



**Bring New Orleans Back**  
**Infrastructure Committee**  
**Levees and Flood Protection**

Bring New Orleans Back  
Infrastructure Committee  
Levees and Flood Protection  
January 18, 2006



# Vision Statement

To ensure that our citizens, their families and property, are secure from intrusion by and damage from water, whether river, rain or sea.

**Flood control is not simply accomplished by raising levees, but requires a coordinated system of levees, pumps, locks, dams, weirs, flood gates, dredging, siphons and other forms of coastal restoration.**

**The charge to this Subcommittee was to examine, probe, learn and recommend a course of action which would give our citizens comfort that our flood control system for Orleans Parish would provide by its design and construction a clear margin of safety when confronted with rising water.**

A photograph of St. Louis Cathedral in New Orleans, Louisiana, taken at dusk. The cathedral's three spires are silhouetted against a dark, cloudy sky. In the foreground, there are dark silhouettes of trees and a statue on a horse. The overall mood is somber and reflective.

- **Feasible**

- **Affordable**

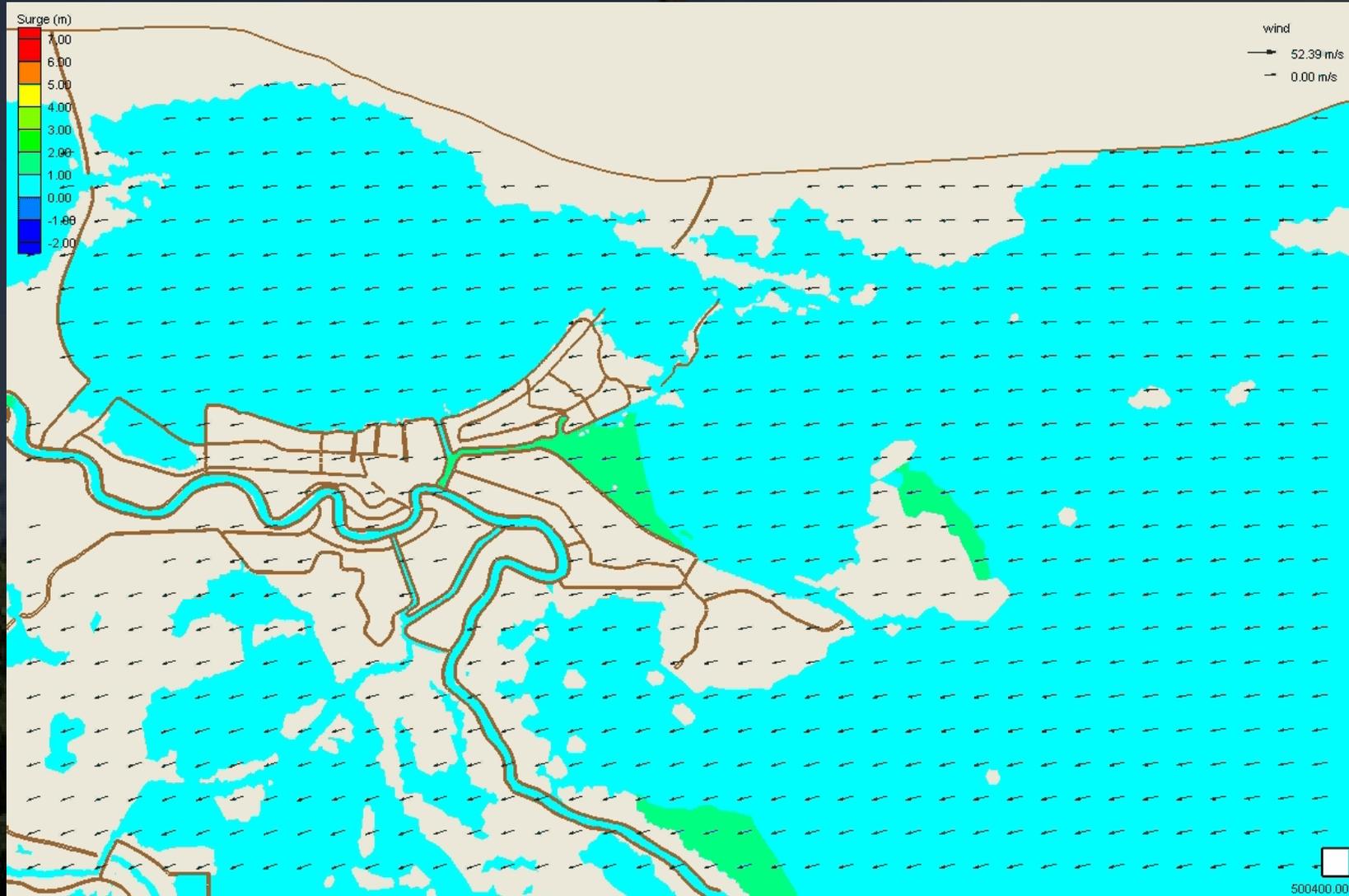
# Many Have Contributed To This Report

Bruce Thompson	TECO
Billy Marchal	Engineer
Boysie Bollinger	Bollinger Shipyards / Dock Board
Jim Bean	Bean Dredging
Mark Schxnider	LSU Agricultural Center
John Kallenborn	Chase Bank / Dock Board
John Barry	Author
Charles Nelson	Waldemar S. Nelson and Company
Jimmy Kostmayer	Kostmayer Construction
Robert Boh	Boh Bros. Construction
Marsha St. Martin	Sewerage & Water Board of New Orleans
Toby Roesler	Levee Guard
Allan Colley	Dupuy Storage
Rene Cross	Louisiana Recovery Authority
David Voelker	Louisiana Recovery Authority
Joe Sullivan	Sewerage & Water Board of New Orleans
Tim Axtman	U.S. Corps of Engineers
Cynthia Fromhertz	FEMA
Erik L. Johnsen	International Shipholding
Walter Baumy	U.S. Corps of Engineers
Randy Evans	Levee Guard
Ralph Lehmann	Koerner Capital
Jason Lehmann	UNO
Jay Lapeyre	Laitrim / Business Council
King Milling	American's Wetlands
Frank Nicolates	NY Associates
Bill Monteleone	La Branch Wetlands
John Lopez	Lake Pontchartrain
Greg Miller	U.S. Corps of Engineers
Joseph Becker	Sewerage & Water Board of New Orleans
Walter Baudier	Desin Engineering, Inc.
Maj. Hugh Darville	U.S. Corps of Engineers
Col. Lewis Setliff	U.S. Corps of Engineers
	Times Picayune
	National Geographics

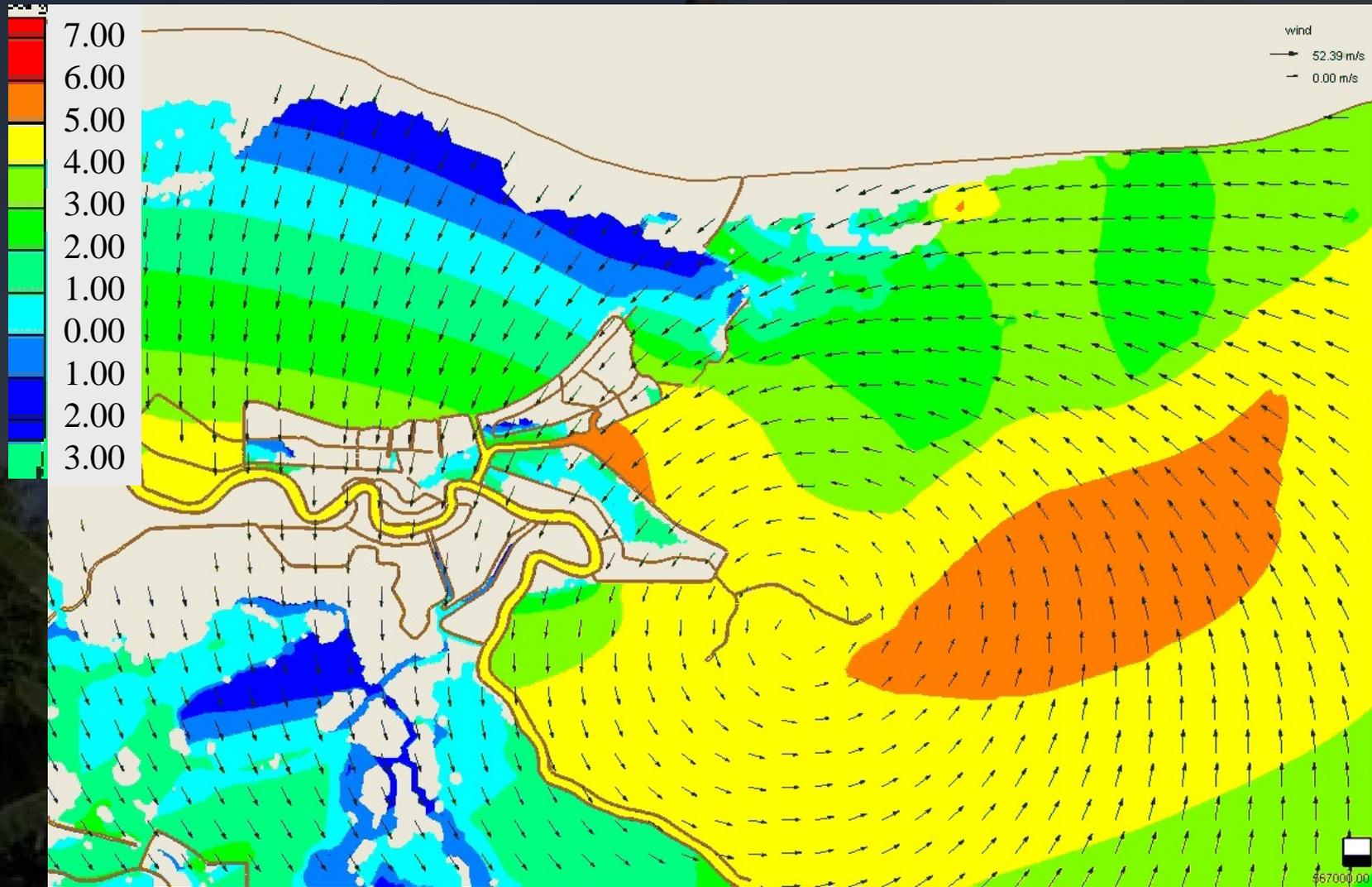
# What Happened ?



