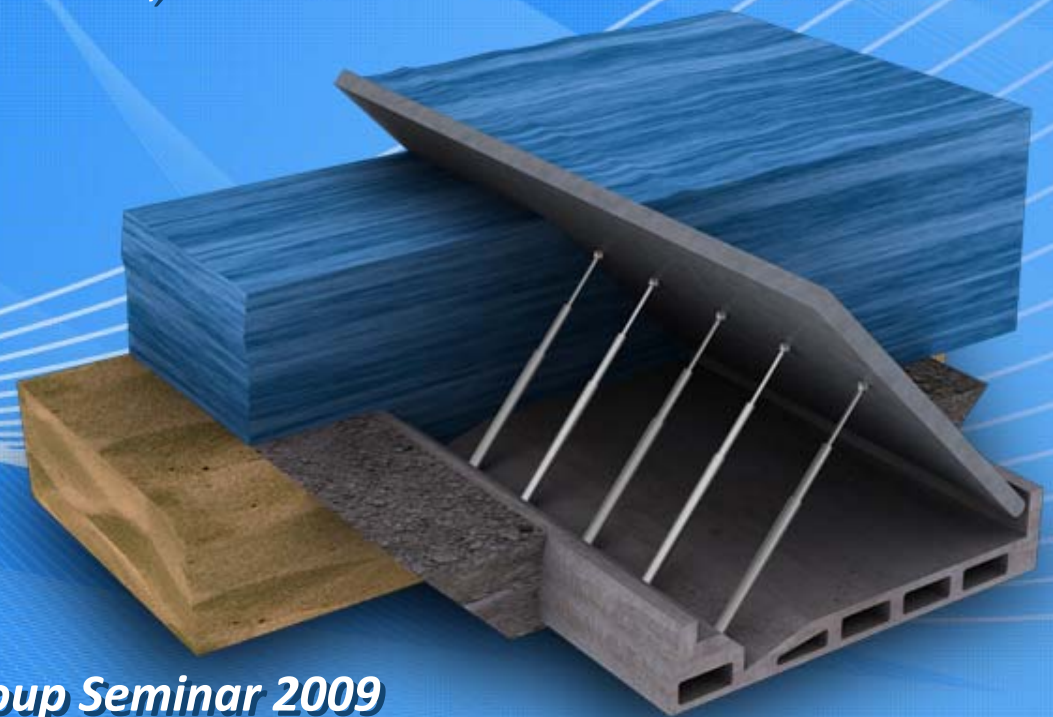


Against the Deluge: Storm Surge Barriers to Protect New York City

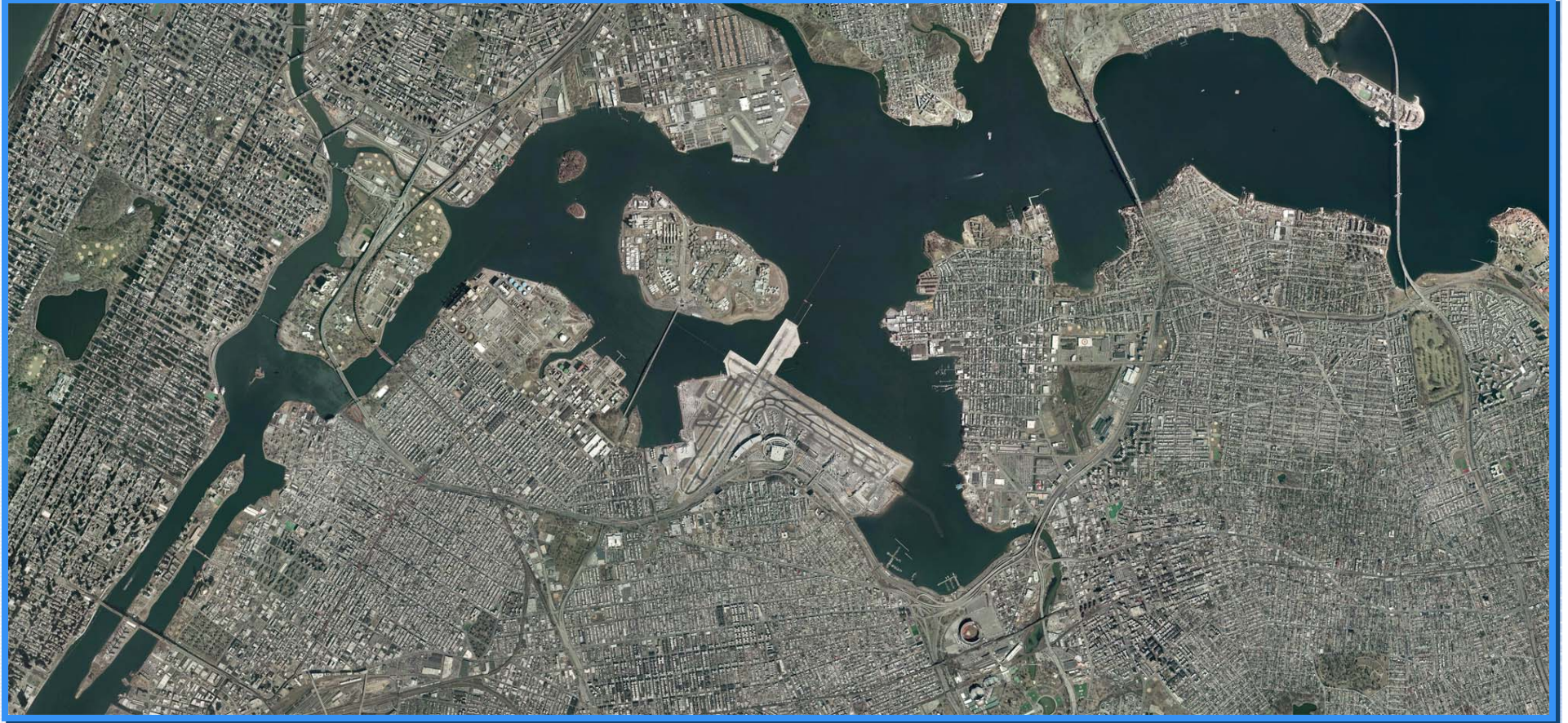
Conceptual Design of an East River Storm Surge Barrier

