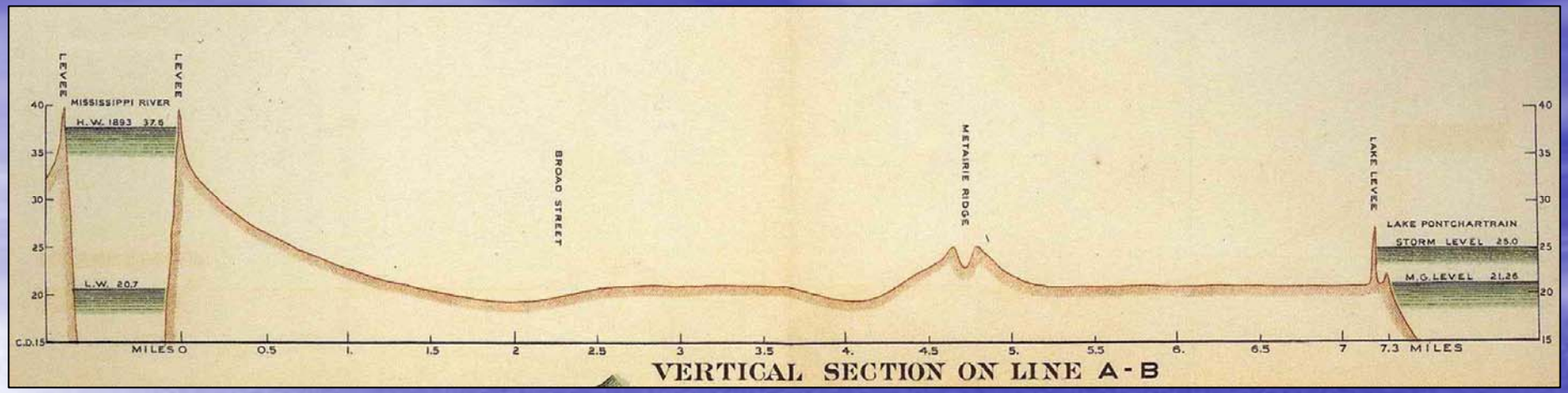
PART 2

NEW ORLEANS DRAINAGE CANALS

The Old Basin drainage canal was excavated in the 1790s. This shows the systems of drainage ditches and canals established by 1829, leading to Bayou St. John.



Cross section through New Orleans in 1895. The Mississippi River's natural levees form the highest ground in New Orleans. **Metarie** and **Gentilly Ridges** are recent distributary channels, lying about 3 to 6 feet above the adjacent ground. The earliest levees along Lake Ponchartrain (far right) were erected in the 1890s; then enlarged considerably in 1931-32, when the concrete seawall was built ½ mile into Lake Ponchartrain and backfilled with the **Lakshore Landfill**.

Many Canals were filled or superseded by newer ones

- The **Old Basin**, or **Old Carondelet Canal** was excavated for drainage and navigation (row boats), between the City and Lake Ponchartrain. It ended at Basin Street, and was infilled in the **1920s**, when it became railroad tracks and Lafitte Avenue.
- The **New Basin Canal** was excavated in the early **1830s** in the American Sector, yellow fever killing 10,000 Irish immigrants. The New Orleans City Railroad paralleled this canal in post Civil War era.
- The **New Basin Canal** cut through Metarie Ridge; causing flooding of the downtown area in **1871**.
- The portion south of Metarie Ridge was filled in the **1930s**; and the remainder in the **1950s**, with the **Ponchartrian Expressway** replacing the old canal.

Drainage Canal Chronology

- The **Orleans Canal** was excavated in **1833** to convey water from Bayou Metarie. The Turnpike Road ran along the west side of this canal.
- The **Upper Line/17TH St. Canal** along the Orleans-Jefferson Parish boundary was excavated prior to **1849** – along the upper end of today's **17th St Canal.** The lower portion was excavated in **1857-58**, all the way to Bucktown, along Lake Ponchartrain
- In **1853** the **Jefferson & Lake Ponchartrain Railroad** was built along the Upper Line Canal

The **1878 Hardee drainage map** was compiled after a yellow fever epidemic the previous year, which brought to City's accumulated death toll to in excess of 100,000 people.