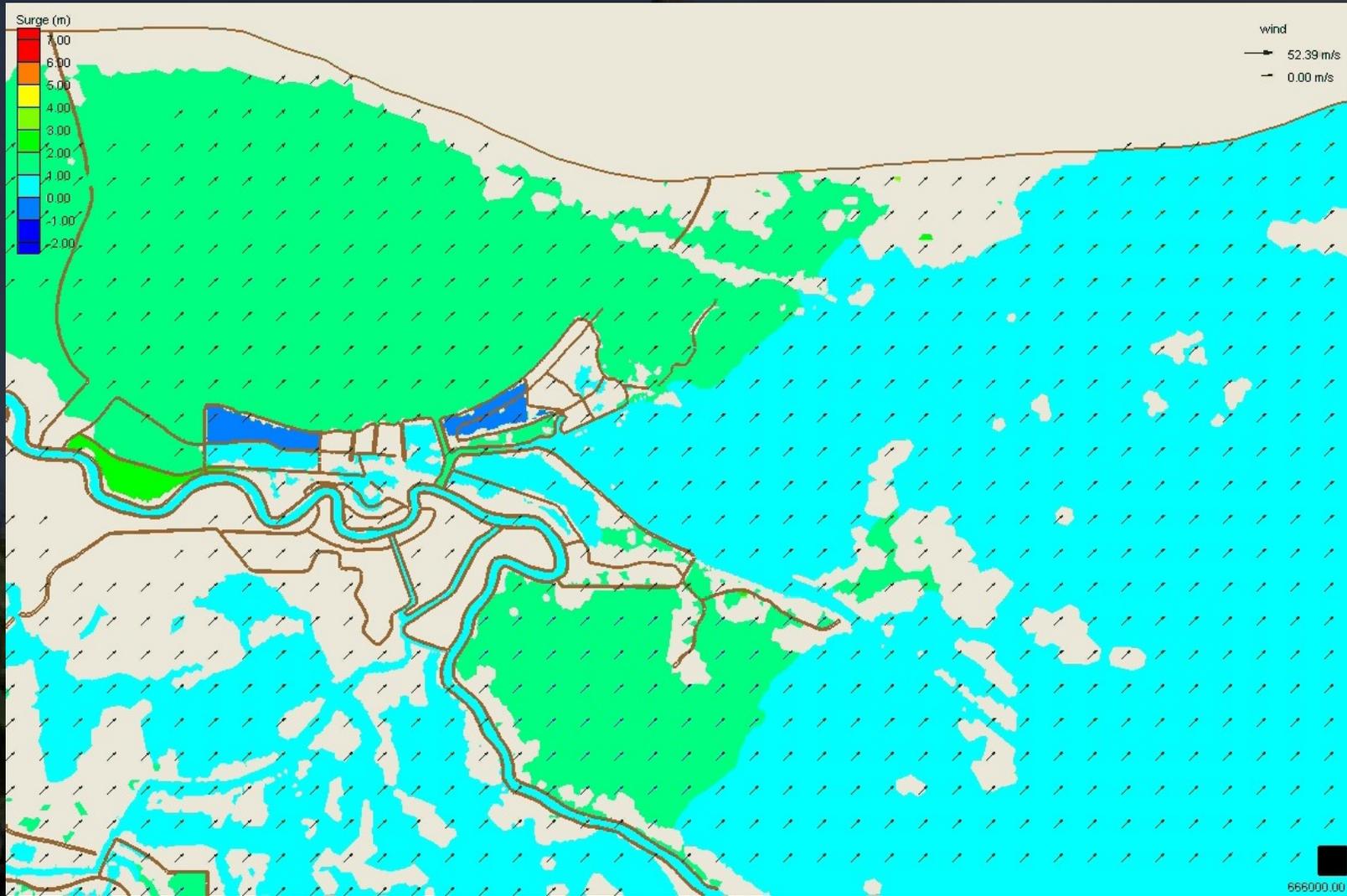
# Katrina's Tidal Surge



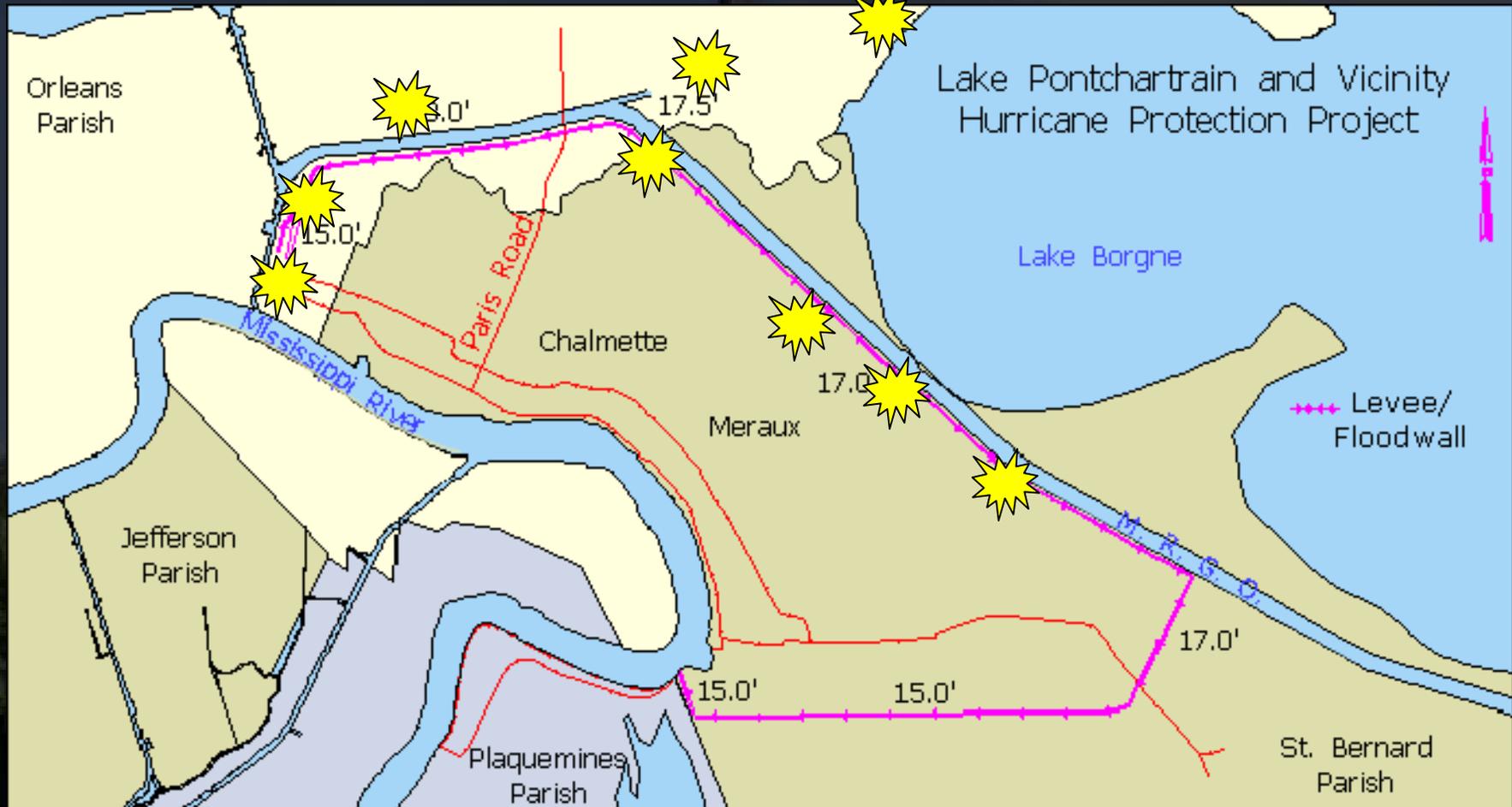
# Funnel Effect



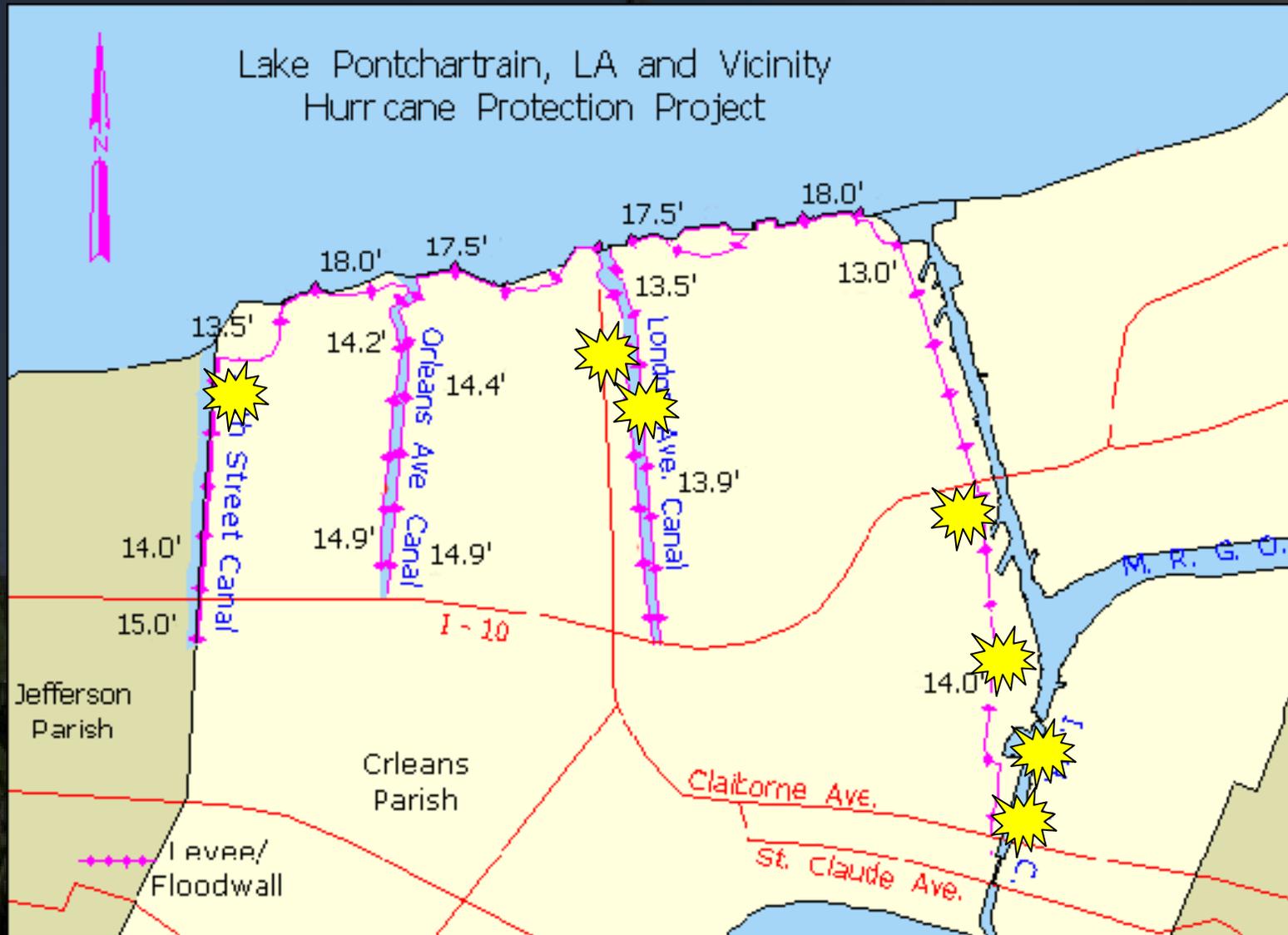
# Swollen Lake Pontchartrain



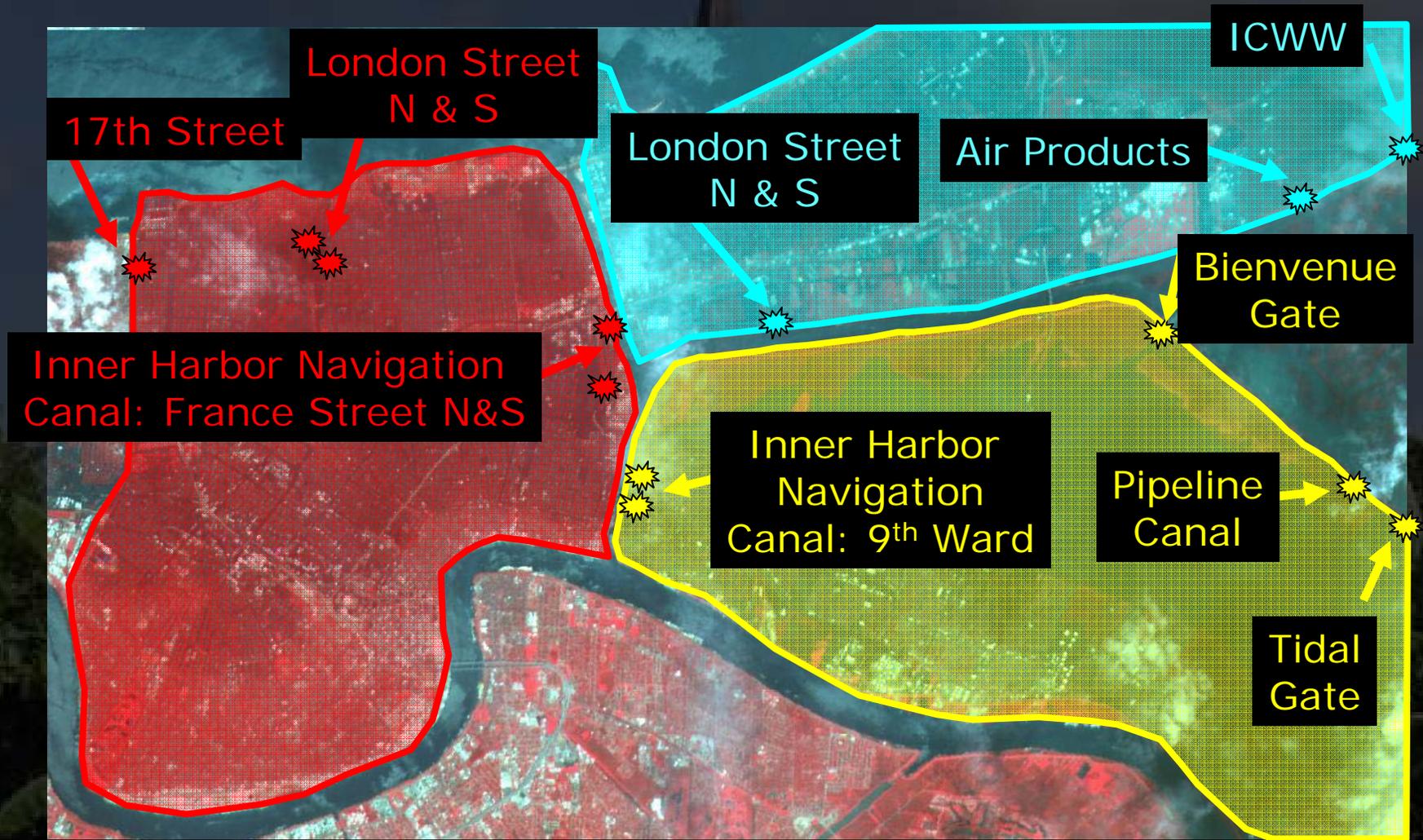
# Where The Breaks Were



# Where The Breaks Were



# Three Separate Bowls

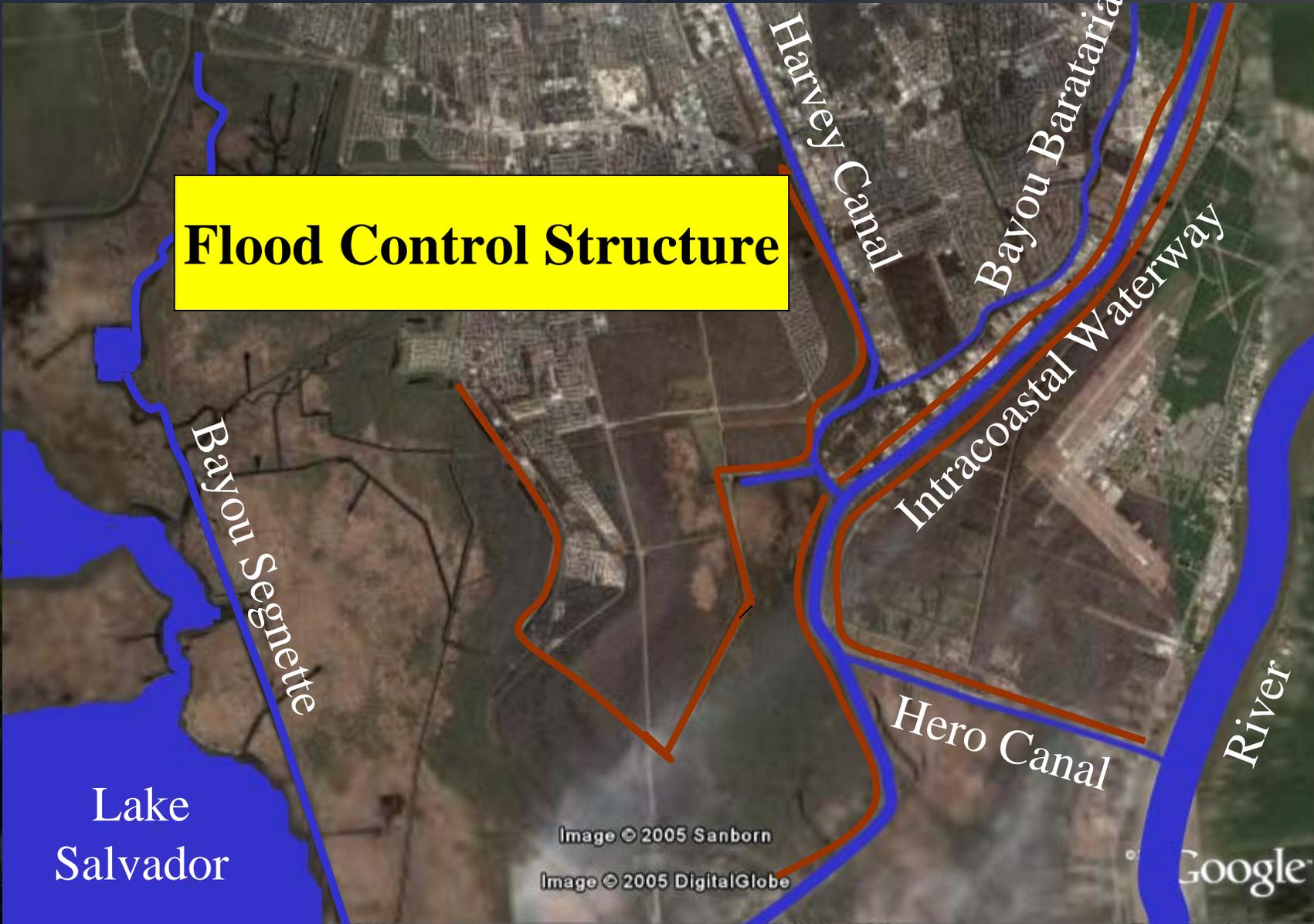