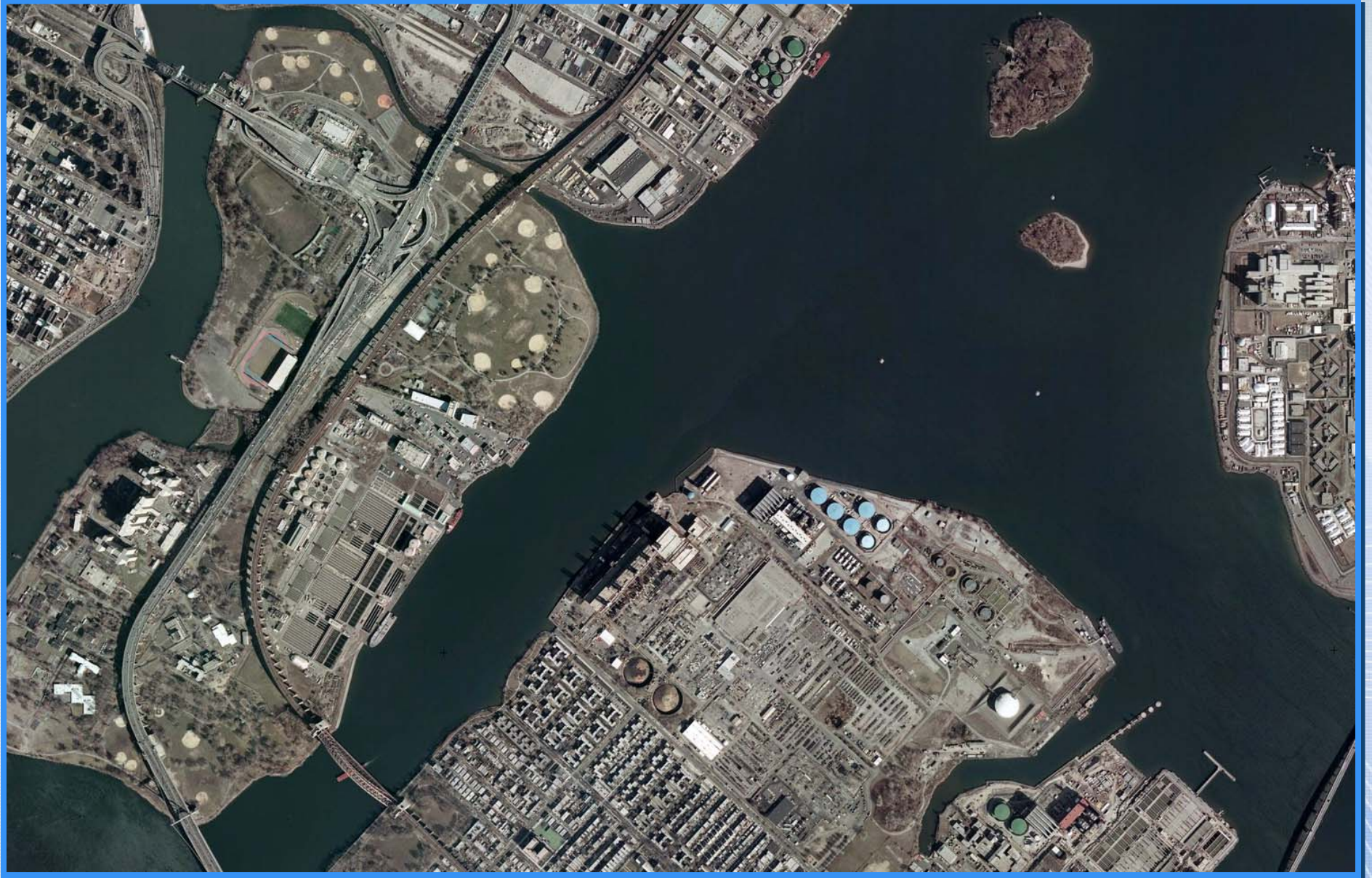
*Michael J. Abrahams, P.E.
March 31, 2009*

