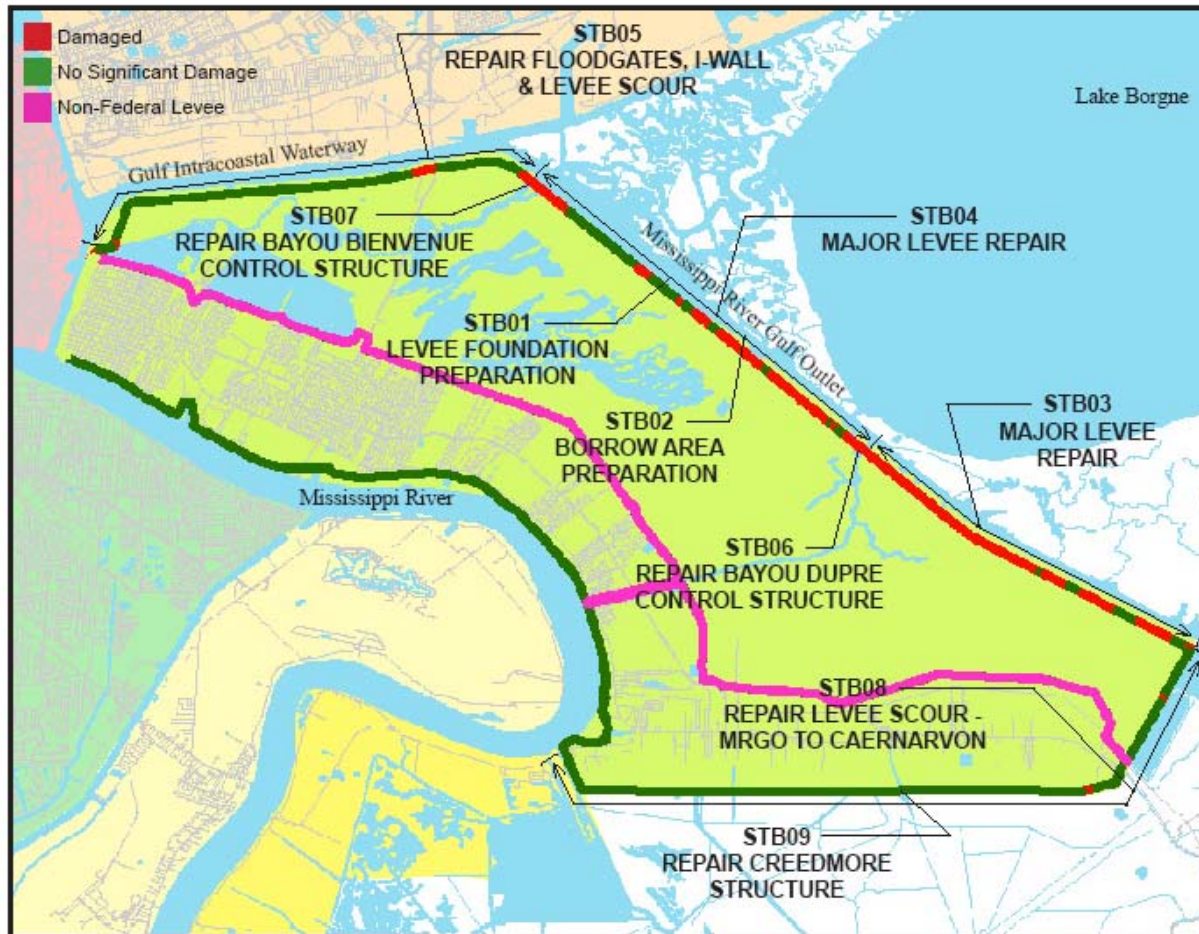
As of Jan. 18, 2006

### Awarded Contracts

Project	Awarded/ Planned Amount (\$000)	Solicitation Method	Large/Small Business	Contractor HQ Location
NOE01	\$30,675	Unrestricted	Large	LA
NOE02	\$ 2,765	Unrestricted	Large	LA
NOE03	\$ 848	Hub Zone	Small	LA
NOE04	\$15,190	Unrestricted	Large	LA
NOE05	\$ 1,030	Unrestricted	Large	LA
NOE06	\$ 890	8(a)	Small	LA
NOE07	\$ 1,431	8(a)	Small	LA
NOE08	\$ 225	8(a)	Small	LA
NOE09	\$ 8,500			
<b>TOTALS</b>	<b>\$53,054</b>	<b>Actual</b>		
	<b>\$ 8,500</b>	<b>Planned</b>		
	<b>\$61,554</b>	<b>TOTAL</b>		

# TASK FORCE GUARDIAN

## Saint Bernard - Project Summary



### Local Authorities

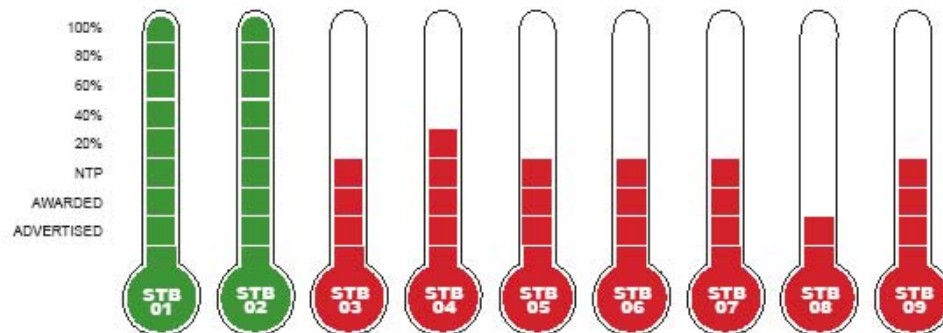
- Lake Borgne Basin Levee District / Orleans Levee District
- St. Bernard Parish Government
- Louisiana DOTD