Drainage Canal Chronology

- The **1853** Ponchartrain Harbor Map shows brackish water tidal influx zone around the mouth of Bayou St. John, extending westward, to the New Basin Canal.
- The **Upper Protection Canal** was excavated around **1857-58** out to Lake Ponchartrain. This became the **17th Street Canal** (the street was renamed Palmetto Avenue in 1894)
- By **1863** there were a series of east-west **feeder canals** serving Bayou St. John from the west side
- By **1863** there were a series of NNE trending drainage canals in St. Bernard Parish

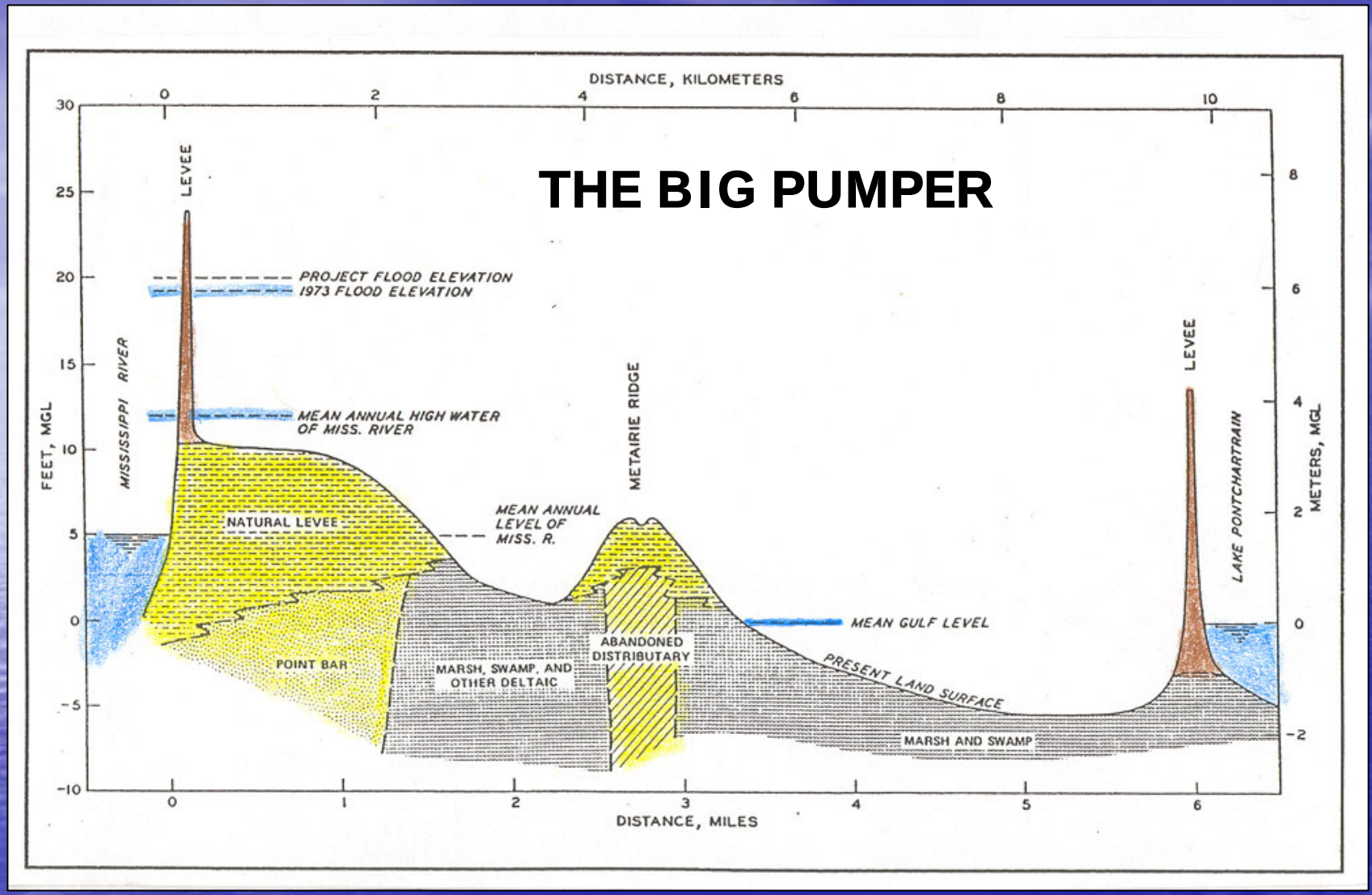
All 36 miles of drainage canals in the Lakeview and Gentilly areas are shown in 1878: 17th Street, New Basin, Orleans, Bayou St. John, London, and the Lower Line Protection Levee.