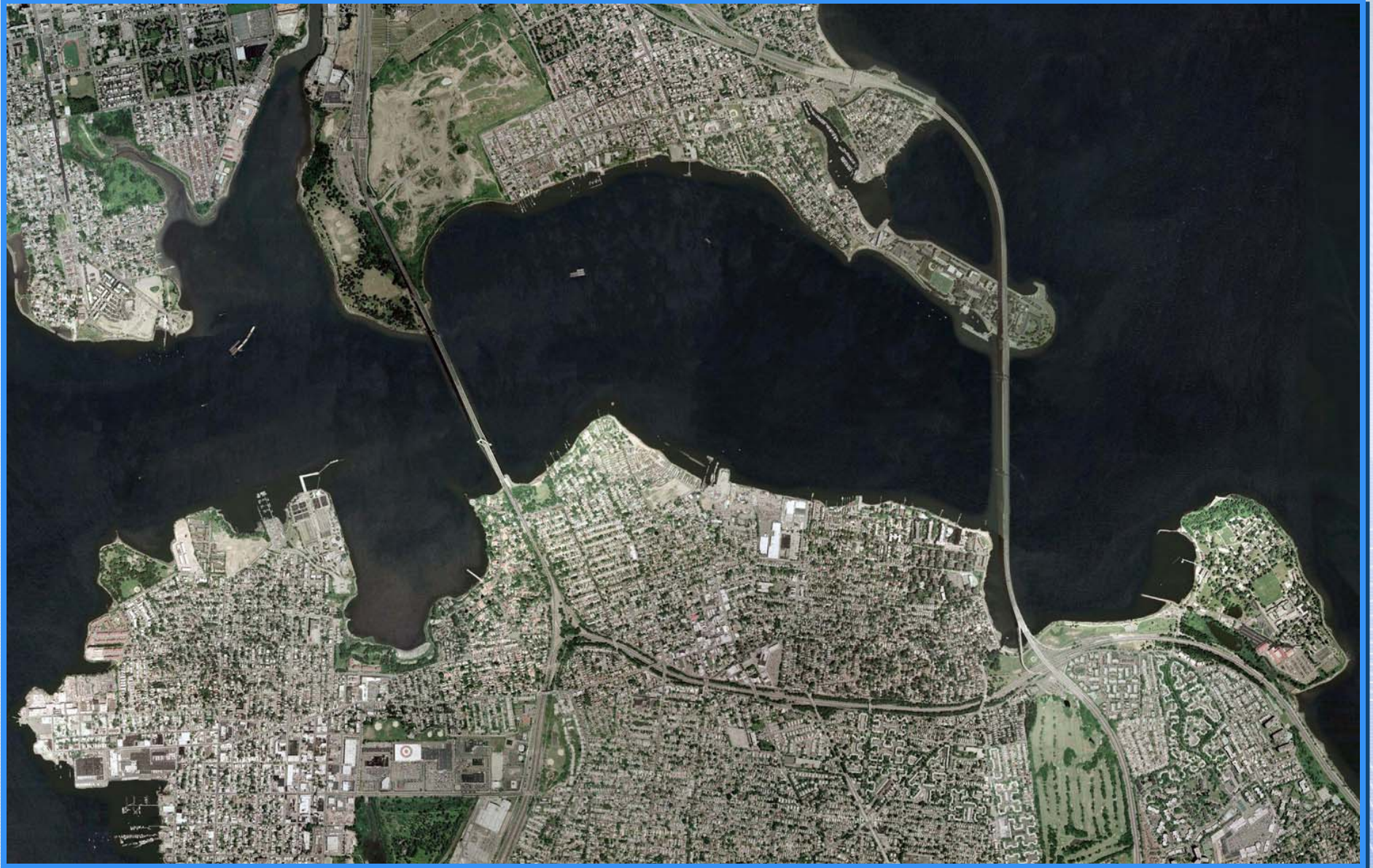


ASCE Met Section Infrastructure Group Seminar 2009

Location of Barrier



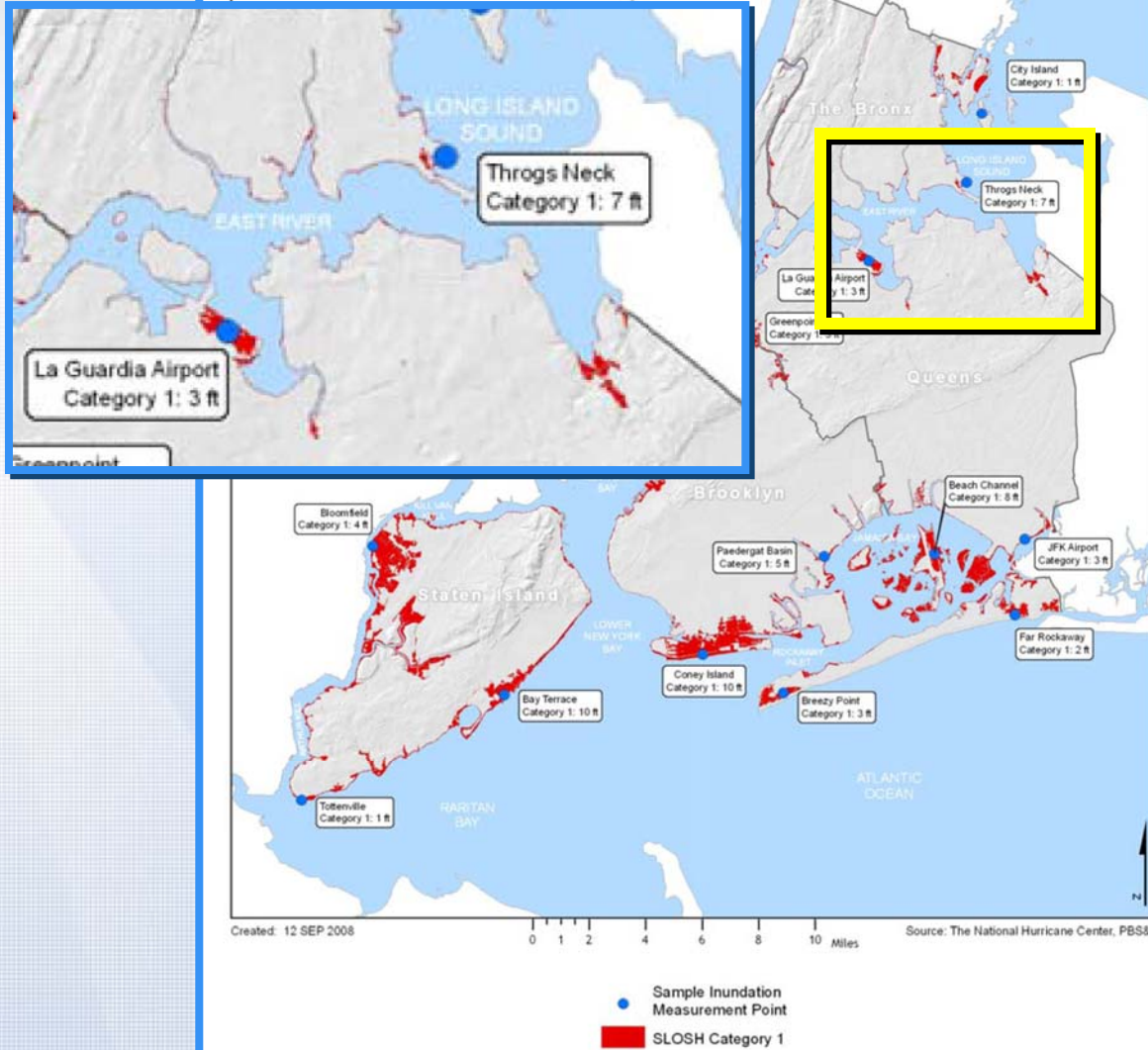






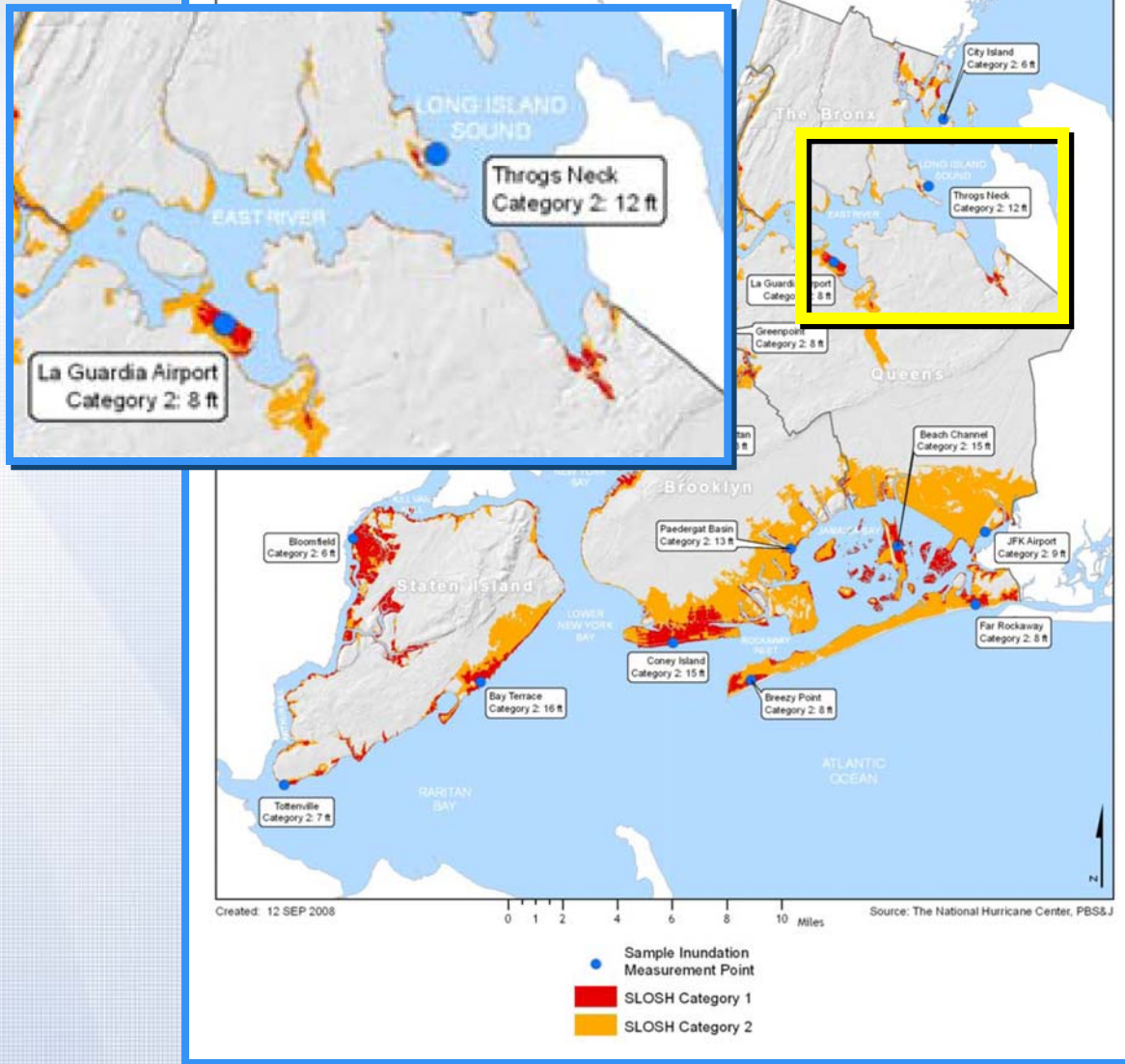