### Hurricane Protection System

- 30 miles of exterior levee and floodwall
- 22 miles of non-federal interior levee
- 8 pump stations (St. Bernard)
- 1 Pump Station (Orleans)
- 2 control structures (Bayou Beinvenue & Bayou Dupre)
- 6 floodgates

### Damage

- 8 miles of exterior levee and floodwall (I-wall)
- 14 miles of non-federal interior levee
- 8 pump stations
- 2 control structures



### Contract Progress

As of Jan. 18, 2006

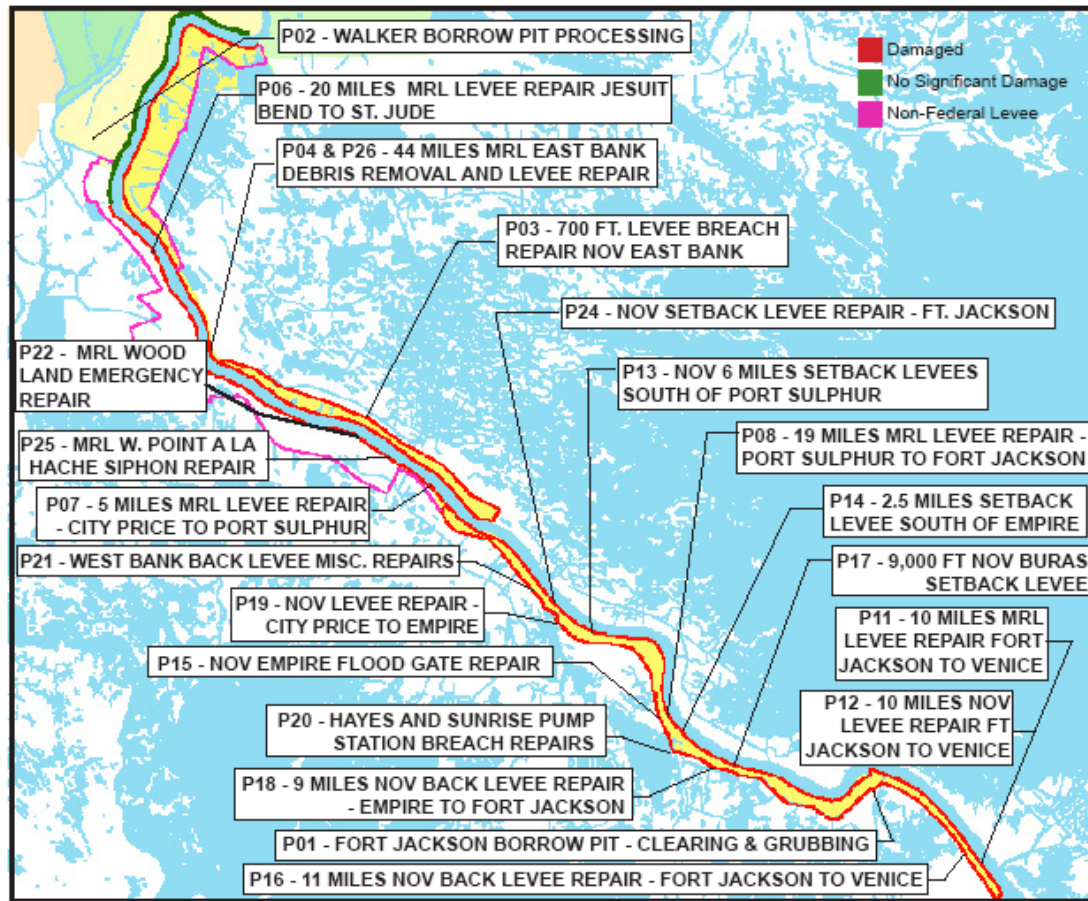
### Awarded Contracts

Project	Awarded/ Planned Amount (\$000)	Solicitation Method	Large/Small Business	Contractor HQ Location
STB01	\$ 630	Hub Zone	Small	LA
STB02	\$ 659	Hub Zone	Small	LA
STB03	\$14,375	Unrestricted	Large	National
STB04	\$11,732	Unrestricted	Large	LA
STB05	\$ 1,995	8(a)	Small	LA
STB06	\$ 7,952	Unrestricted	Large	LA
STB07	\$ 7,994	Unrestricted	Small	LA
STB08	\$ 3,000			
STB09	\$ 250	8(a)	Small	LA

**TOTALS**    \$45,587    Actual  
                   \$ 3,000    Planned  
                   \$48,587    TOTAL

# TASK FORCE GUARDIAN

## Plaquemines - Project Summary



### Local Authorities

- Plaquemines Parish Government (Buras, Grand Prairie, and Plaquemines Parish West Bank Levee Districts)