Drainage Canal Chronology

- The upper London Avenue Canal was constructed in the 1860s, north of Bayou Gentilly. A steam-powered draining machine near the intersection of London and Pleasure Street dumped this water into the cypress swamp near what is now Dillard University, north of Gentilly Ridge.
- The lower London Avenue Canal was extended out to Lake Ponchartrain sometime between 1873-78

EARLY WARNINGS

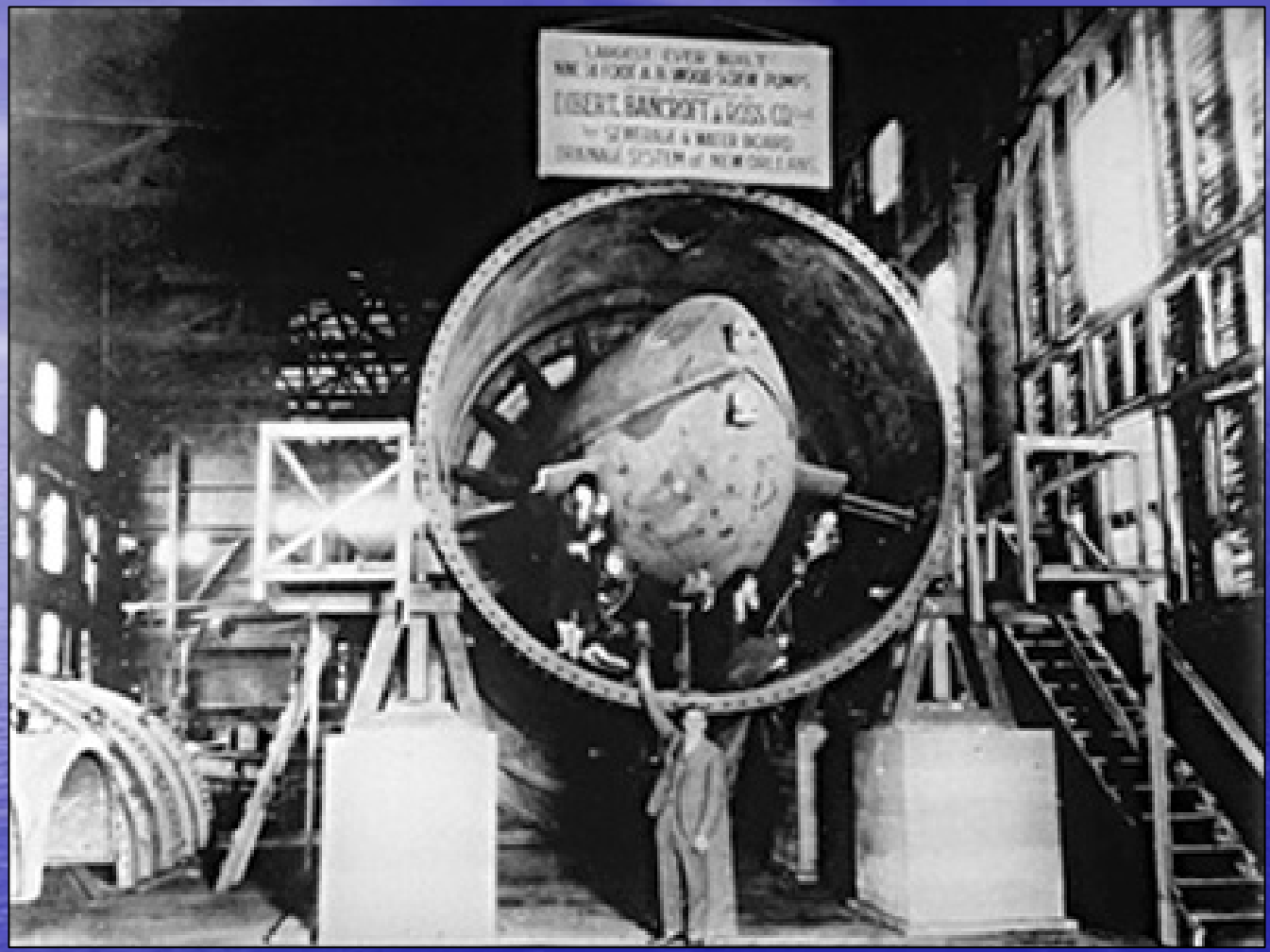
- In **1871**, the New Orleans City Surveyor **W.H. Bell** warned of the potential dangers posed by the big outfall drainage canals
- He told city officials to place pumping stations on the lakeshore, otherwise "***heavy storms would result in water backup within the canals, culminating in overflow into the city***."