SLOSH Category 1

New York City



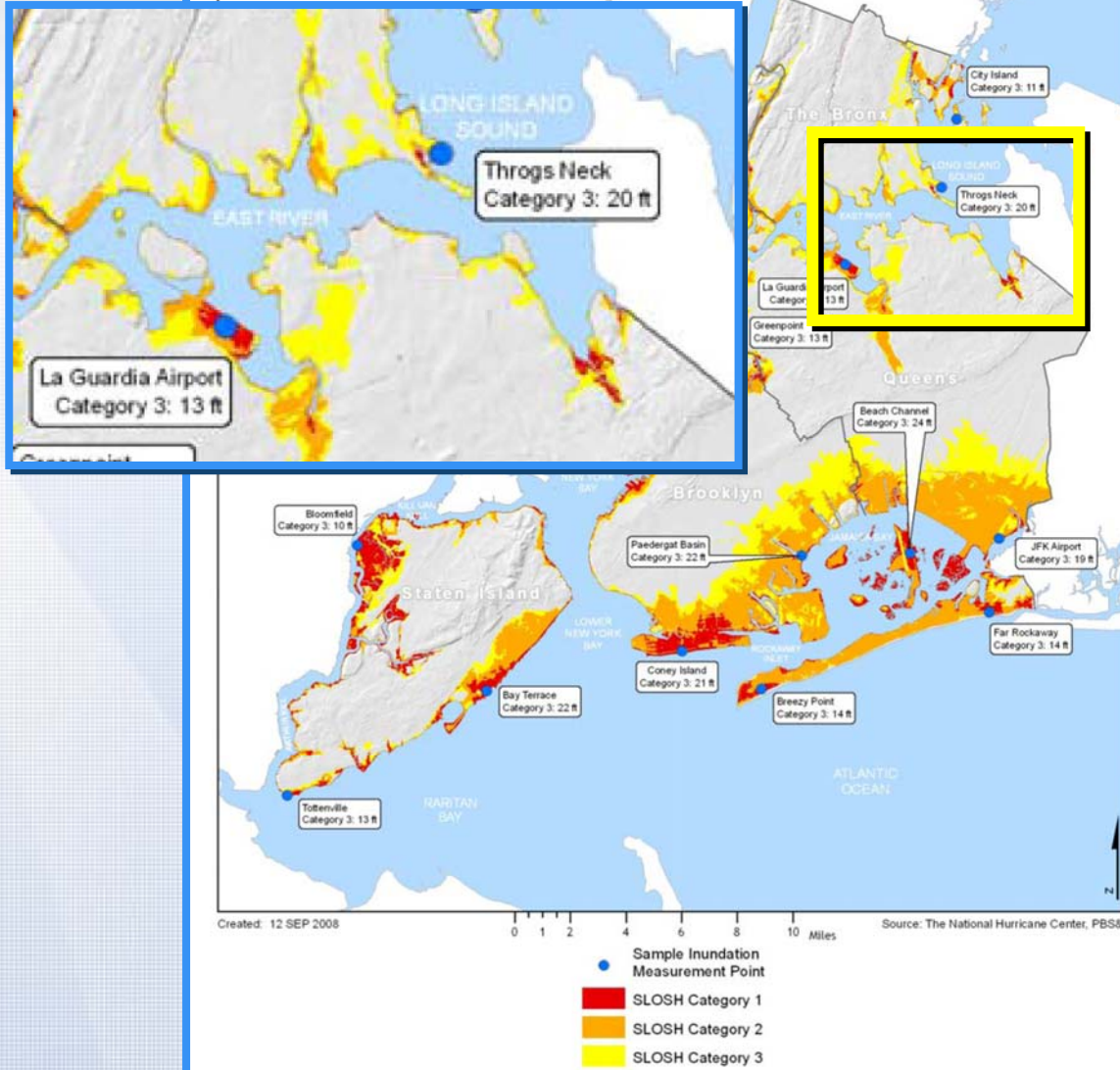
SLOSH Category 2

New York City



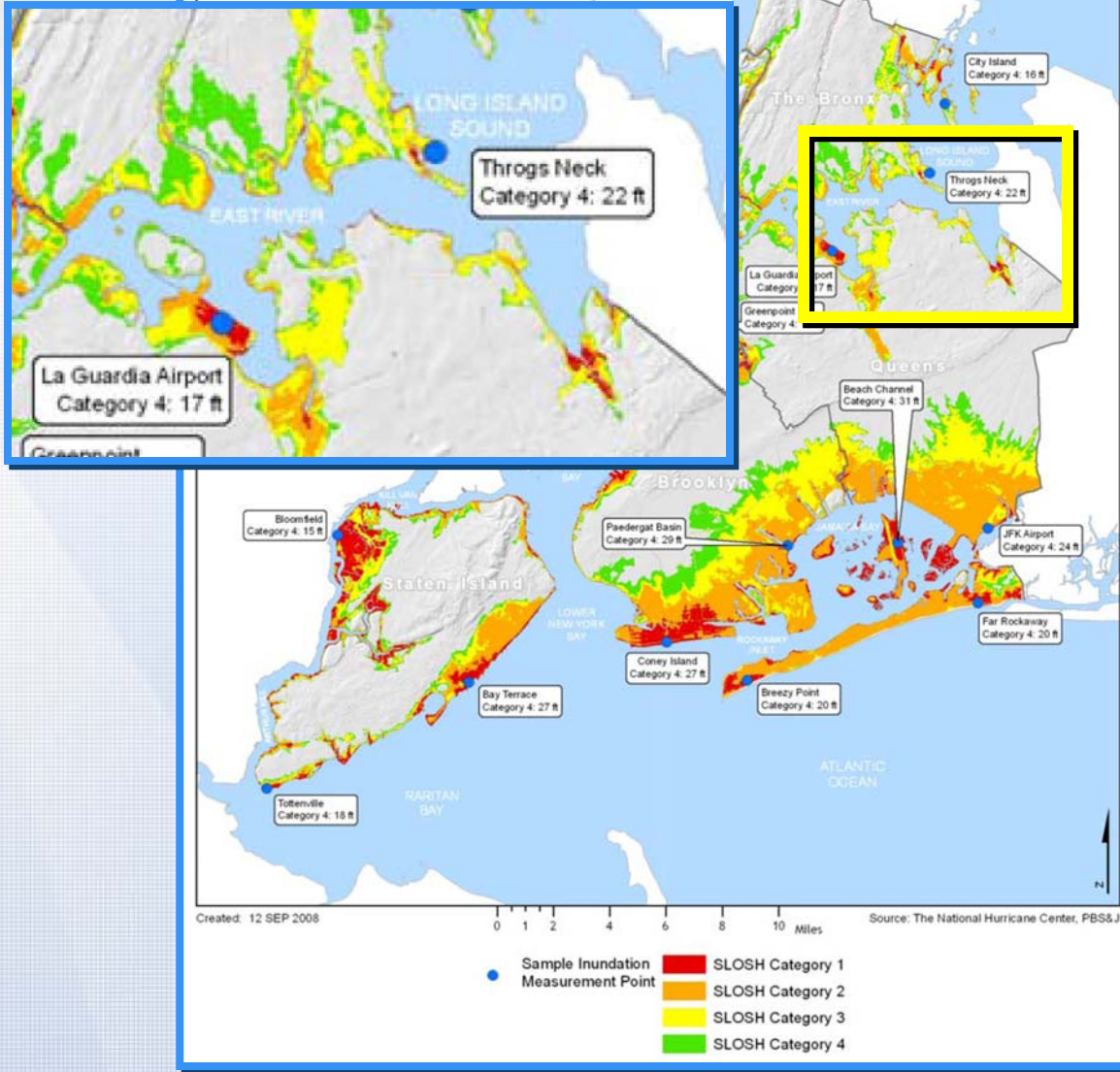
SLOSH Category 3

New York City