- Louisiana DOTD

### Hurricane Protection System

- 109 miles of Mississippi River levee and floodwall (34 miles part of NoV)
- 53 miles of Hurricane Protection back levee
- 6.4 miles of floodwall
- One marine floodgate
- Non-Federal/Private: 19 pump stations

### Damage

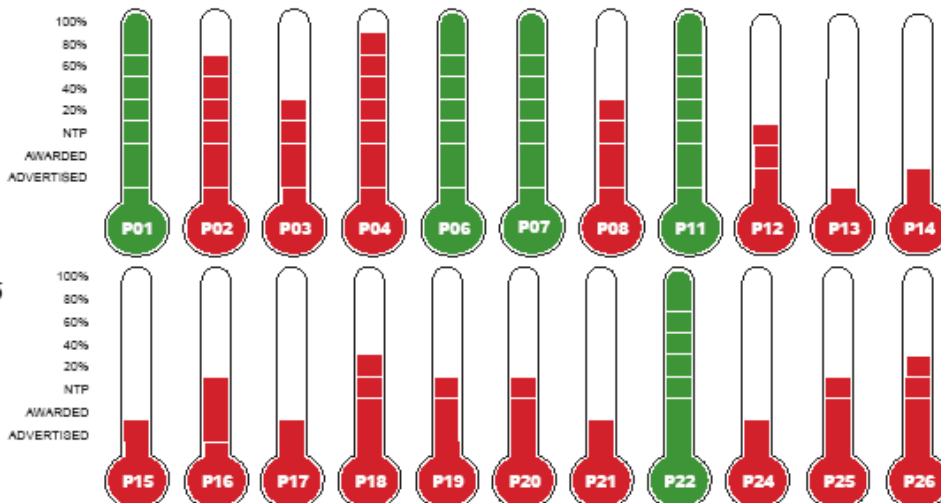
- 150 miles of Mississippi River and Hurricane Protection levee
- 6 miles of floodwall
- One marine floodgate
- Non-Federal/Private levees and pump stations

### Contracts Awarded

Project	Awarded/ Planned Amount (\$000)	Solicitation Method	Large/Small Business	Contractor HQ Location
P01	\$ 567	8(a)	SMALL	LA
P02	\$ 800	GOVERNMENT	LARGE	NATIONAL
P03	\$ 1,879	8(a)	SMALL	LA
P04	\$ 400	GOVERNMENT	LARGE	NATIONAL
P06	\$ 4,260	UNRESTRICTED	SMALL	LA
P07	\$ 1,470	UNRESTRICTED	SMALL	LA
P08	\$ 7,968	UNRESTRICTED	SMALL	LA
P11	\$ 433	GOVERNMENT	LARGE	NATIONAL
P12	\$ 5,586	UNRESTRICTED	SMALL	LA
P13	\$ 7,599			
P14	\$ 19,129			
P15	\$ 900			
P16	\$ 927	8(a)	SMALL	LA
P17	\$ 21,160			
P18	\$ 1,112	8(a)	SMALL	LA
P19	\$ 7,880	UNRESTRICTED	LARGE	LA
P20	\$ 4,500	UNRESTRICTED	LARGE	LA
P21	\$ 2,300			
P22	\$ 501	HUB ZONE	LARGE	LA
P24	\$ 11,325			
P25	\$ 1,036	HUB ZONE 8(a)	SMALL	LA
P26	\$ 870	UNRESTRICTED	SMALL	LA