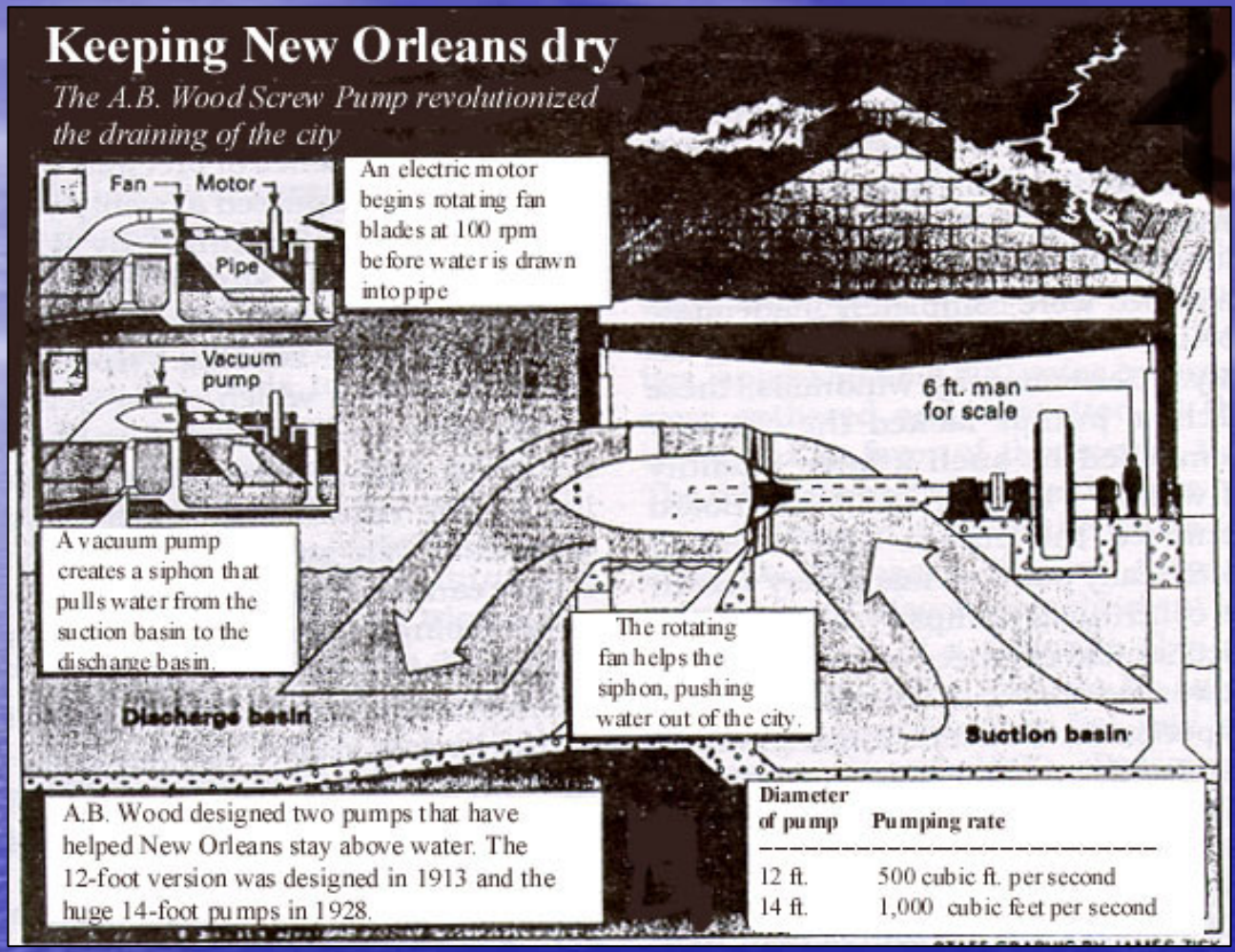
Much of New Orleans lies below sea level, Lake Ponchartrain, and the Mississippi River, making it particularly vulnerable to flooding. Mississippi levee 24.5 feet; Pontchartrain levee 13.5 feet.