# Algiers



# Flood Control Structure



# A Good Flood Strategy Relies on Layers of Protection

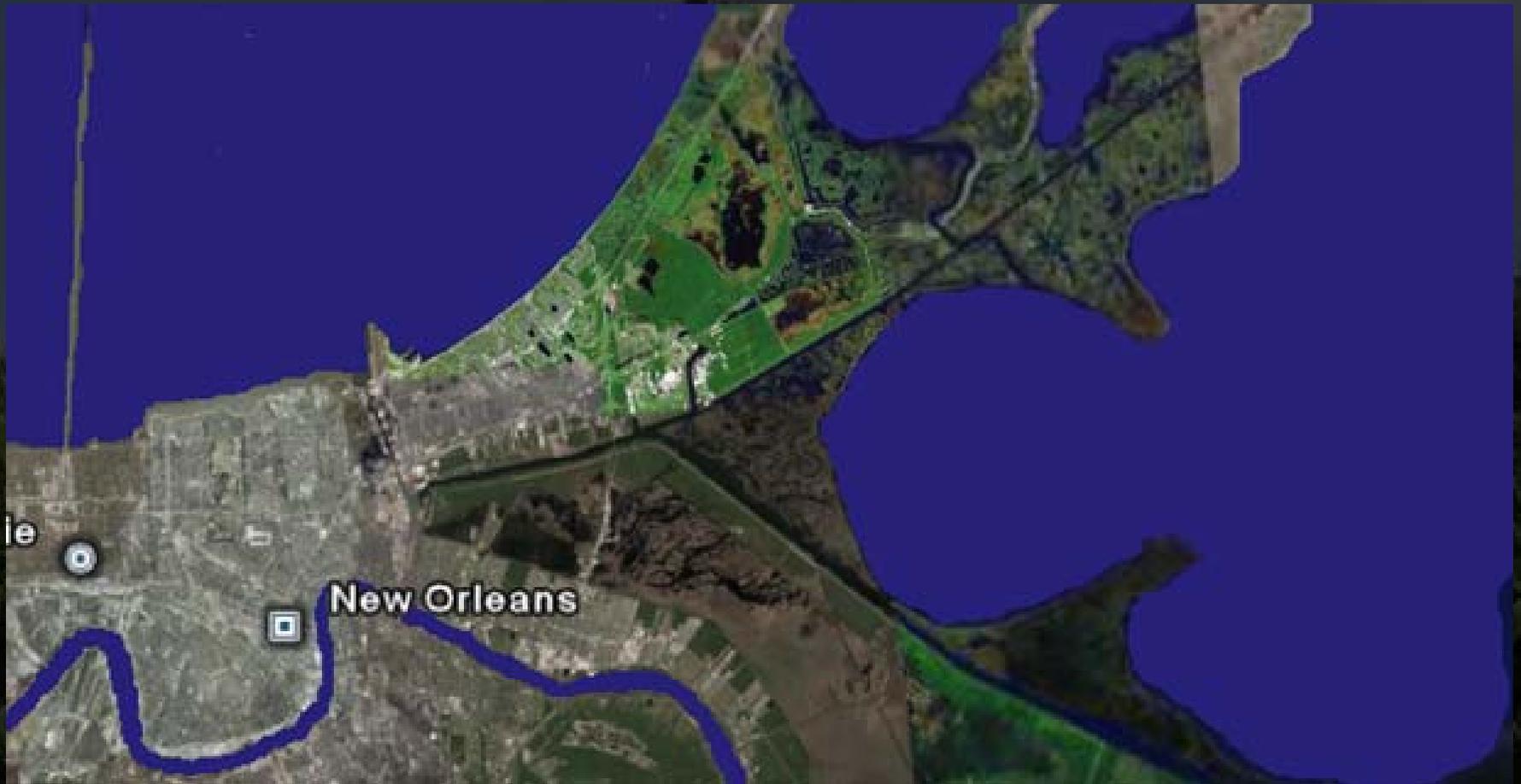
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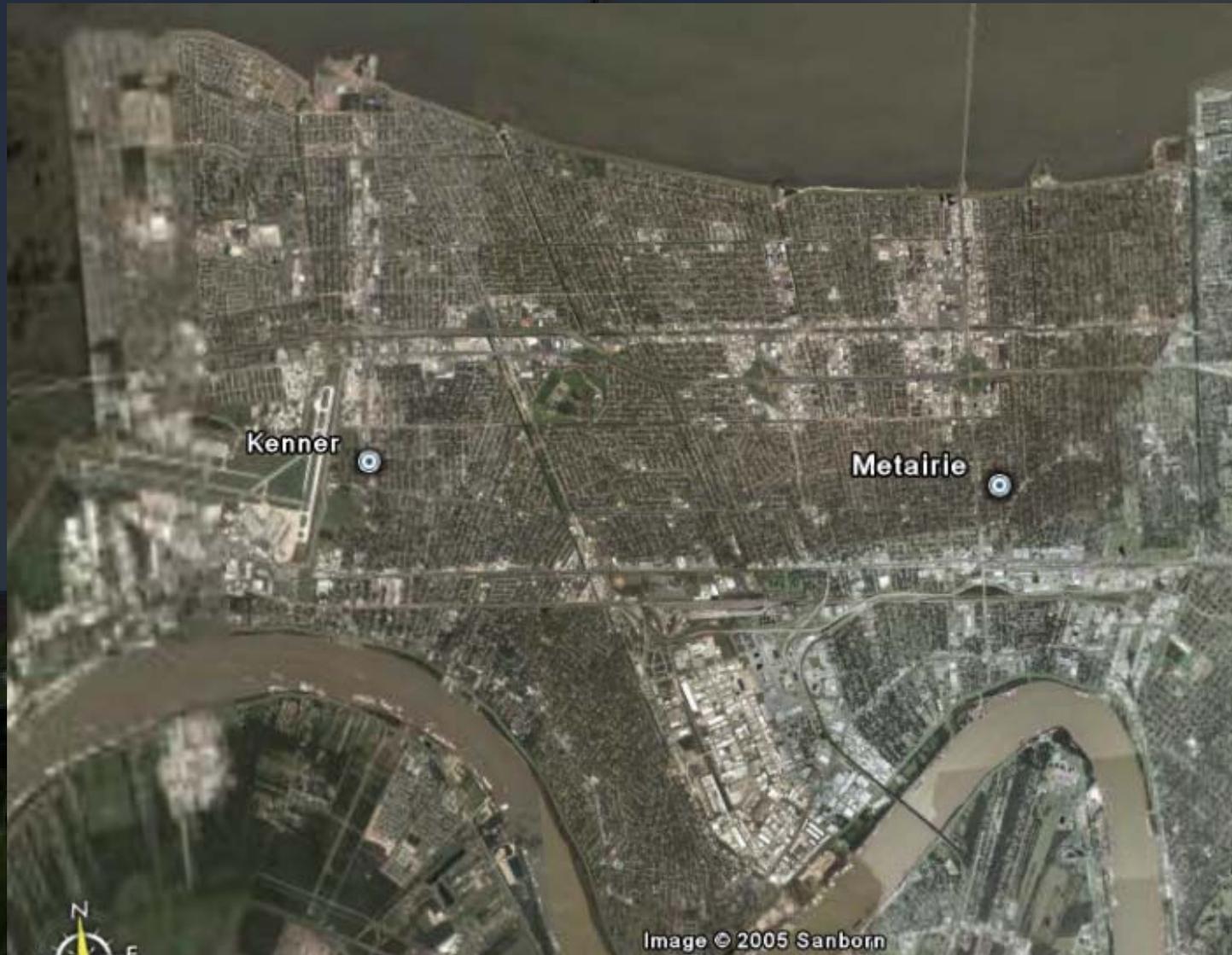
# Backtracking



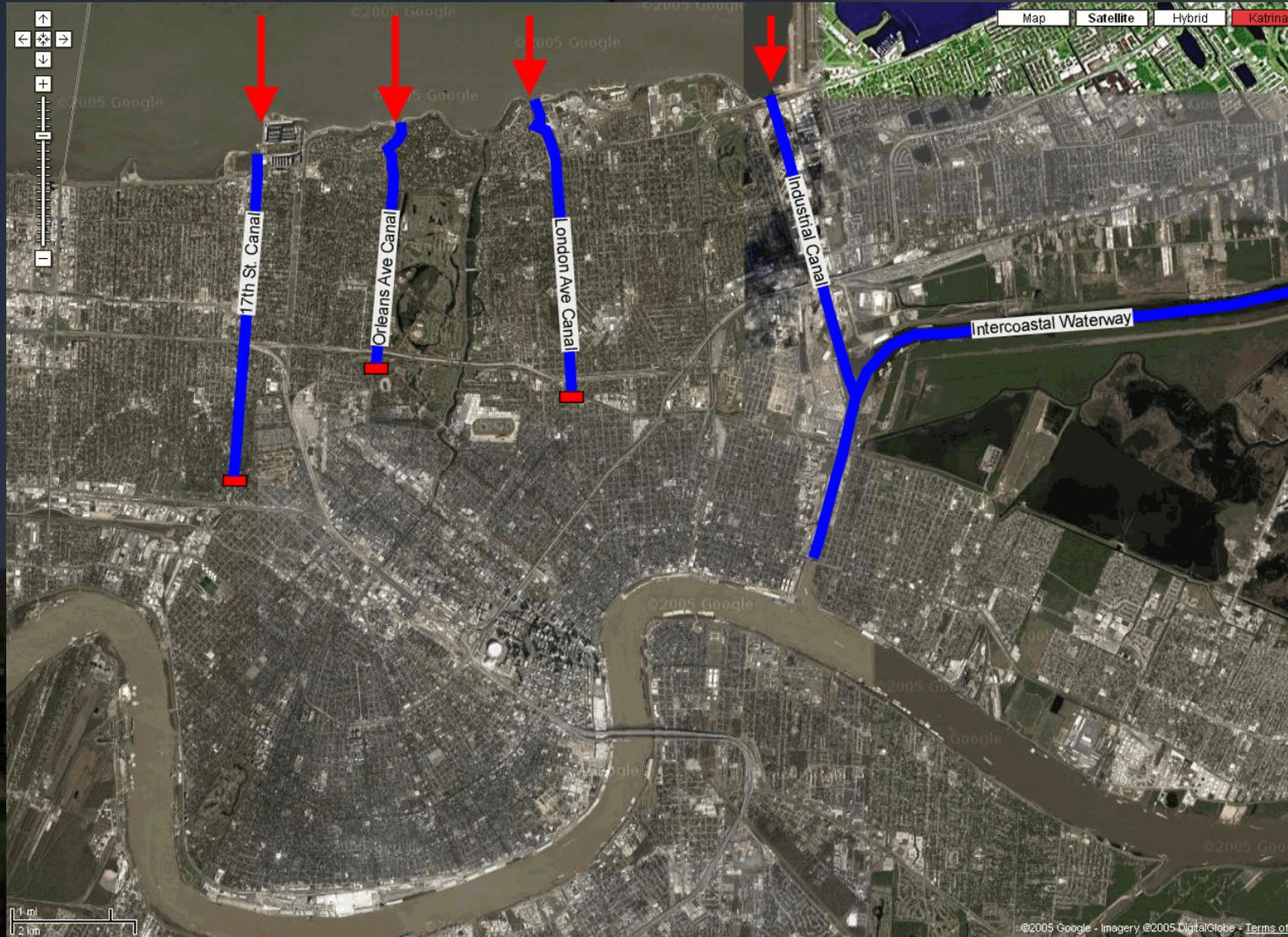
# Assume That East Bank of Orleans Parish Is Protected From The South & West