SLOSH Category 4

New York City



Expected Sea Level Rise at Throgs Neck Due to a Hurricane

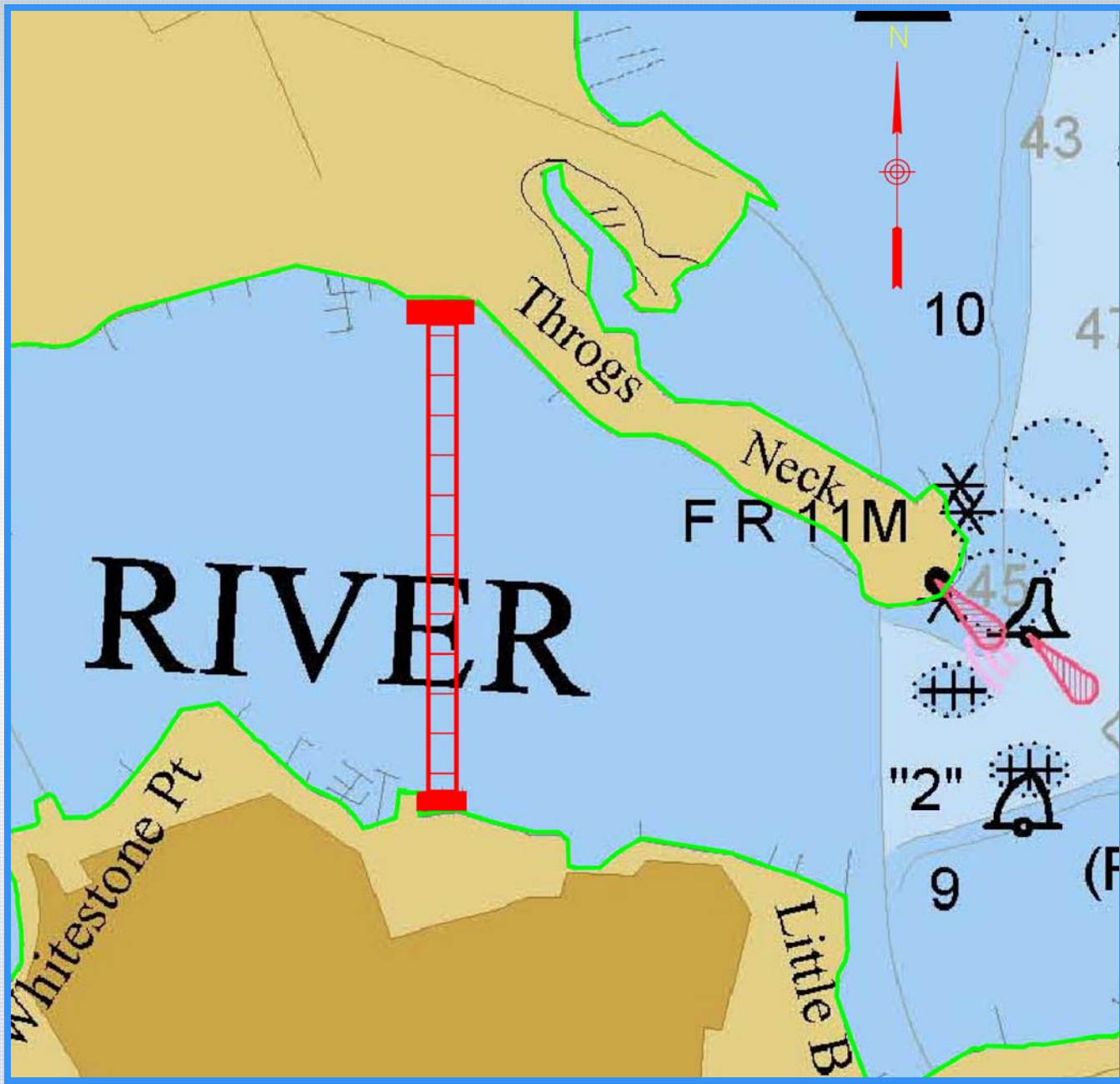
Hurricane Category	Rise (Feet)
1	7
2	12
3	20
4	22
5	<i>Not Reported</i>