### CONTRACT PROGRESS

As of Jan. 18, 2006

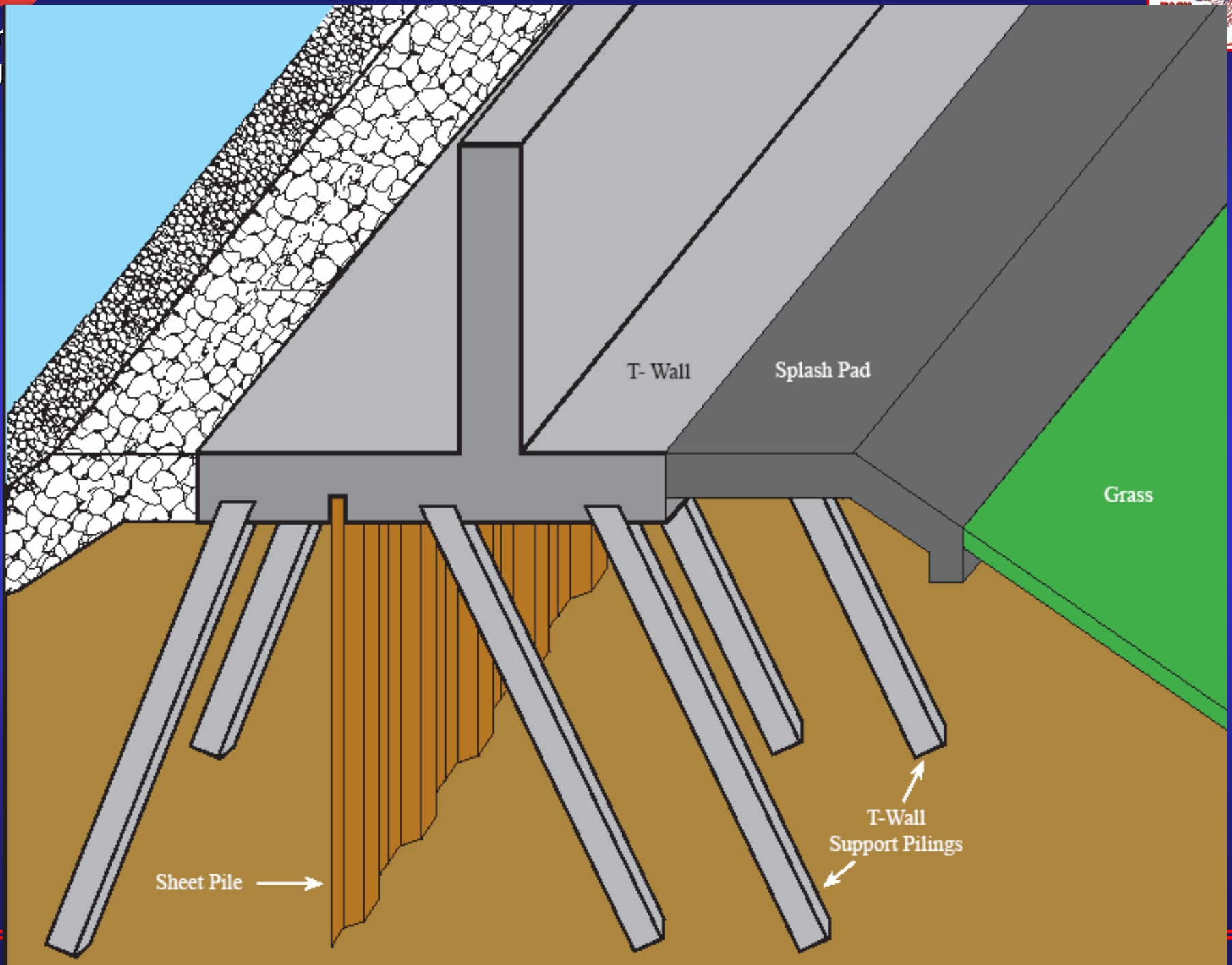


<b>TOTALS</b>	<b>\$ 40,189</b>	<b>ACTUAL</b>
	<b>\$ 62,413</b>	<b>PLANNED</b>
	<b>\$ 102,602</b>	<b>TOTAL</b>



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# T - Wall





# Orleans East Bank



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London Ave. Canal Breach  
Robert E. Lee (OEB05)



17<sup>th</sup> St Canal Breach (OEB01)

London Ave. Canal Breach at Mirabeau  
(OEB03)

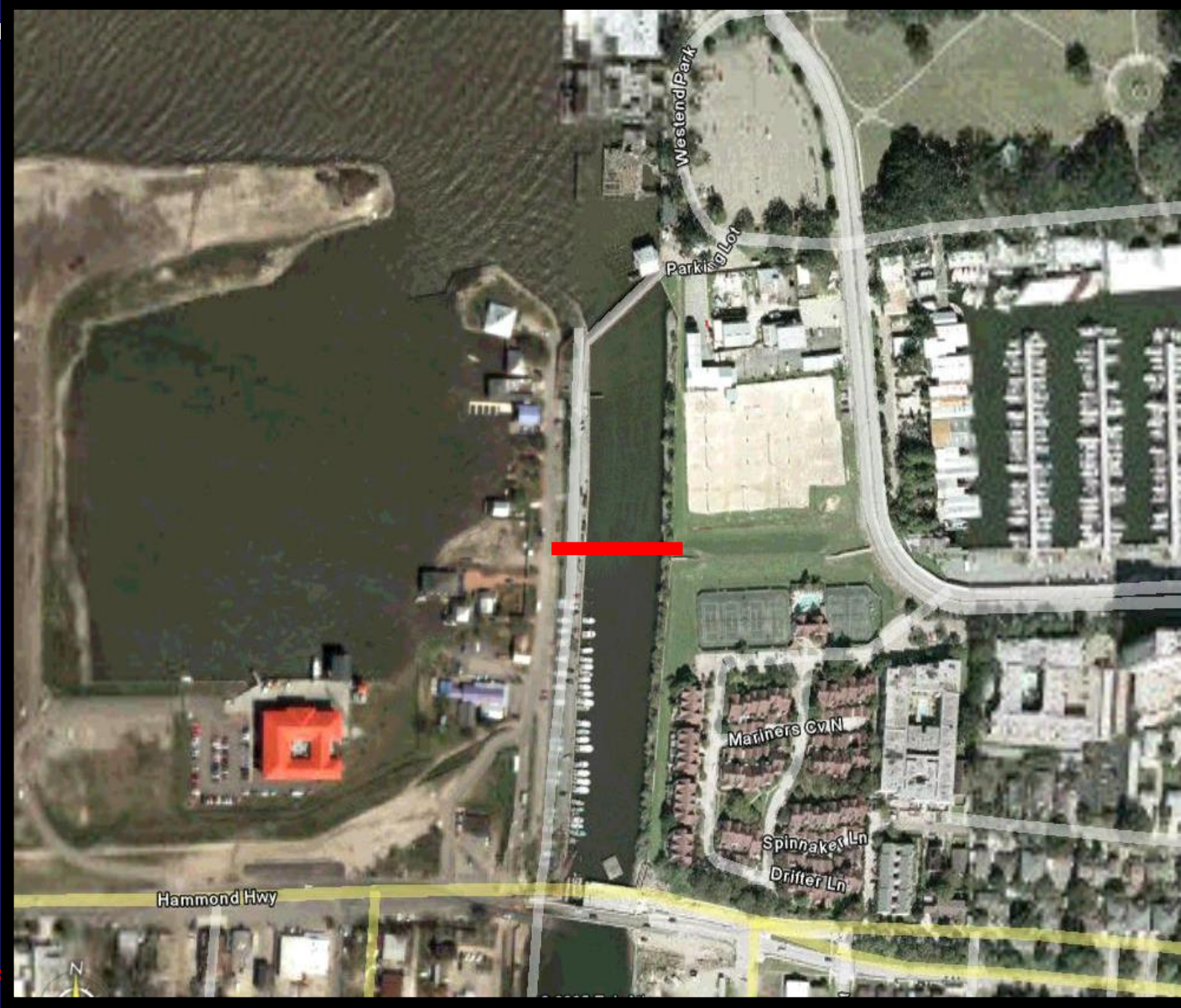
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# 17<sup>th</sup> Street Canal Closure Structure Location