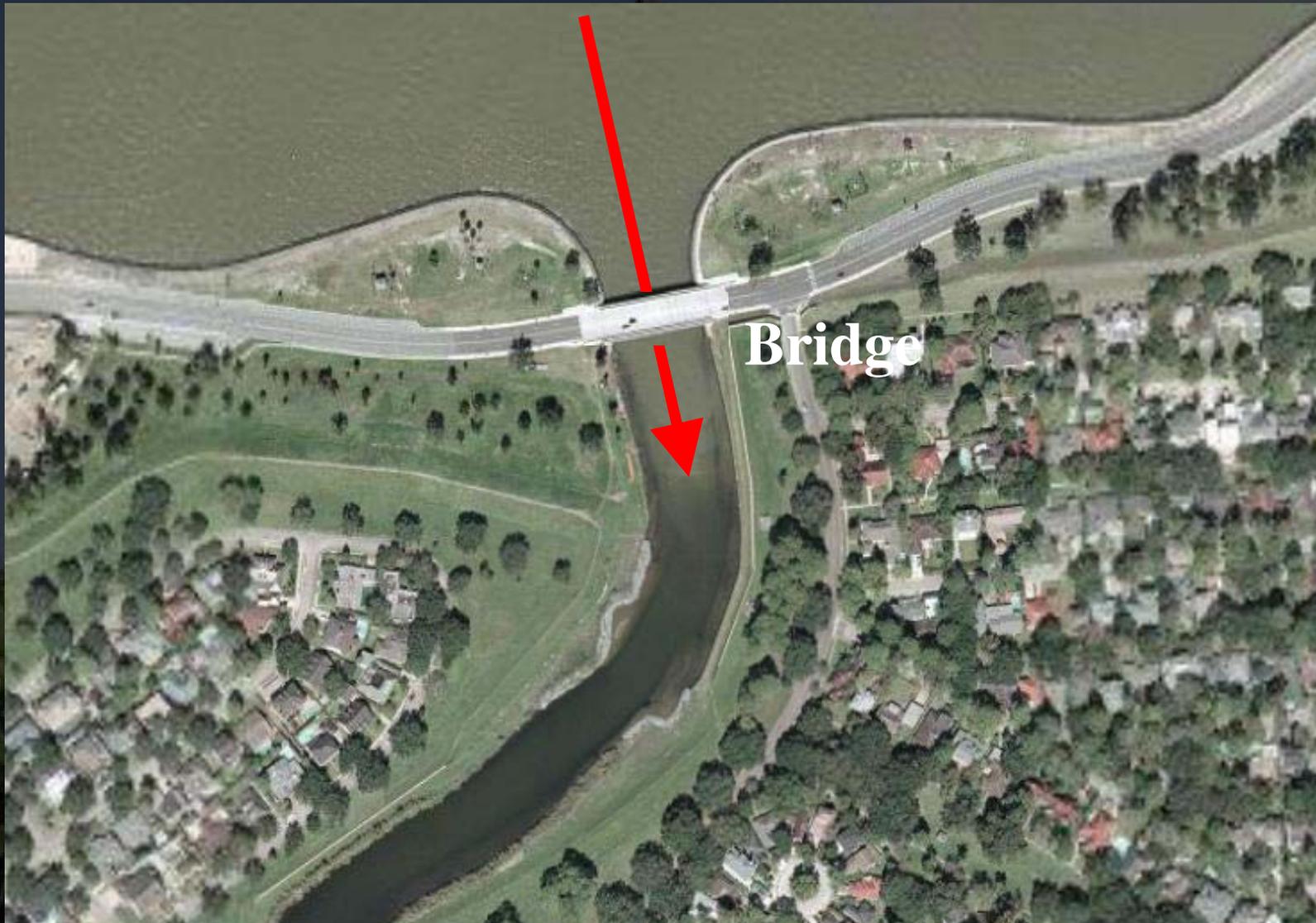
# East Jefferson



# Holes in the Levee



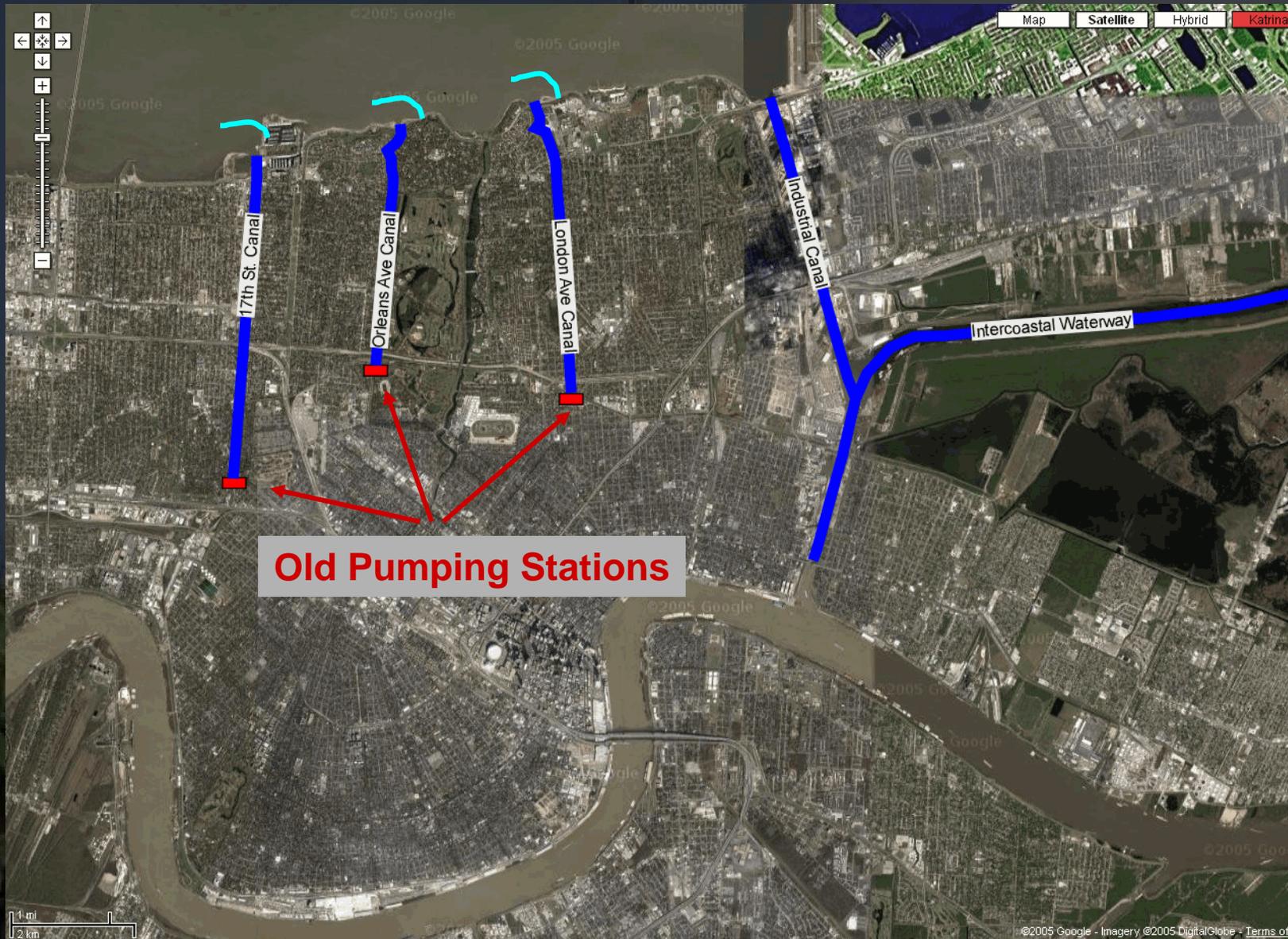
# Orleans Canals Open to the Lake



# Jefferson Parish has Jetties Across the Mouth



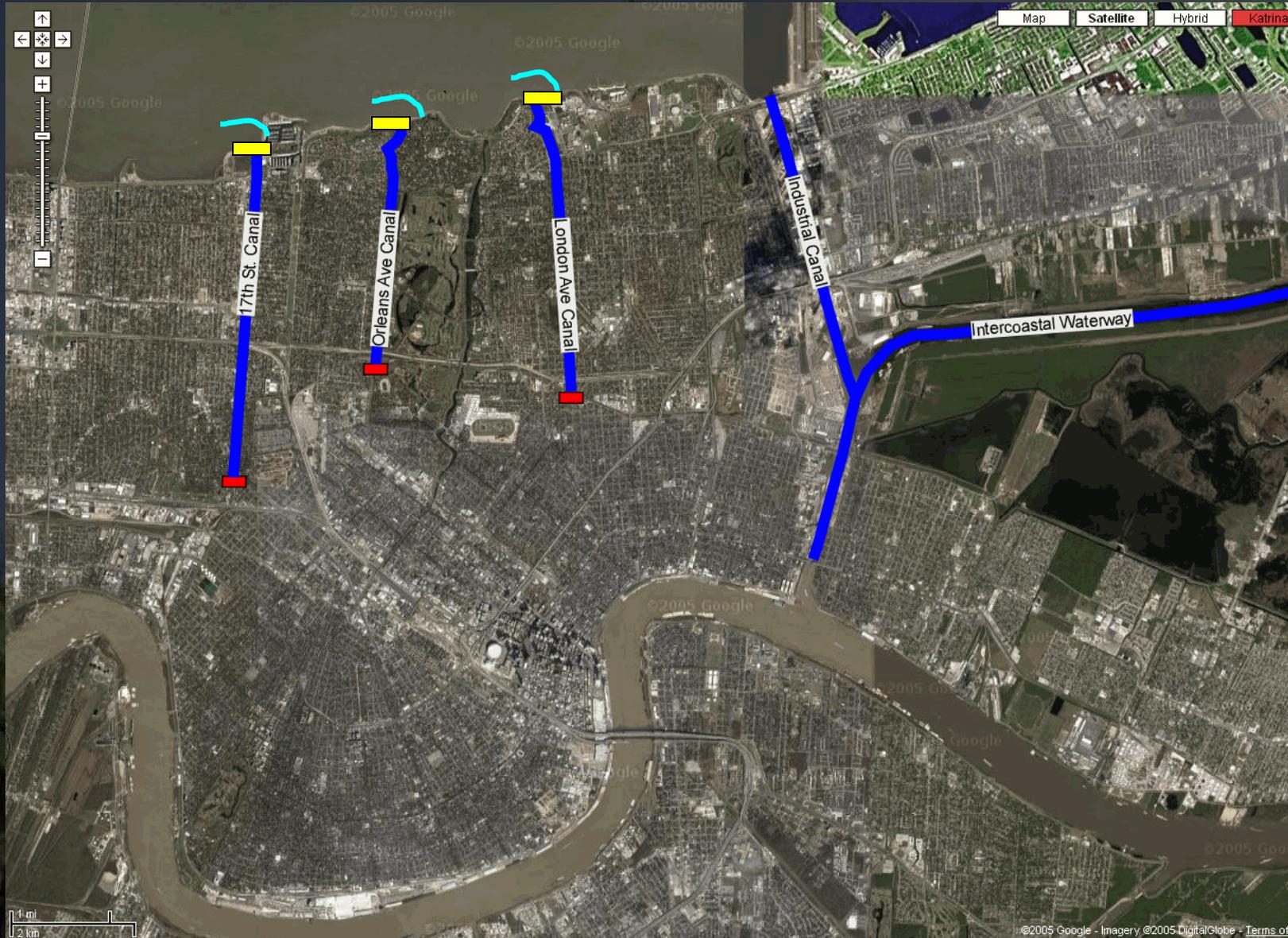
# Add Jetties at the Mouth of Each Canal