Hurricane Category	Return Period (Years)
1	17
2	39
3	68
4	150
5	370

Design Water Rise

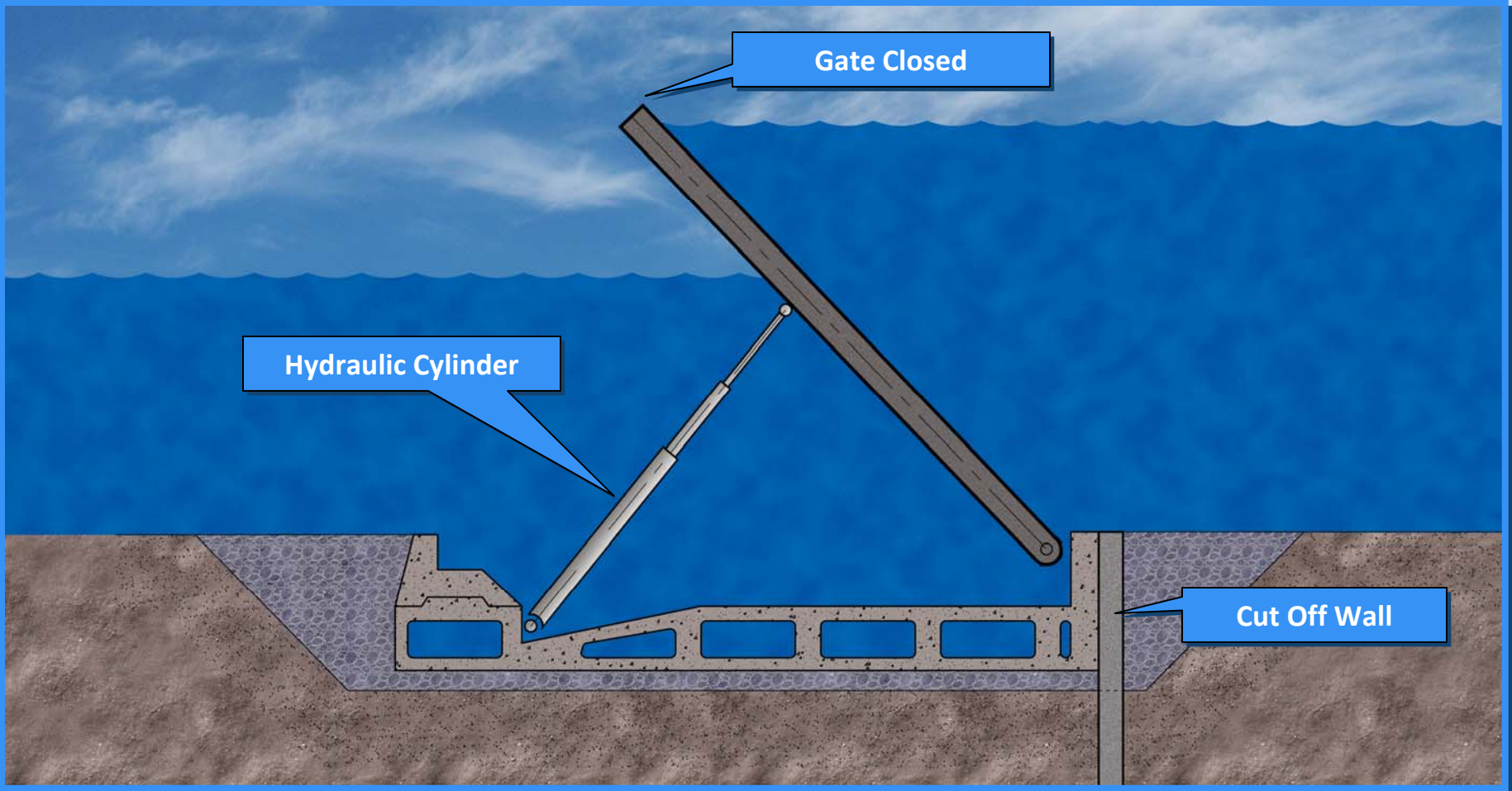
- 22 foot rise due to 150 year storm surge
- 2 foot added rise in water level outside the barrier
- 2 foot increase in the sea level (vs. 41 to 55 inches if rapid ice melt)
- Total water level rise = $22 + 2 + 2 = 26$ ft.