Drainage Commission - 1896

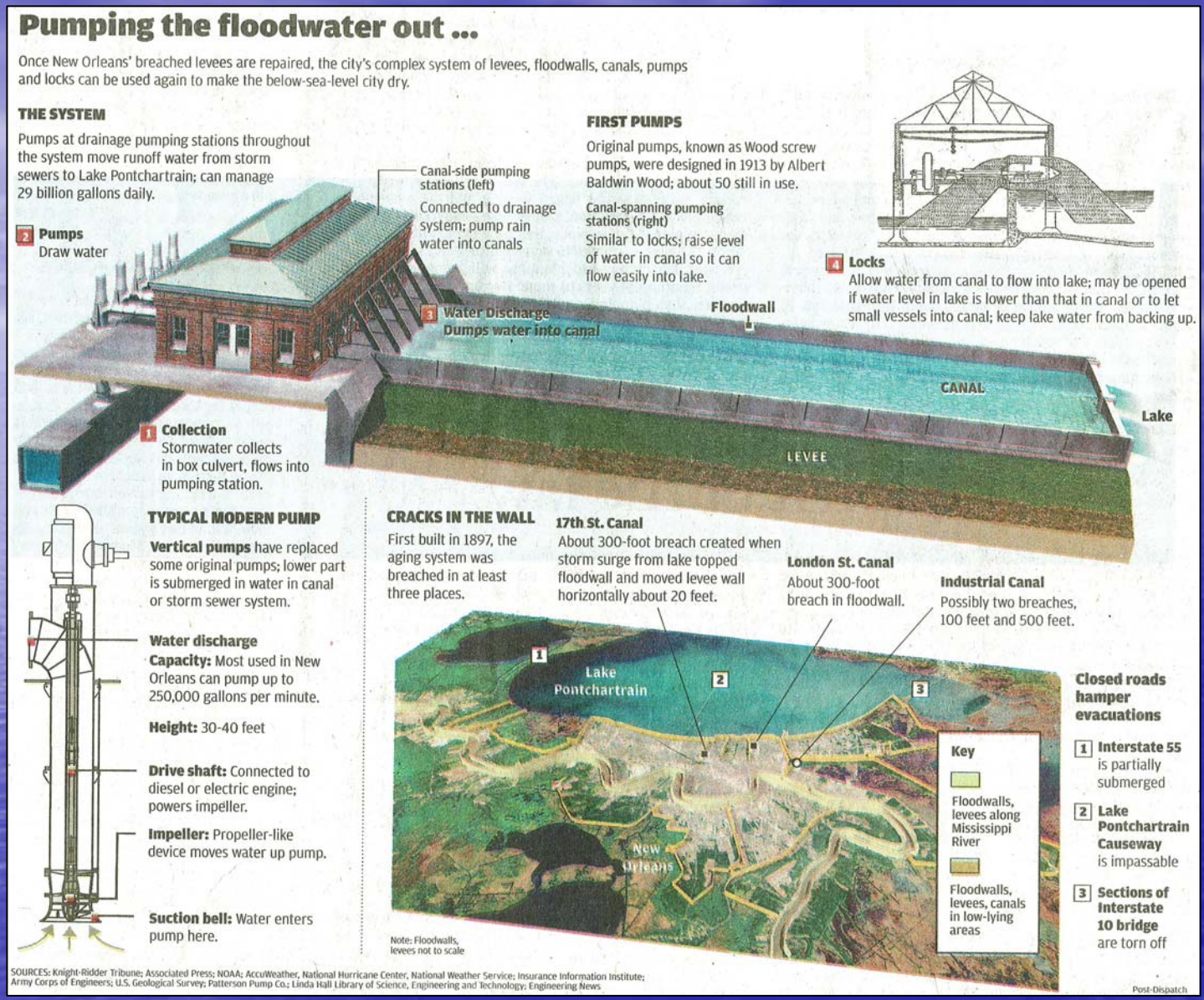
- The Louisiana legislature created a drainage commission in **1896** to deal with drainage of New Orleans
- This subsequently became the **New Orleans Sewerage and Water Board** in **1899**.
- By 1915 there were 70 miles of canals and three new pump stations in place. By 1926 the system cost $27.5 million
- Eventually, this system has expanded to 172 miles of drainage canals, 90 miles of which are covered.



A. Baldwin Wood was a young S&WB engineer who designed the enormous screw pumps, 12 to 14 feet in diameter, which run on 25 Hz electric power using 20 ft diameter dynamos. The City began by installing 11 Wood pumps in **1915** for a cost of $159K. These replaced the old steam powered paddle wheel pumps.



This 1920s drawing shows the arrangement of a Wood screw pump, which uses a powerful siphon action to lift water into the drainage canals, where it flows by gravity to Lake Ponchartrain. The City's 21 pump stations can lift 47,000 csf of water. Prior to Katrina. it had only been overwhelmed on a few occasions, in 1978 and again, in 1995.



New Orleans also employs vertical pumps with impellors to lift water from subterranean storm drains to the drainage canals.