# Pumping Station at the Mouth of Canal



# Move Pumping Stations to the Mouth of Each Canal



# Sheet Piles at 17<sup>th</sup> Street Canal for Rita



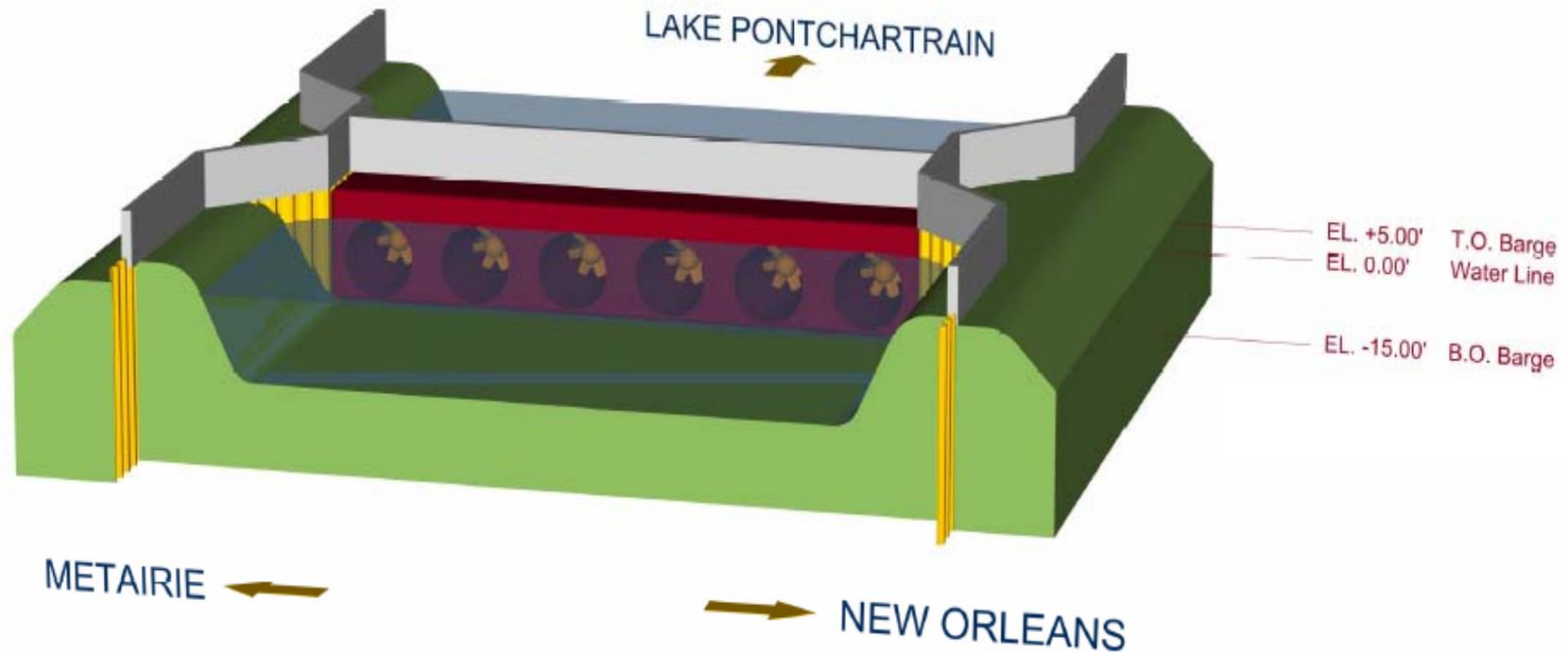
# Sheet Piles at 17<sup>th</sup> Street Canal Today



# I-10 Pumping Station

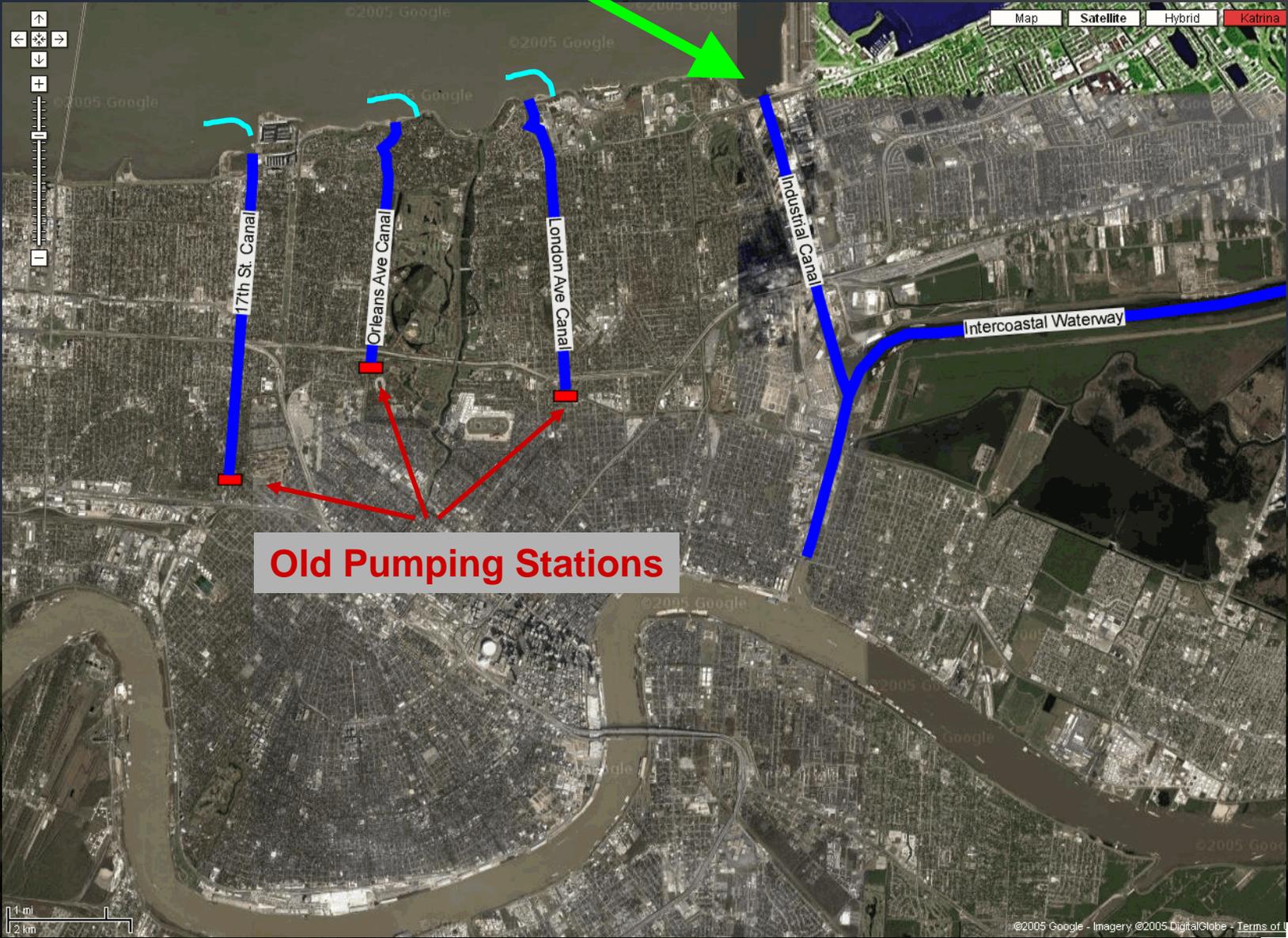


# 17<sup>th</sup> Street Canal Pump Barge



**WALDEMAR S. NELSON AND COMPANY**  
INCORPORATED  
ENGINEERS AND ARCHITECTS  
1200 ST. CHARLES AVE NEW ORLEANS, LA.

# Industrial Canal



# Dam at Seabrook



# Groups Impacted

- Barges
- Fisherman
- Shrimpers
- Boaters
- Repair Yards

# Groups Favorably Disposed

- **Environmentalists**
- **Neighborhoods Near Canal**

# Closing the Four Holes in the Levee Creates a Solid Front to the North, From Hwy. 11 to the St. Charles Parish Line

# Funnel Effect

## BARRIERS OF EARTH AND CONCRETE

Levees and floodwalls that protect against flooding from both the Mississippi River and hurricanes are built by the Army Corps of Engineers and are maintained by local levee districts. The corps and the local districts share the construction cost of hurricane levees, while the Mississippi River levees are a federal project. Local levee districts also build and maintain nonfederal, lower-elevation levees with construction money from each district's share of property taxes and state financing.

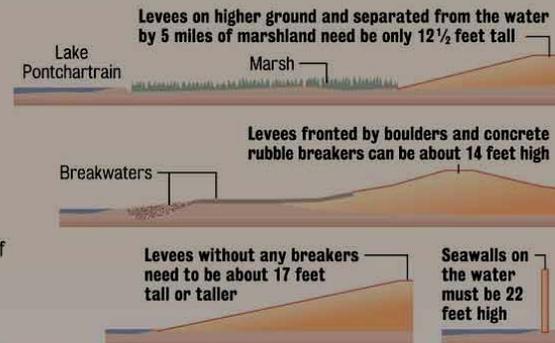
### LEVEES AND FLOODWALLS

-  Mississippi River
-  Hurricane protection
-  Interior parish

Notes: Levee and floodwall elevations are drawn with an extremely exaggerated vertical height but are in proportion to each other. Numbers on specific sections represent average heights in feet above sea level.

## HEIGHT ISN'T EVERYTHING

Different factors permit Lake Pontchartrain levees of varying elevations to withstand an 11½-foot storm surge plus several feet of waves:



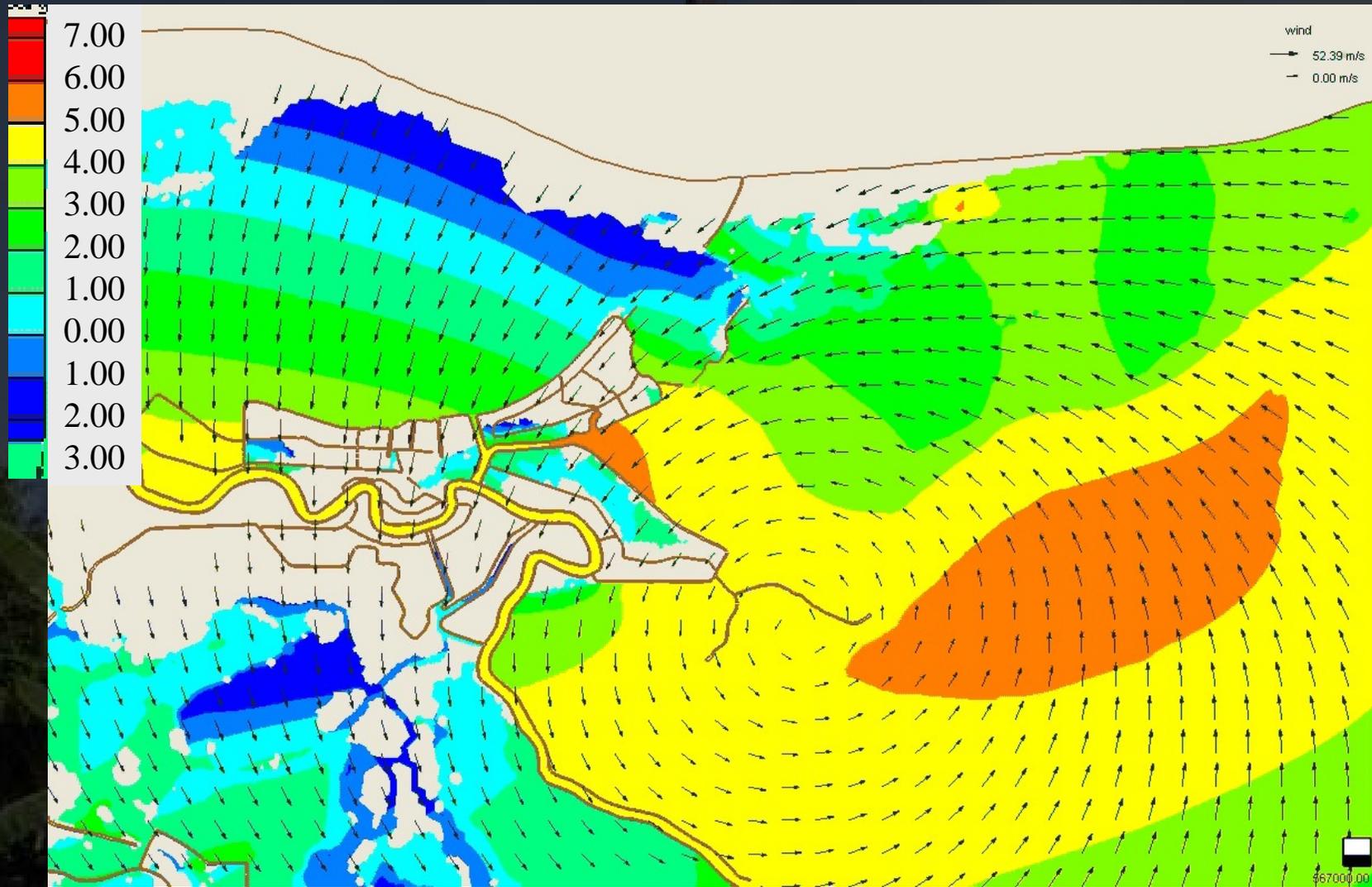
Note: The height and shape of a levee is based on the roughness of the area over which waves pass to reach the structure, and the slope of the structure.