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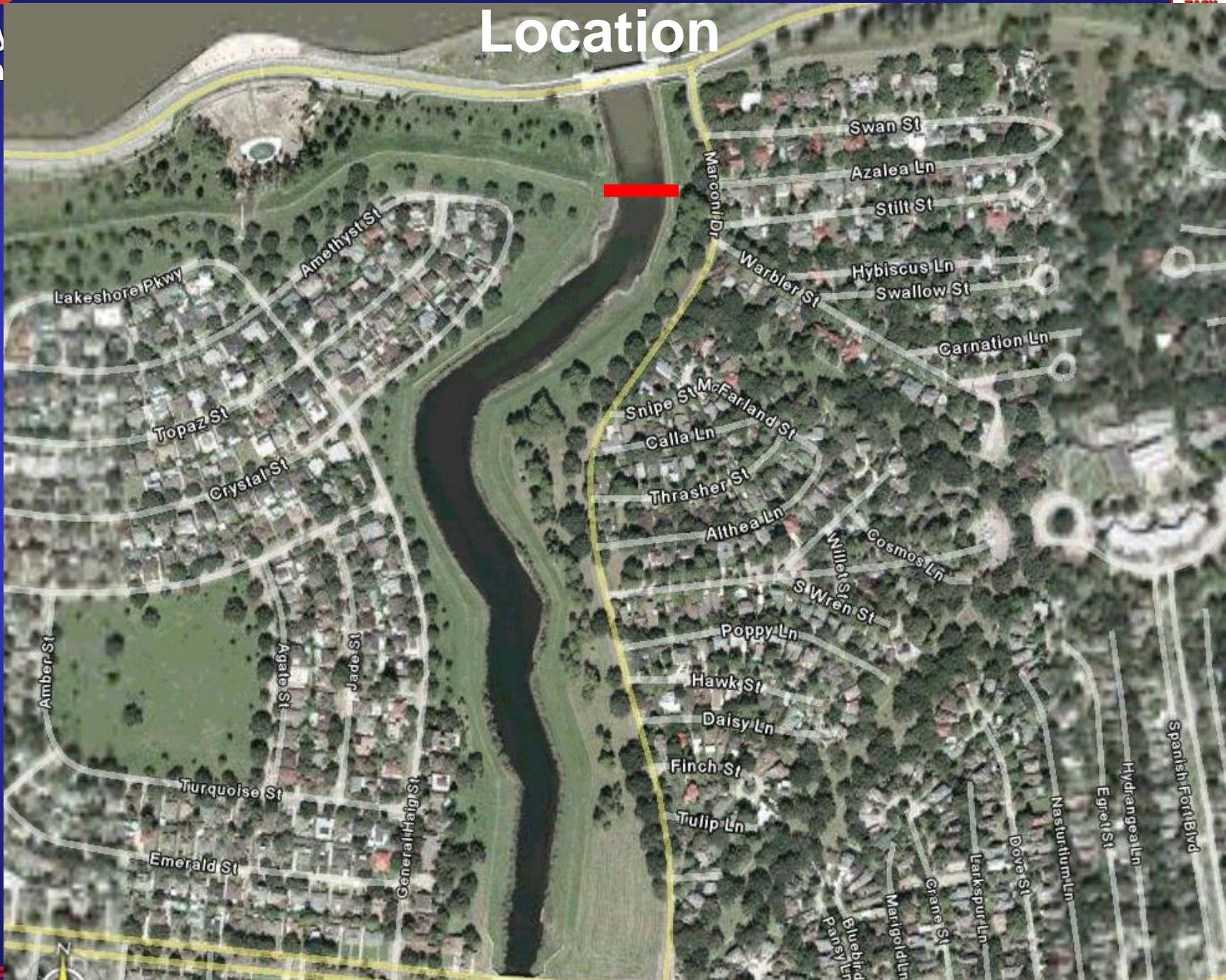