1915 FLOOD ENTERED CITY VIA THE DRAINAGE CANALS

- In 1915 a powerful hurricane lifted the water level in Lake Ponchartrain to 6 feet above mean gulf level.
- The drainage canals were overtopped and much of the city flooded
- The City's new pump system was overwhelmed when the power stations were flooded
- 275 people were killed in the flooding

RESPONSE TO 1915 and 1947 OVERTOPPINGS

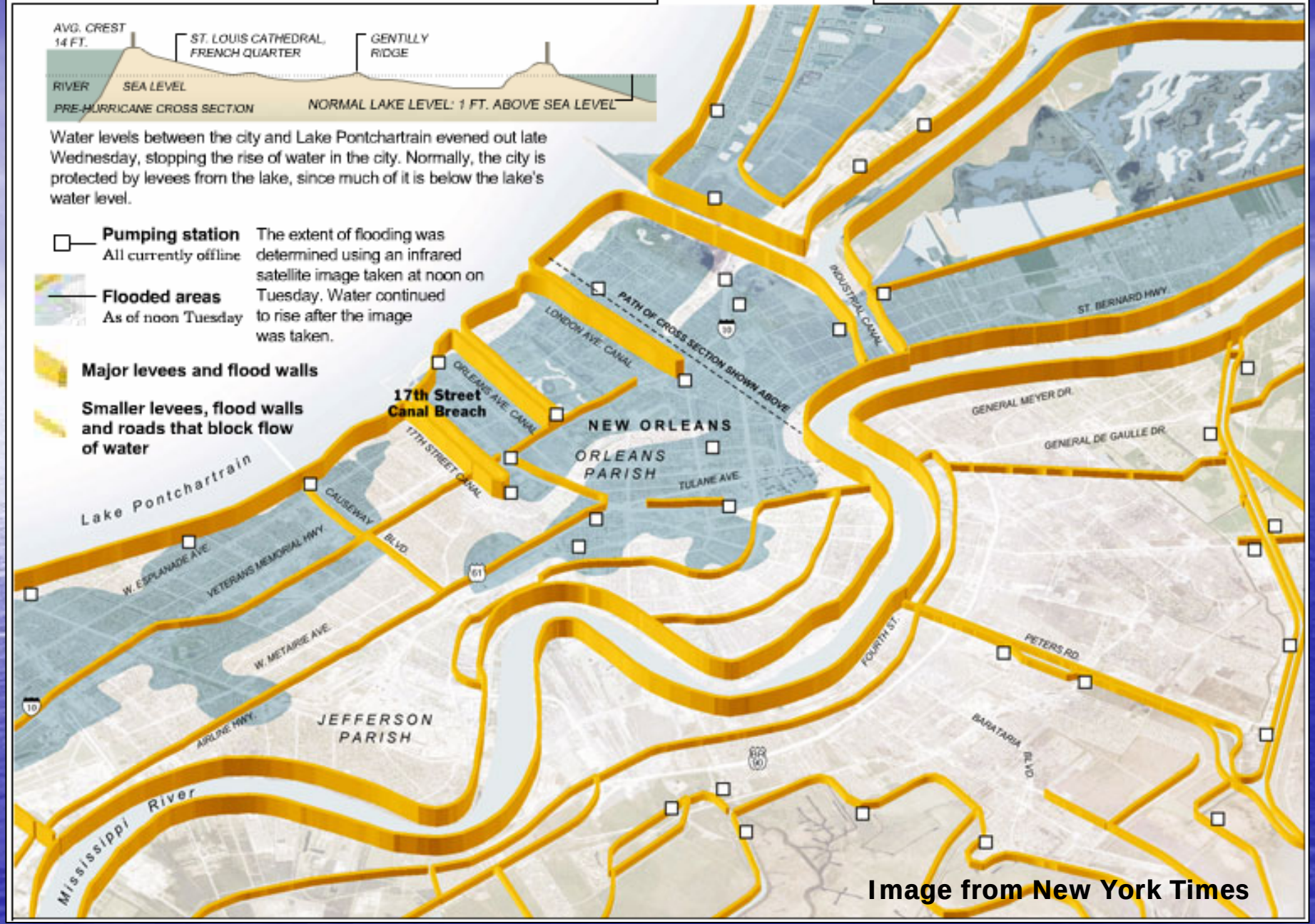
- After the **1915 flood**, Sewerage and Water Board General Superintendent George Earl ordered the levees along the drainage canals to be raised.
- After several of these heightened drainage canal levees were overtopped in **1947**, the state's congressional delegation asked the federal government to assist in protecting the city

FEDERAL INVOLVEMENT

- Federal involvement in the drainage canals began in **1955** with approval of the **Lake Ponchartrain and Vicinity Hurricane Protection Project**
- Clash of cultures and goals between local levee districts, the S&WB, and the Corps of Engineers ensued.
- The Corps preferred gates at the mouths of the canals, but S&WB and many residents opposed, fearing they would malfunction, inhibiting outflow of storm water.