## THE LEVEE SYSTEM:



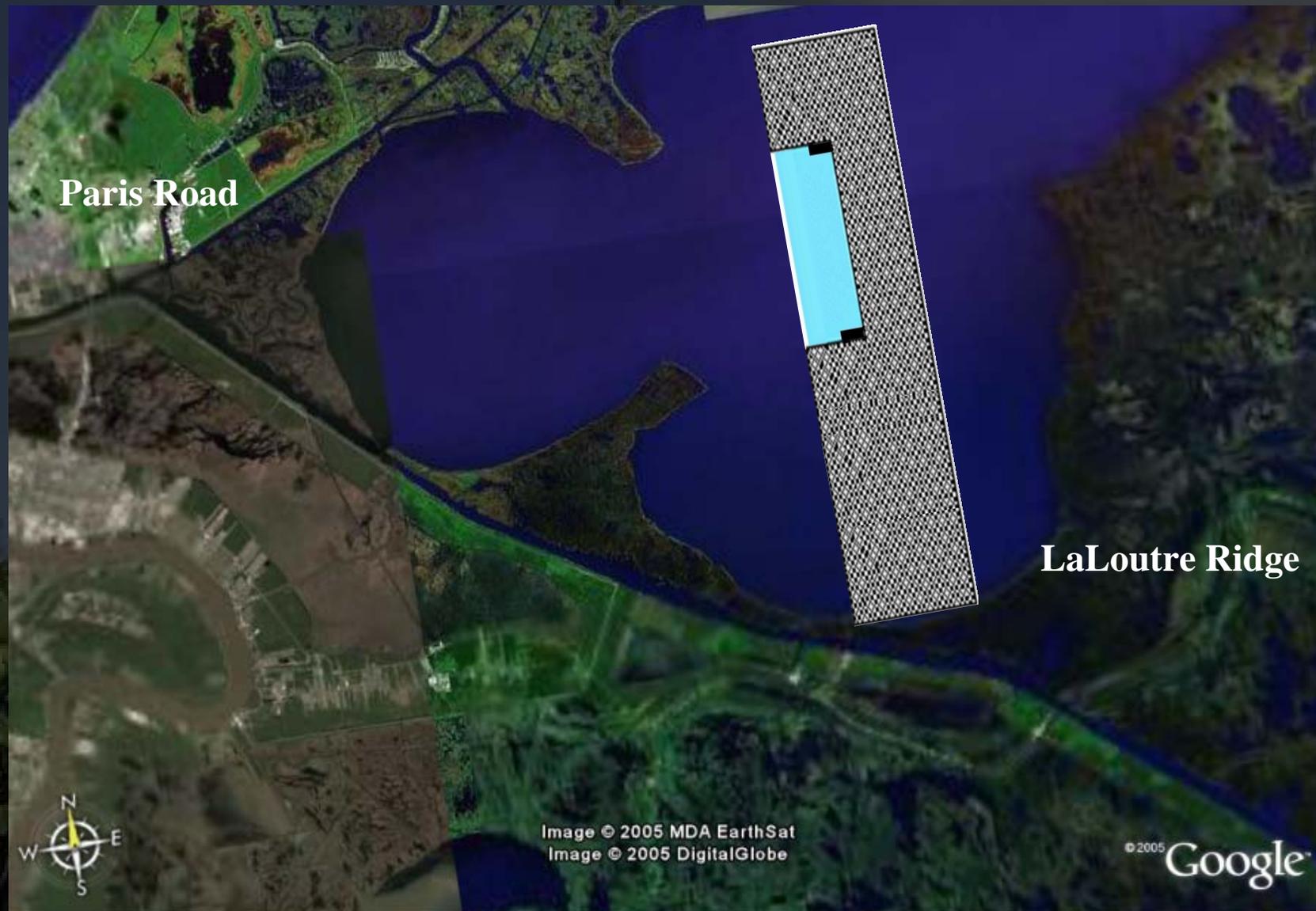
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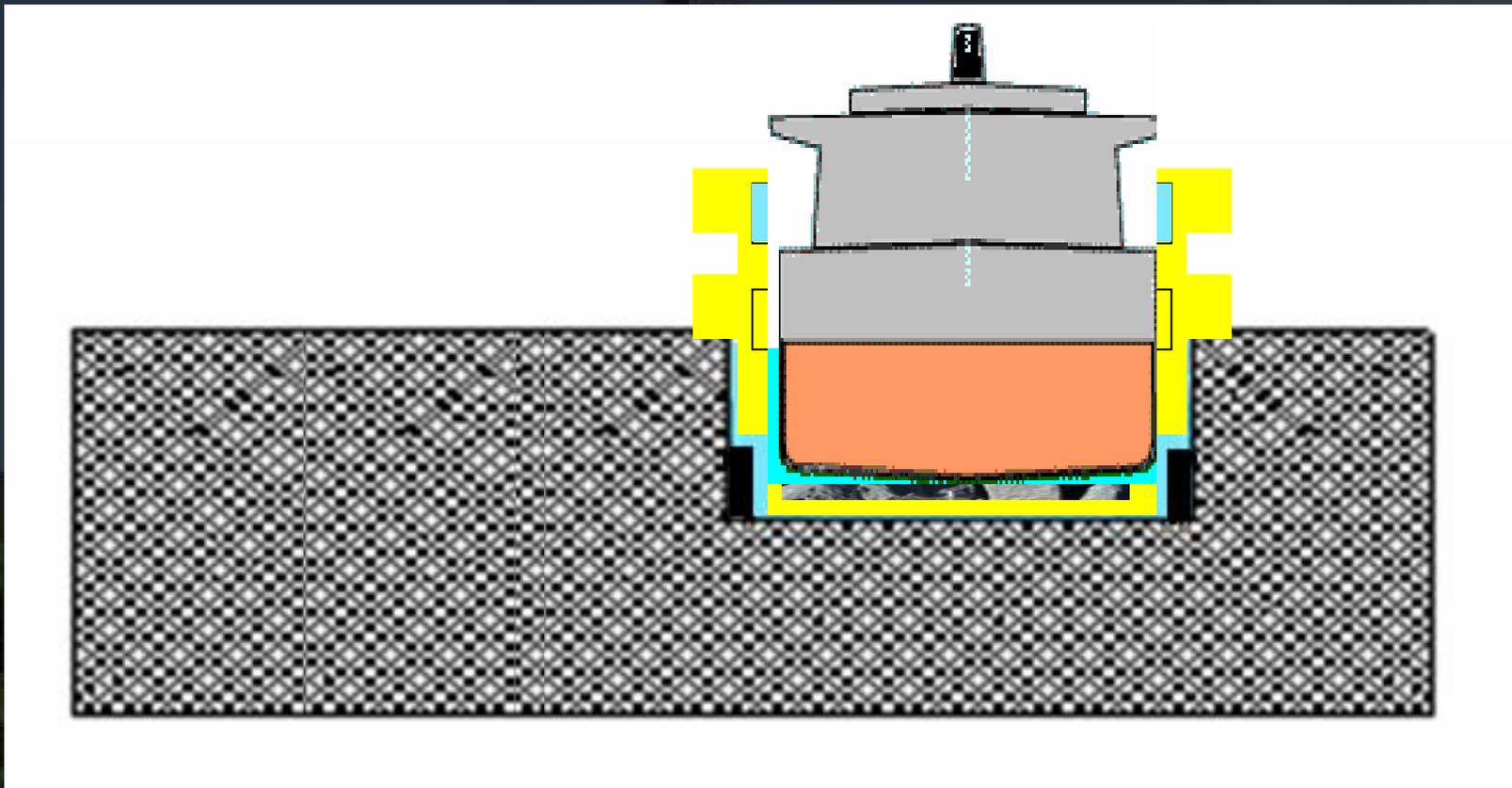


# Weir Across the MRGO/GIWW at Paris Road

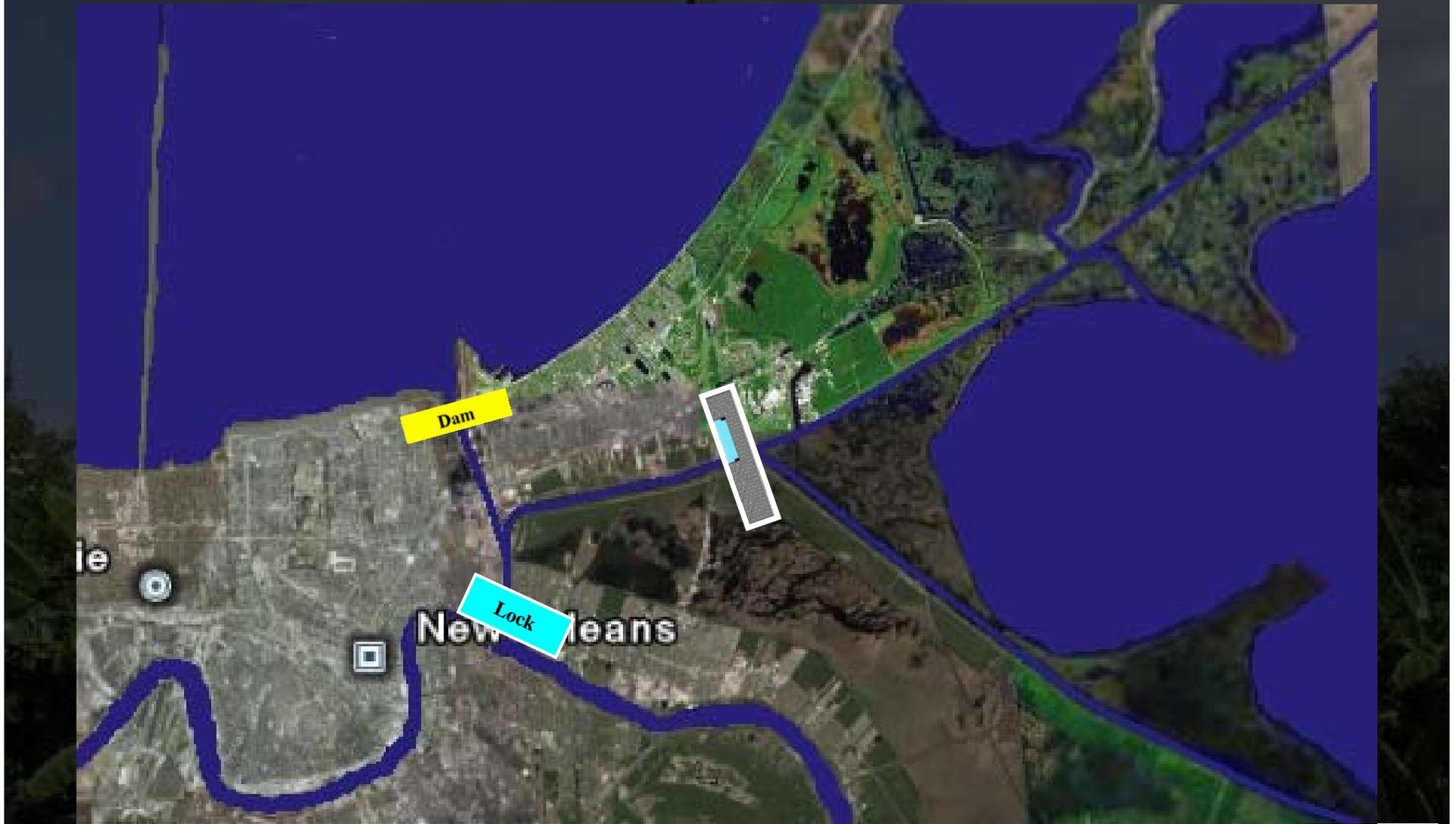


# Weir Across the MRGO at Paris Road

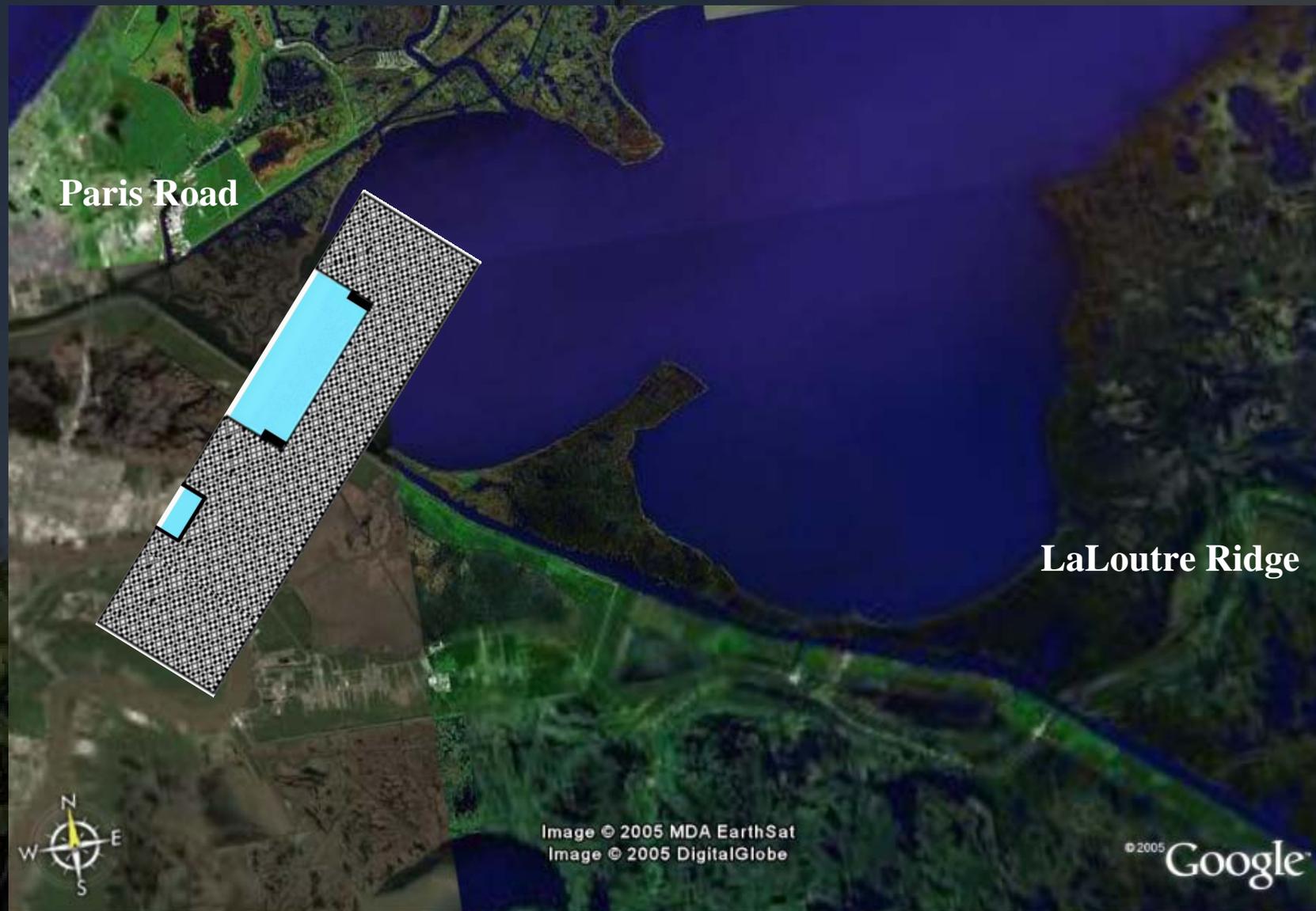
For Maritime Traffic  
Closed When a Hurricane  
To the Industrial Canal  
Is Approaching