# Orleans Ave. Canal Closure Structure



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## Location



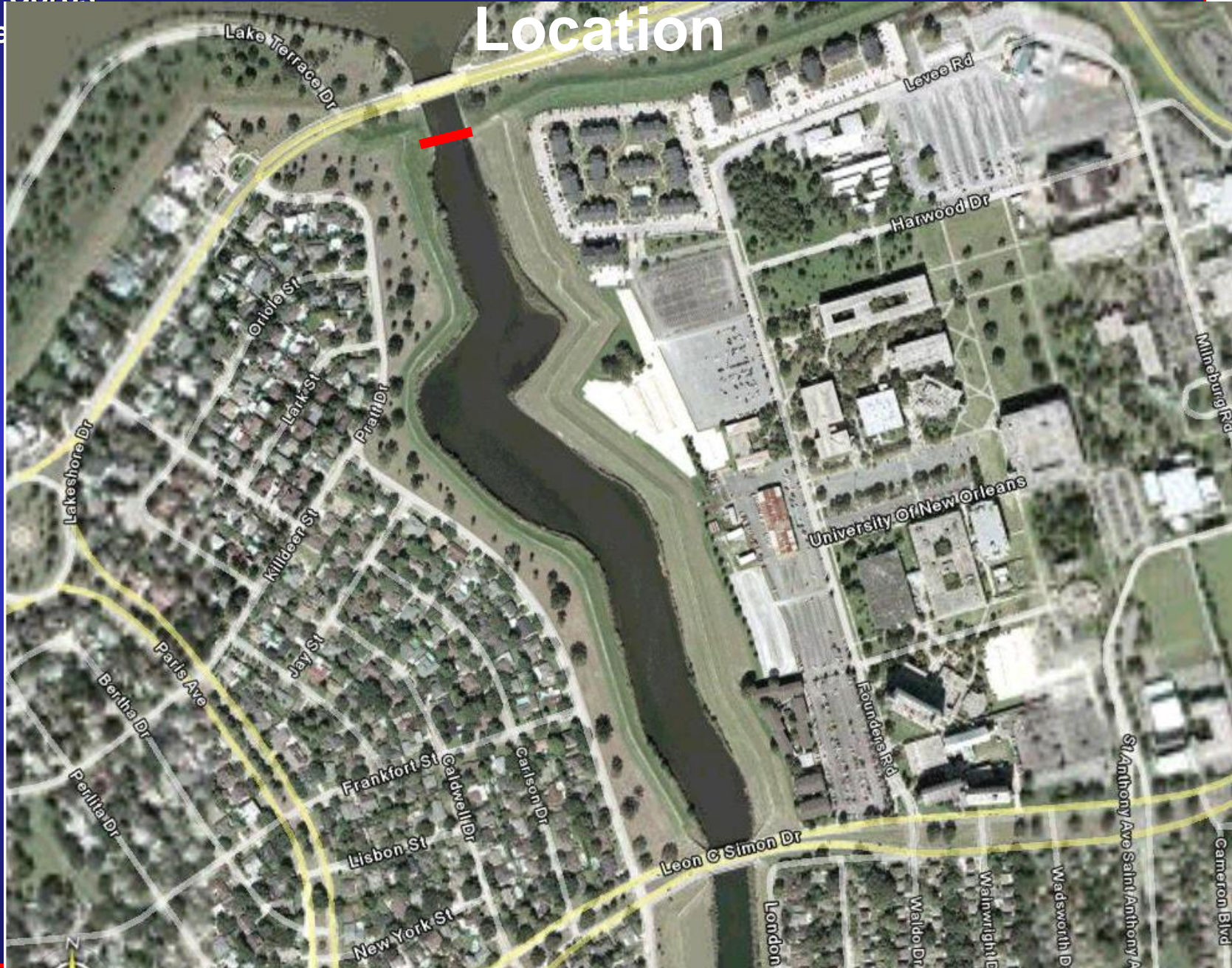


# London Ave. Canal Closure Structure

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## Location



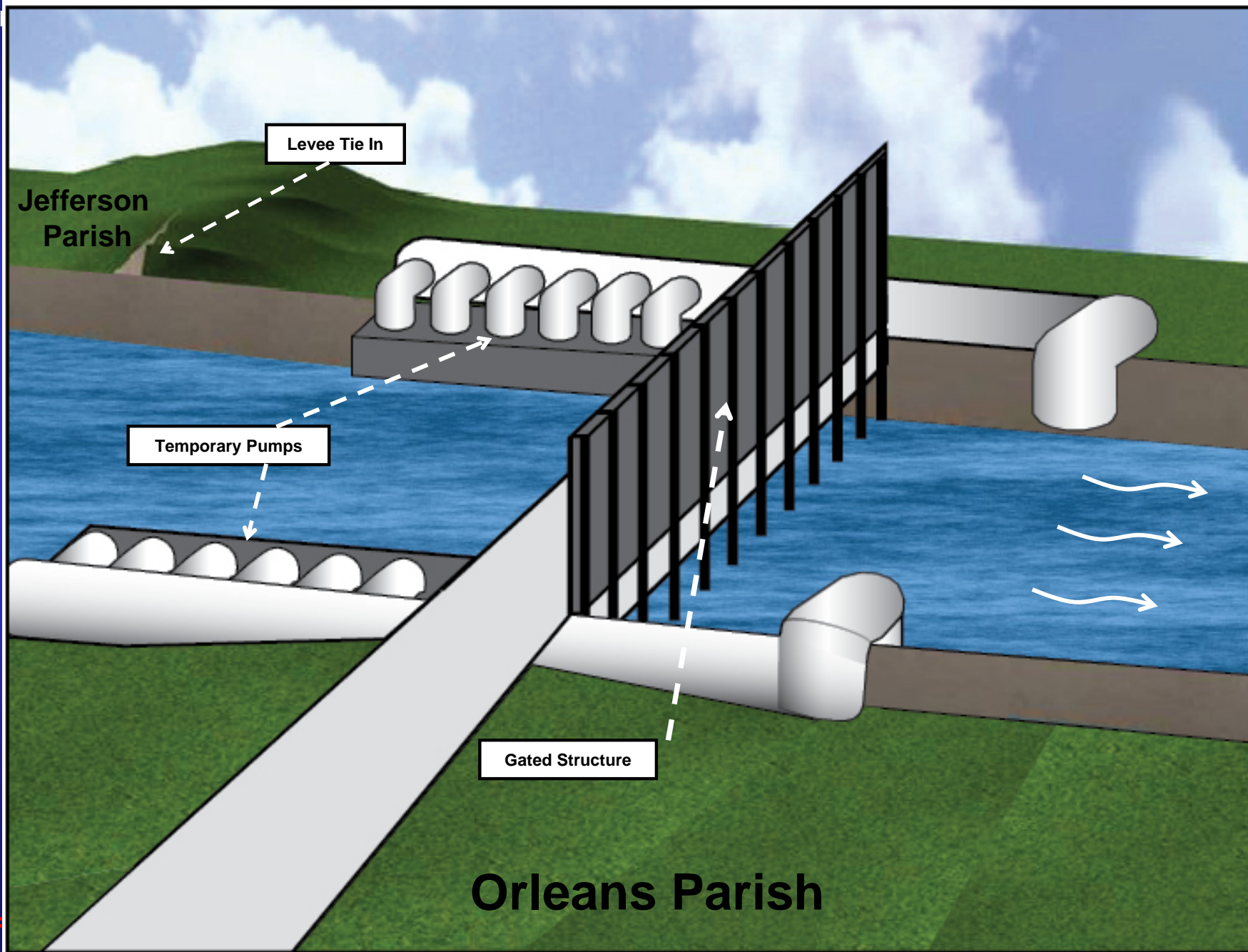
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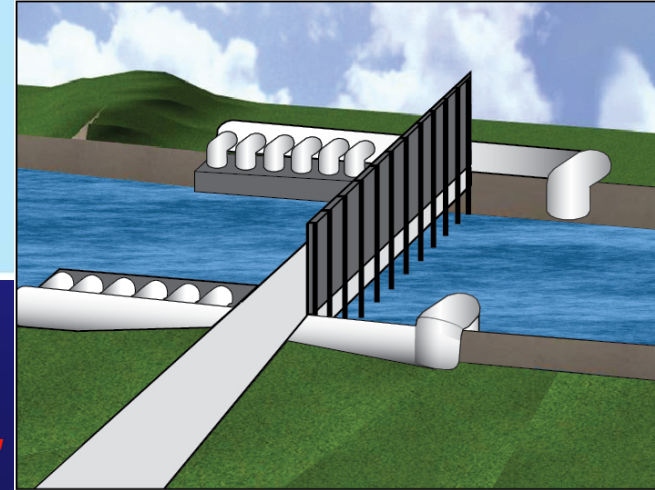
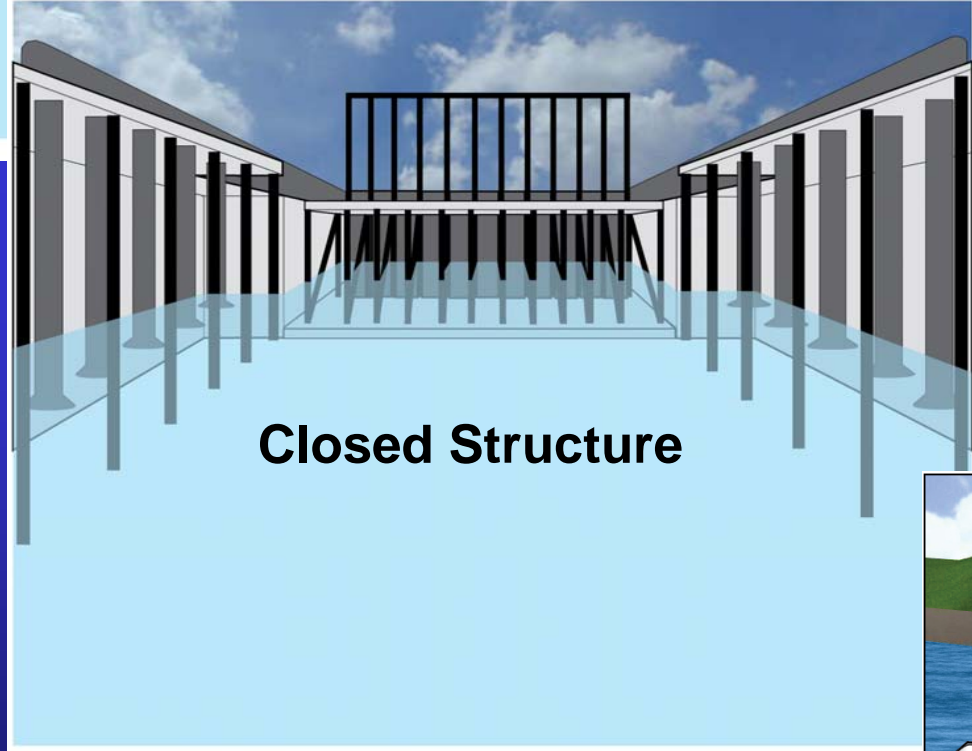
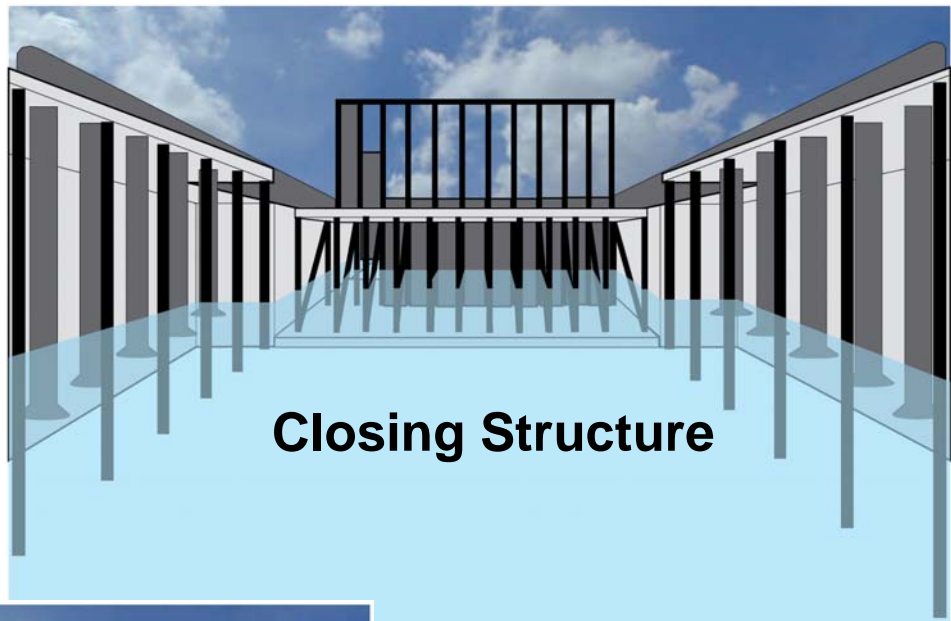