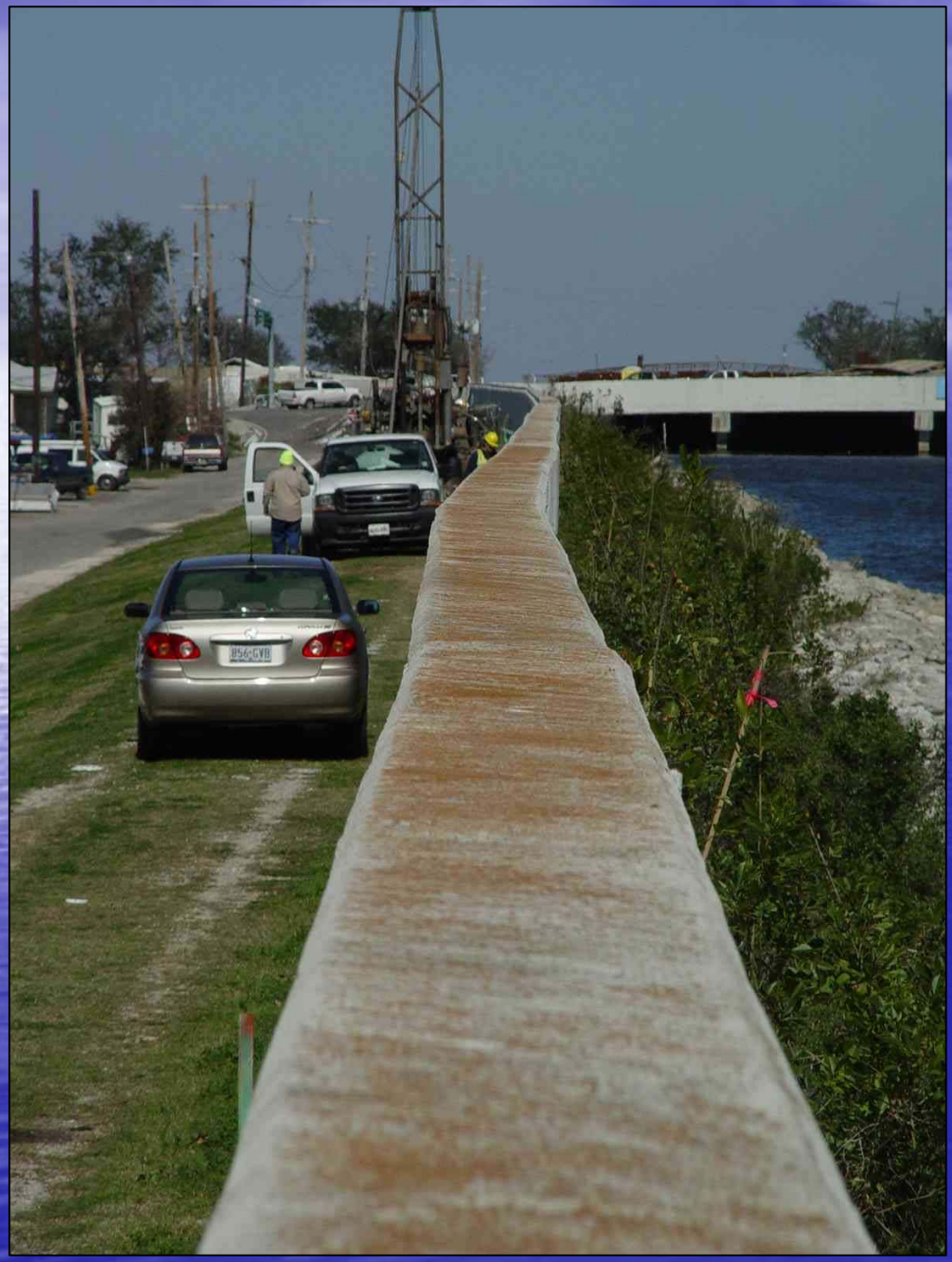
40 YEAR BATTLE

- The issue of how to address improvement of the drainage canals dragged on for almost 40 years.
- In the meantime, intense residential development encroached upon the drainage canals, beginning in 1955.
- Congress decided the issue in 1992, ordering the Corps to go with heightened levees able to withstand a Category 3 storm with 12 ft tides and 130-mph winds.



A complex network of levees protected the city from flooding, but it quickly failed on August 29, 2005, when water levels rose.

Flood Walls were constructed on the crowns of drainage canals and the Inner Harbor Navigation Canal to accommodate functionality during high storm surges. The walls in the Lakeview and Gentilly Districts topped out at +14 ft above MGL.