# The Dam and Weir Combination Would Isolate the Industrial Canal System From Flood Waters



# Weir Across the MRGO at the LaLoutre Ridge



# Lake Pontchartrain Barrier Plan

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# STOPPING THE SURGE

Although still working on the final plan, the Army Corps of Engineers said it probably will use a system of high levees and floodgates in building a Category 5 hurricane protection system for the New Orleans metro area. Here are some of the possible tools expected to be used:

## CATEGORY 5 PRICE TAG

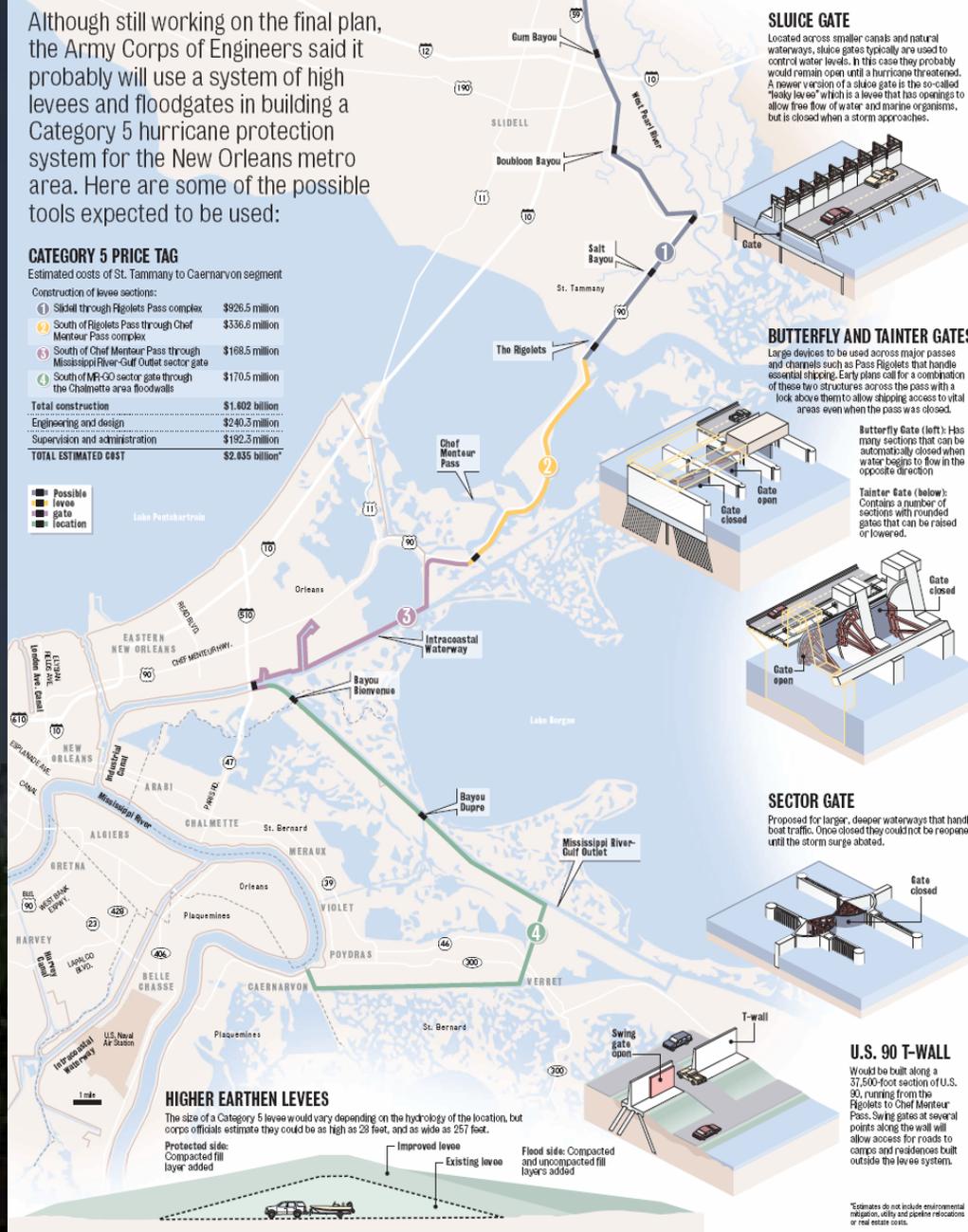
Estimated costs of St. Tammany to Caernarvon segment

Construction of levee sections:

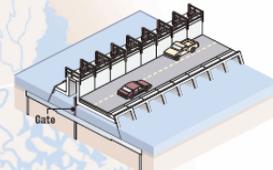
- 1 Slidell through Rigolets Pass complex \$926.5 million
- 2 South of Rigolets Pass through Chef Menteur Pass complex \$336.6 million
- 3 South of Chef Menteur Pass through Mississippi River-Gulf Outlet sector gate \$168.5 million
- 4 South of MR-GO sector gate through the Chalmette area floodwalls \$170.5 million

Total construction	\$1,602 billion
Engineering and design	\$240.3 million
Supervision and administration	\$192.3 million
<b>TOTAL ESTIMATED COST</b>	<b>\$2,035 billion*</b>

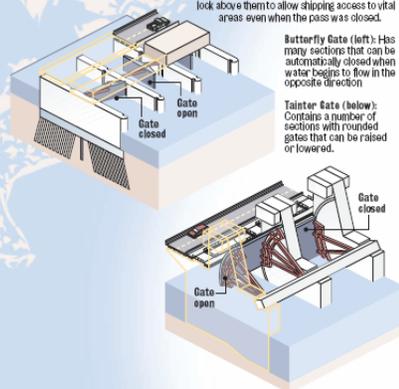
- Possible levee
- Gate location



**SLUICE GATE**  
 Located across smaller canals and natural waterways, sluice gates typically are used to control water levels. In the case they probably would remain open until a hurricane threatened. A newer version of a sluice gate is the so-called "tidy levee" which is a levee that has openings to allow free flow of water and marine organisms, but is closed when a storm approaches.



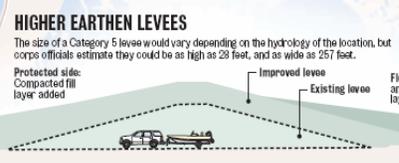
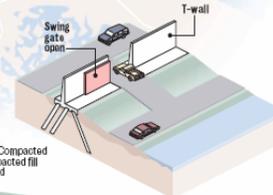
**BUTTERFLY AND TAITER GATES**  
 Large devices to be used across major passes and channels such as Pass Rigolets that handle essential shipping. Early plans call for a combination of these two structures across the pass with a lock above them to allow shipping access to vital areas even when the pass was closed.



**SECTOR GATE**  
 Proposed for larger, deeper waterways that handle boat traffic. Once closed they could not be reopened until the storm surge abated.



**U.S. 90 T-WALL**  
 Would be built along a 37,500-foot section of U.S. 90, running from the Rigolets to Chef Menteur Pass. Swing gates at several points along the wall will allow access for roads to camps and residences built outside the levee system.



\*Estimates do not include environmental mitigation, utility and pipeline relocations or real estate costs.

STAFF GRAFHC BY EMMETT MAYER III

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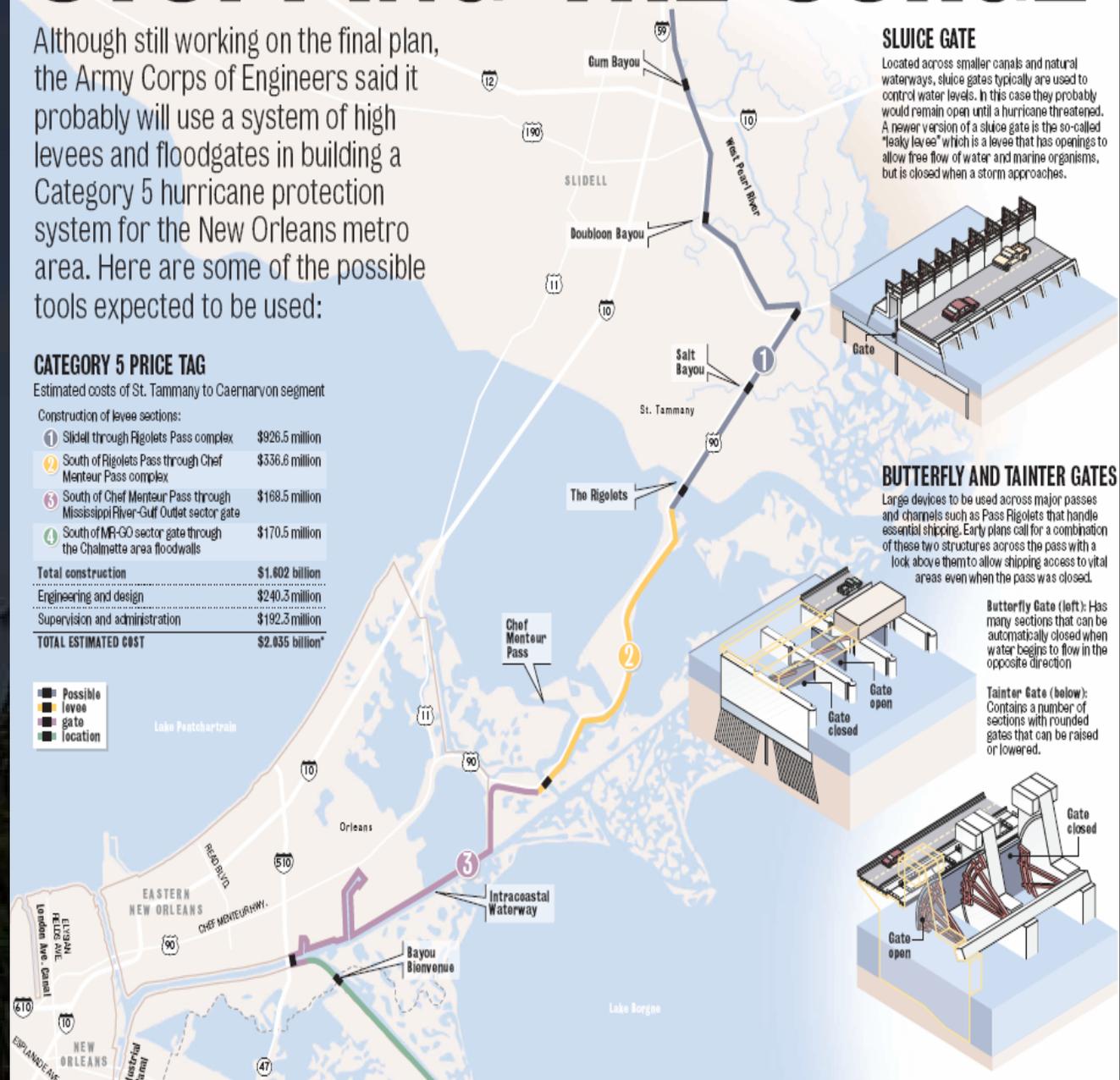
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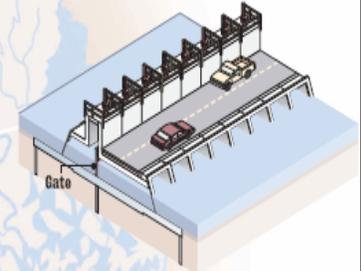
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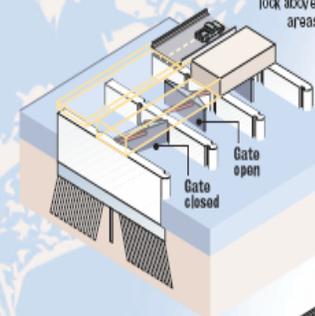
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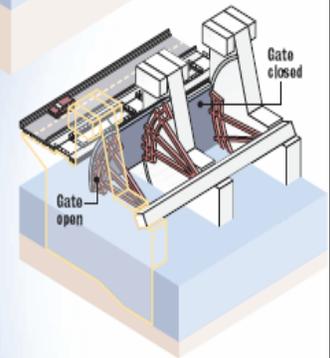
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Large devices to be used across major passes and channels such as Pass Figolets that handle essential shipping. Early plans call for a combination of these two structures across the pass with a lock above them to allow shipping access to vital areas even when the pass was closed.