Proposed East River Barrier



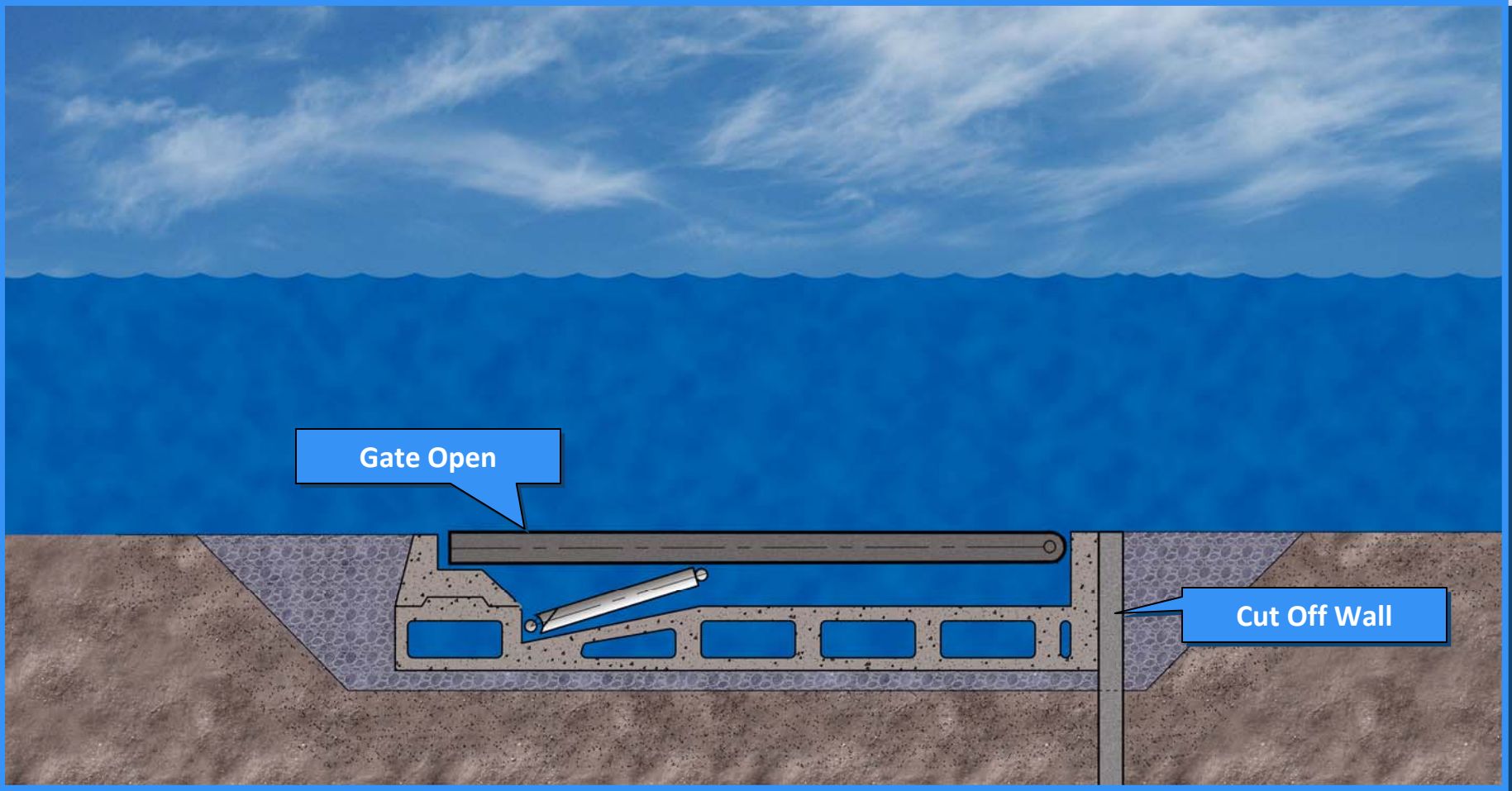
East River

Long Island Sound



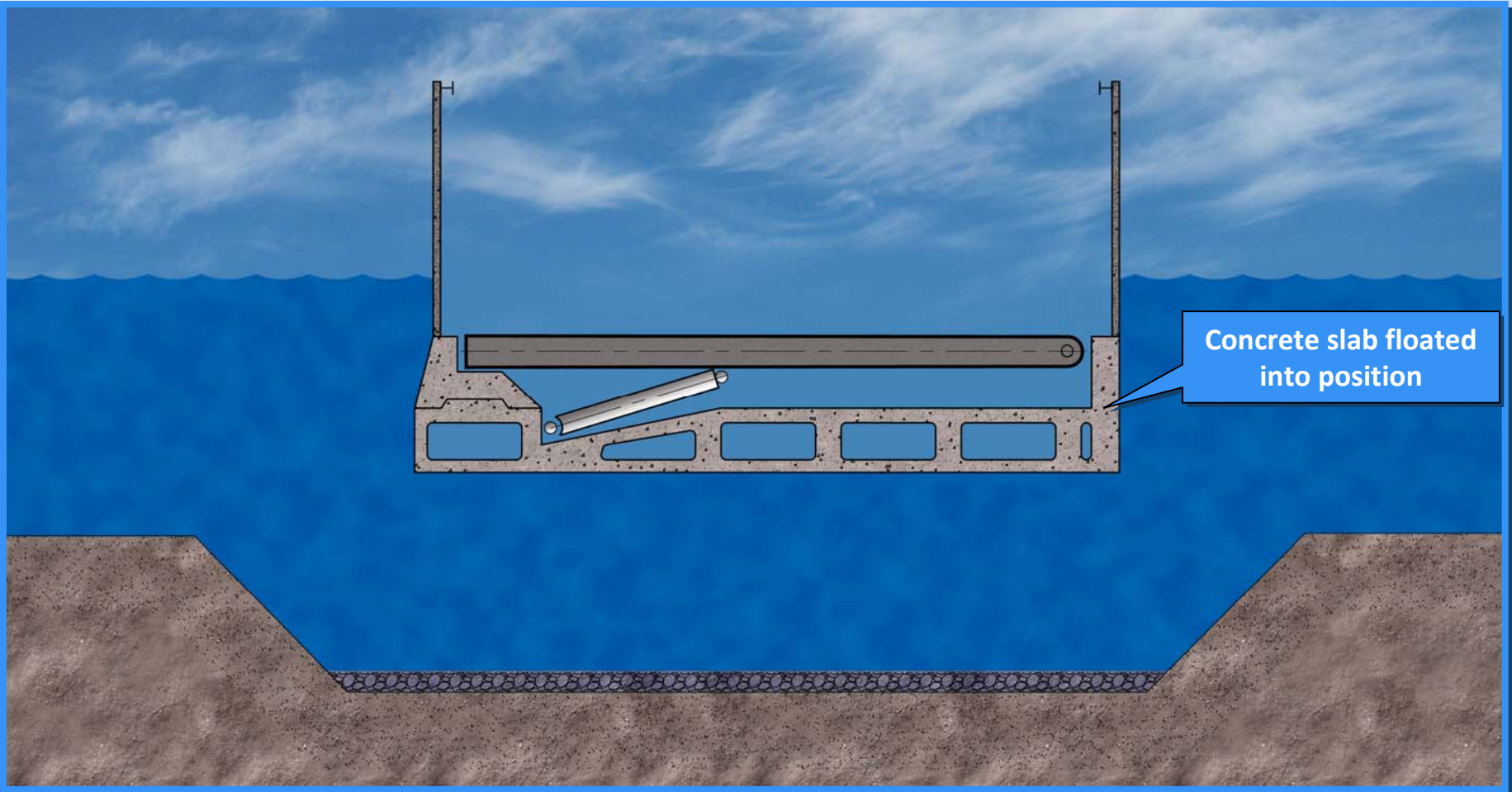
East River

Long Island Sound



East River