Flood Walls

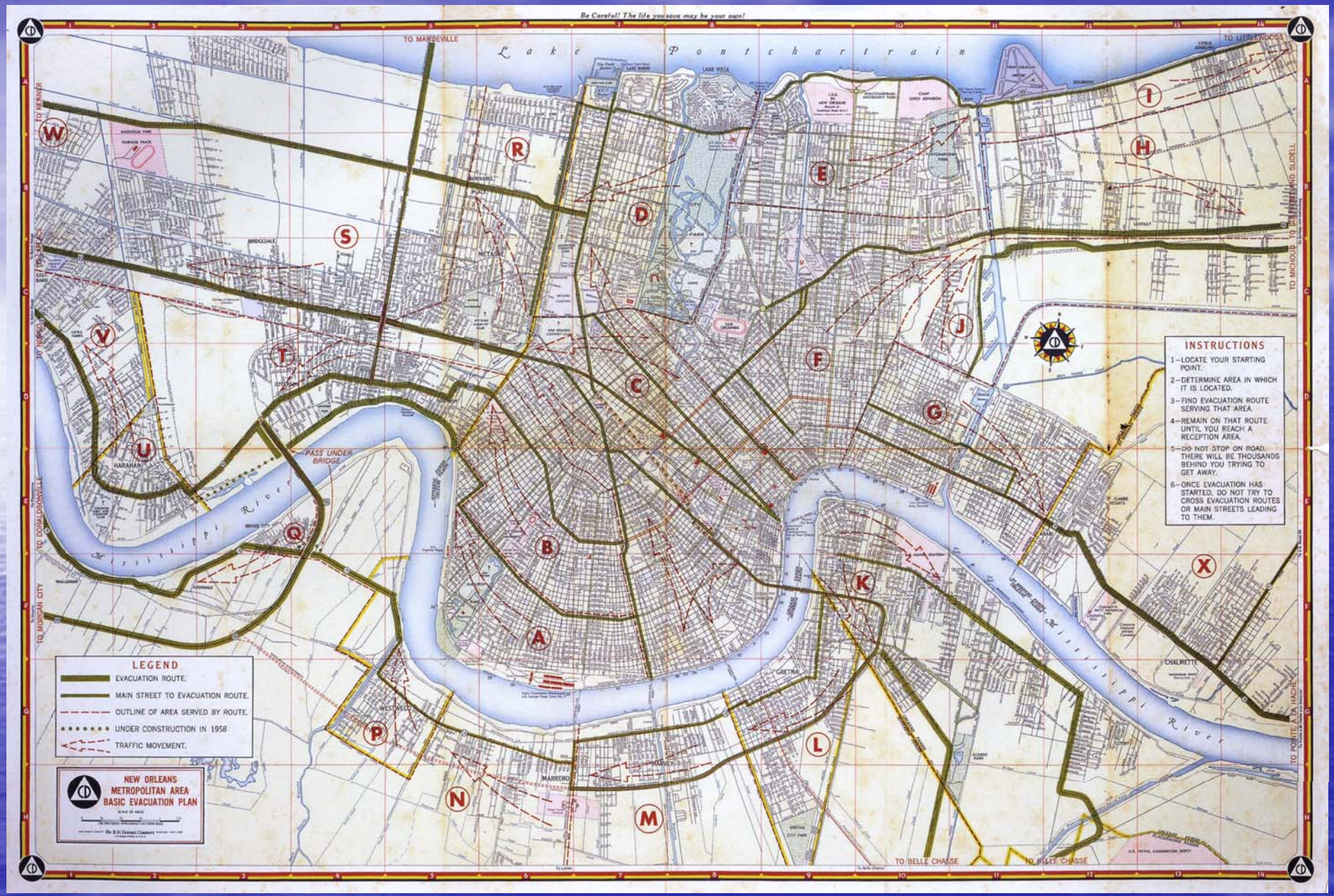
Prior to Hurricane Katrina, the drainage canals feeding into Lake Ponchartrain never exceeded a flow height of **7 feet above MGL**

This shows deflection of the western 17th Street Canal flood wall, opposite the August 29, 2005 break of the eastern wall, near the Hammond Highway Bridge.

Meanwhile - Land Reclamation

- In **1924** the state commissioned the Orleans Levee Board to construct new levees along Lake Ponchartrain
- In the **1930s** the levee board constructed a concrete stepped seawall one-half mile out into Lake Ponchartrain, and backfilled this with **1,800 acres of "made ground."**
- This development solidifies the Lakeshore area as a desirable bedroom community with yacht harbors, parks, and pleasant summer breezes

View of New Orleans from above Lake Ponchartrain in the mid 1950s, when the Lakeview and Gentilly neighborhoods adjacent to the lake were under intense development.



1958 Civil Defense Map shows the designated evacuation routes (before I-10 and I-610 freeways) and areal limits of development.