Butterfly Gate (left): Has many sections that can be automatically closed when water begins to flow in the opposite direction

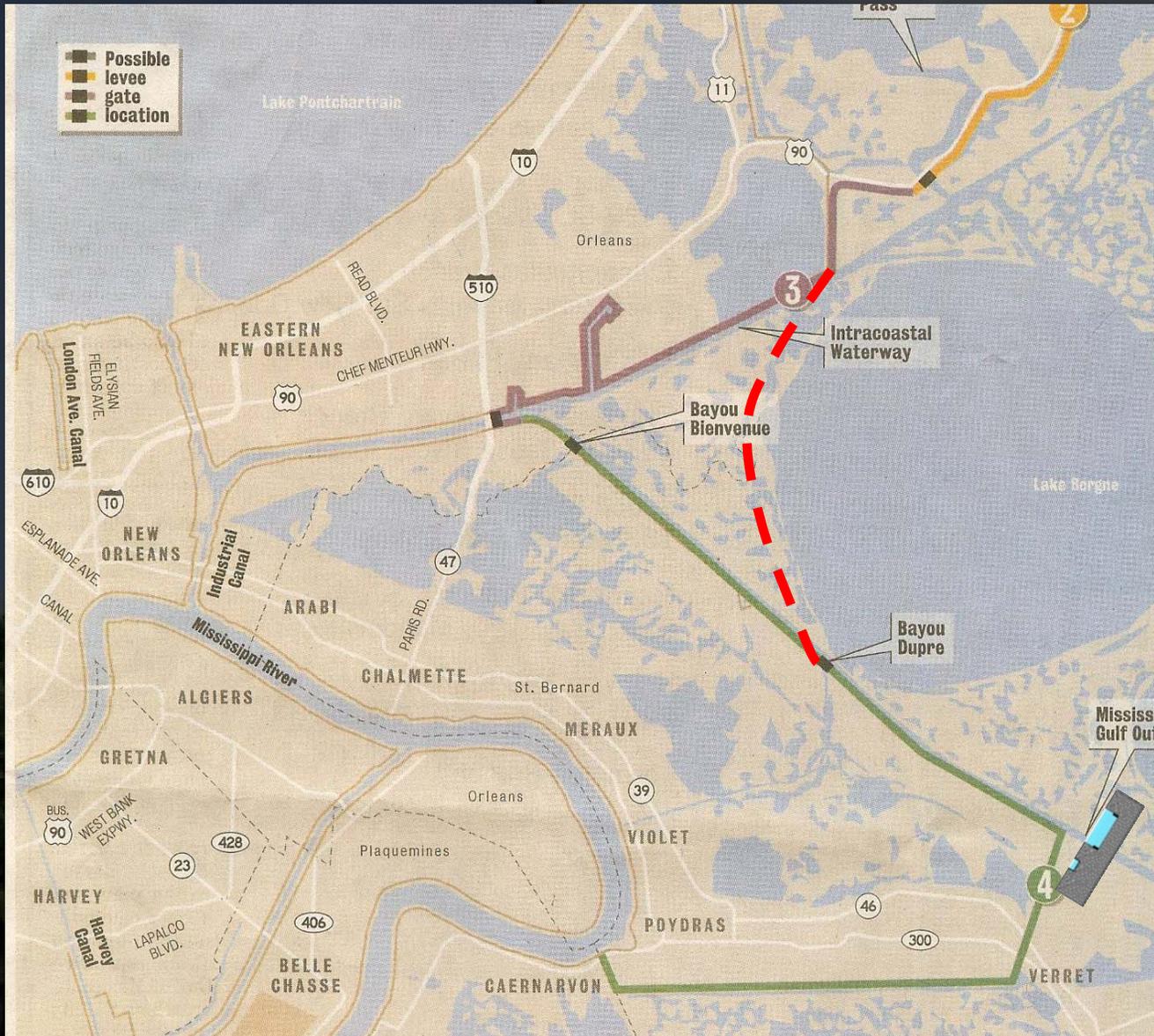
Tainter Gate (below): Contains a number of sections with rounded gates that can be raised or lowered.



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# Flood Control Structures in the Chef and Rigolets



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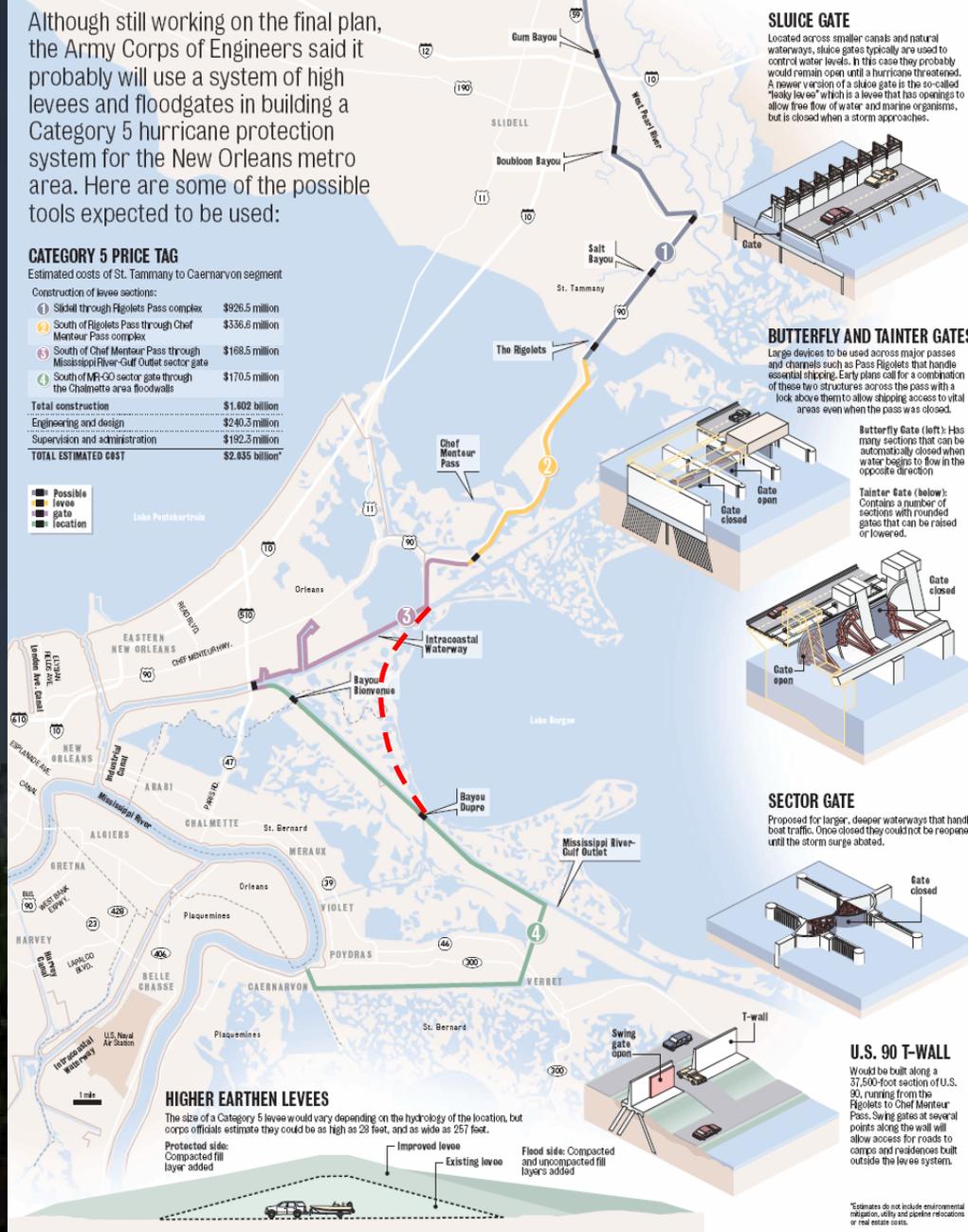
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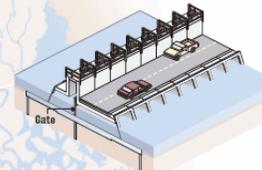
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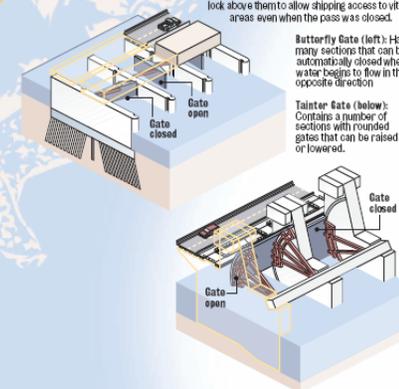


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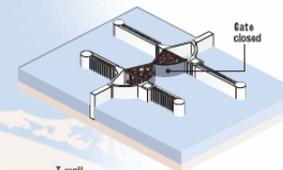
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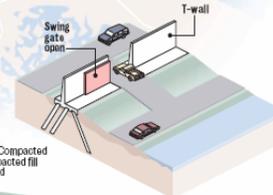
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## HIGHER EARTHEN LEVEES

The size of a Category 5 levee would vary depending on the hydrology of the location, but corps officials estimate they could be as high as 23 feet, and as wide as 257 feet.

Protected side: Compacted fill layer added



Flood side: Compacted and uncompacted fill layers added

\*Estimates do not include environmental mitigation, utility and pipeline relocations or real estate costs.

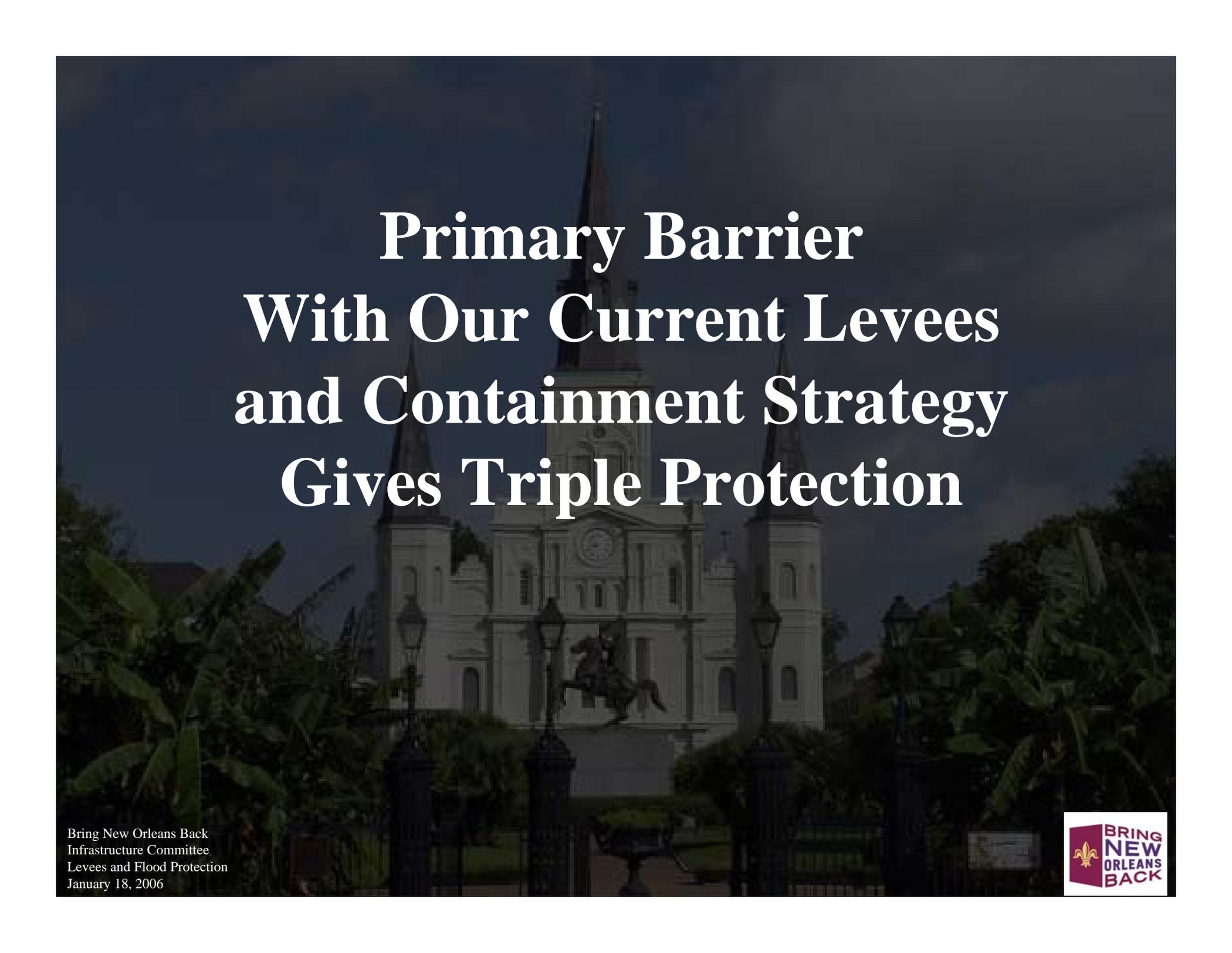
STAFF GRAPHIC BY EMMETT MAYER III

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# Times Picayune Estimate of Component Cost

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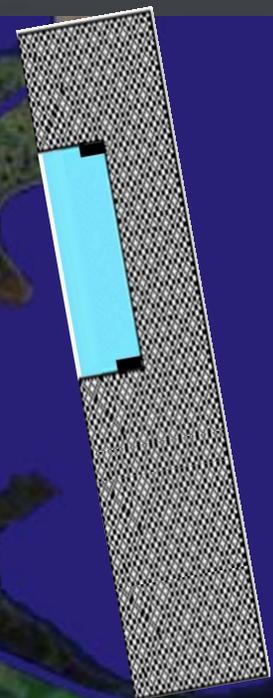


# Primary Barrier With Our Current Levees and Containment Strategy Gives Triple Protection

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# Add-Ons to Current Corps Plans



Metairie

New Orleans

Lake Borne

MRGO



Lake Salvador



Image © 2005 Sa  
Image © 2005 MDA En  
Image © 2005 DigitalGlo

©2005 Google

**Note:**

**Four Suggestions/Recommendation Can Be Fast Tracked**

- \* Jetties
- \* Barge/Thruster
- \* Dam
- \* Weir

**These Suggestions Do Not Interfere With Any Ongoing Corps Work**

**These are Add-Ons Which Complement and Augment Current Projects**

# Fast Track Projects

## Cost Ranges – Best Estimate

<b>3 Jetties</b>	<b>\$15-25 Million</b>
<b>1 Barge/Thruster – 17st.</b>	<b>10-20</b>
<b>2 Barge/Thrusters-Orleans &amp; London</b>	<b>15-30</b>
<b>1 Dam</b>	<b>10-15</b>
<b>1 Weir and Barge Gate</b>	<b><u>50-80</u></b>
	<b>\$100-170 Million</b>

***A Good Nights Sleep***

***Priceless***



*Thank You*  
*Welcome Back*