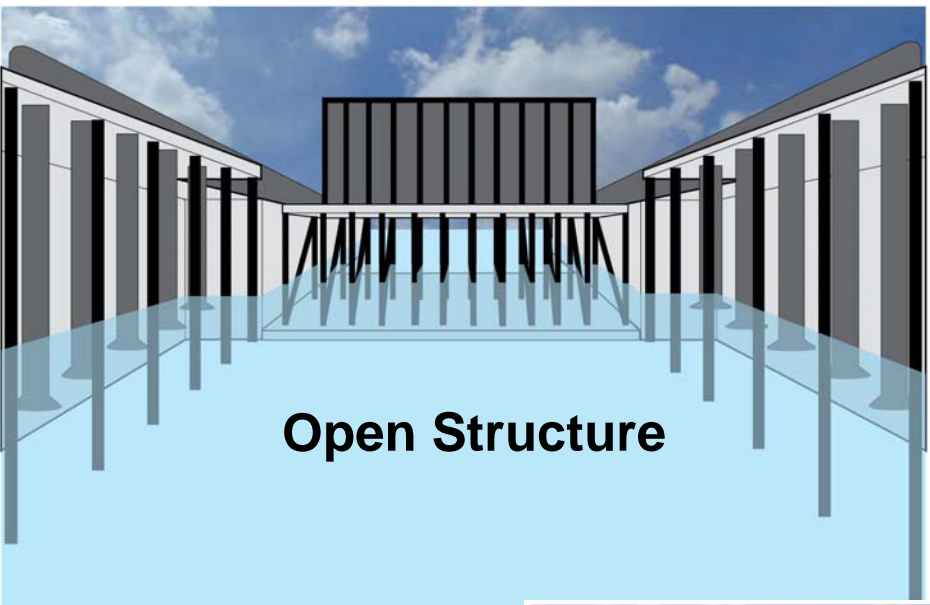




# 17<sup>th</sup> Street Canal Closure Structure

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# North Claiborne to Florida Avenue



# North Claiborne to Florida Avenue



# France Road to Benefit Street



# France Road to Benefit Street



# Citrus Back Levee Floodwall



# Citrus Back Levee Floodwall





# East of Bayou Dupre - MRGO



# East of Bayou Dupre - MRGO



# Bayou Bienvenue Control Structure



# Bayou Bienvenue Control Structure



# New Orleans to Venice Empire/Buras Area



# New Orleans to Venice Empire/Buras Area



# Sunrise Pump Station



# Sunrise Pump Station







# Better and Stronger



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- **Stability**
- **Interim gated closure structure**
- **Quality soils**
- **Engineered features**
  - **Back scour protection**
  - **Deeper sheetpiles**
  - **Improved utility crossings**
  - **Hardened transition zones**



*One Team: Relevant, Ready, Responsive, Reliable*