Long Island Sound



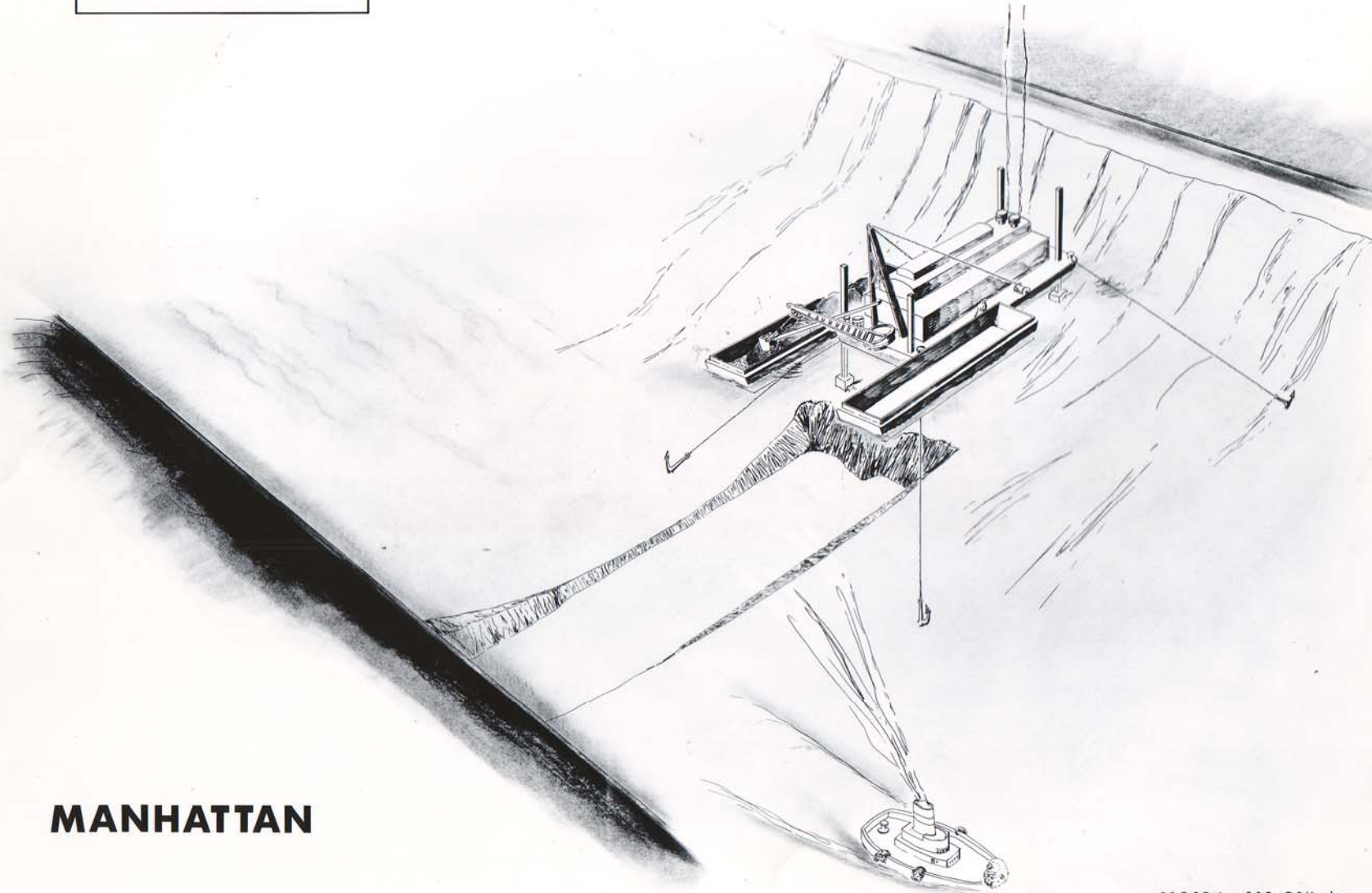
63rd St. Tunnel Construction 1973



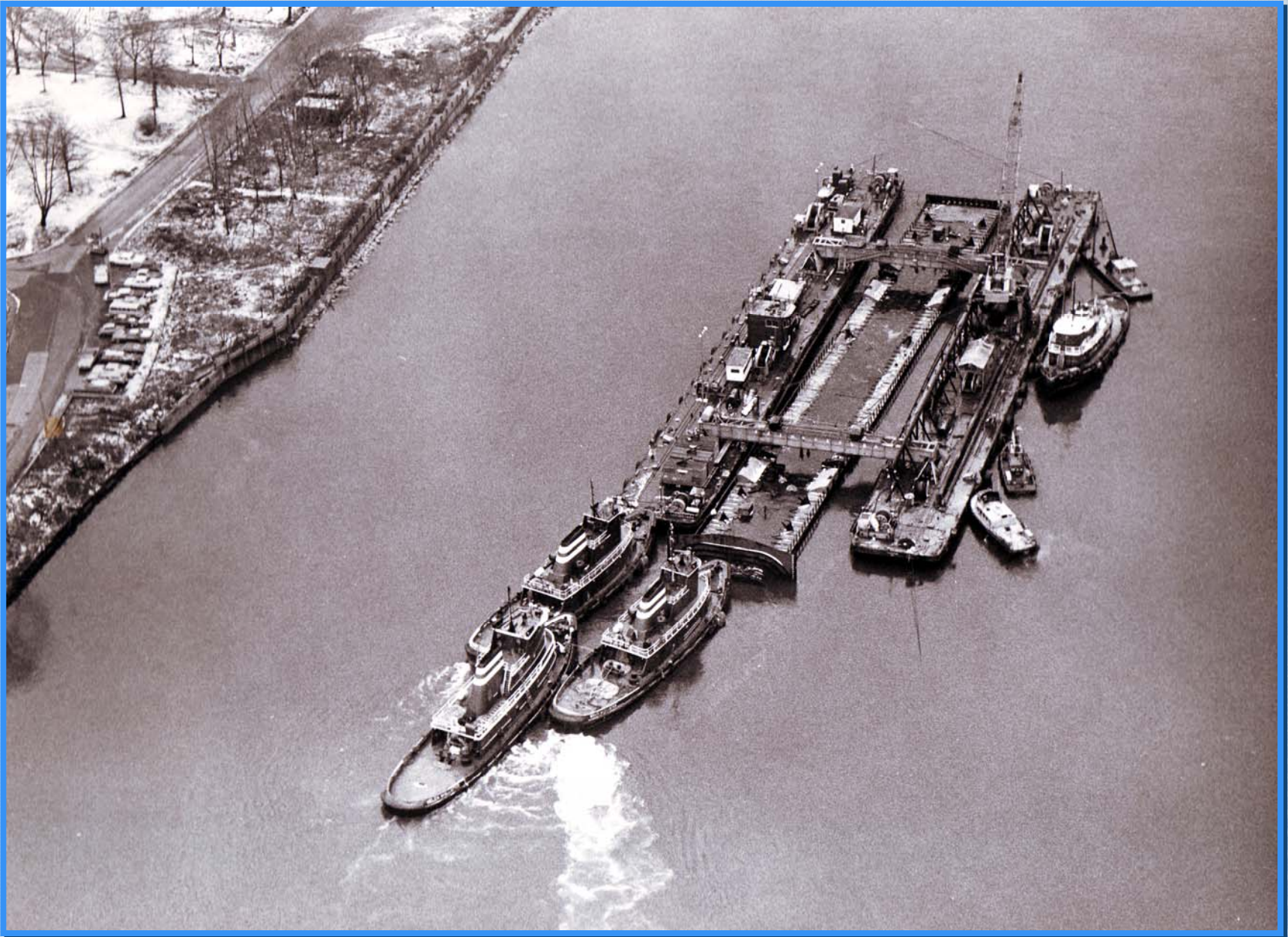
EXCAVATING

WELFARE ISLAND

MANHATTAN



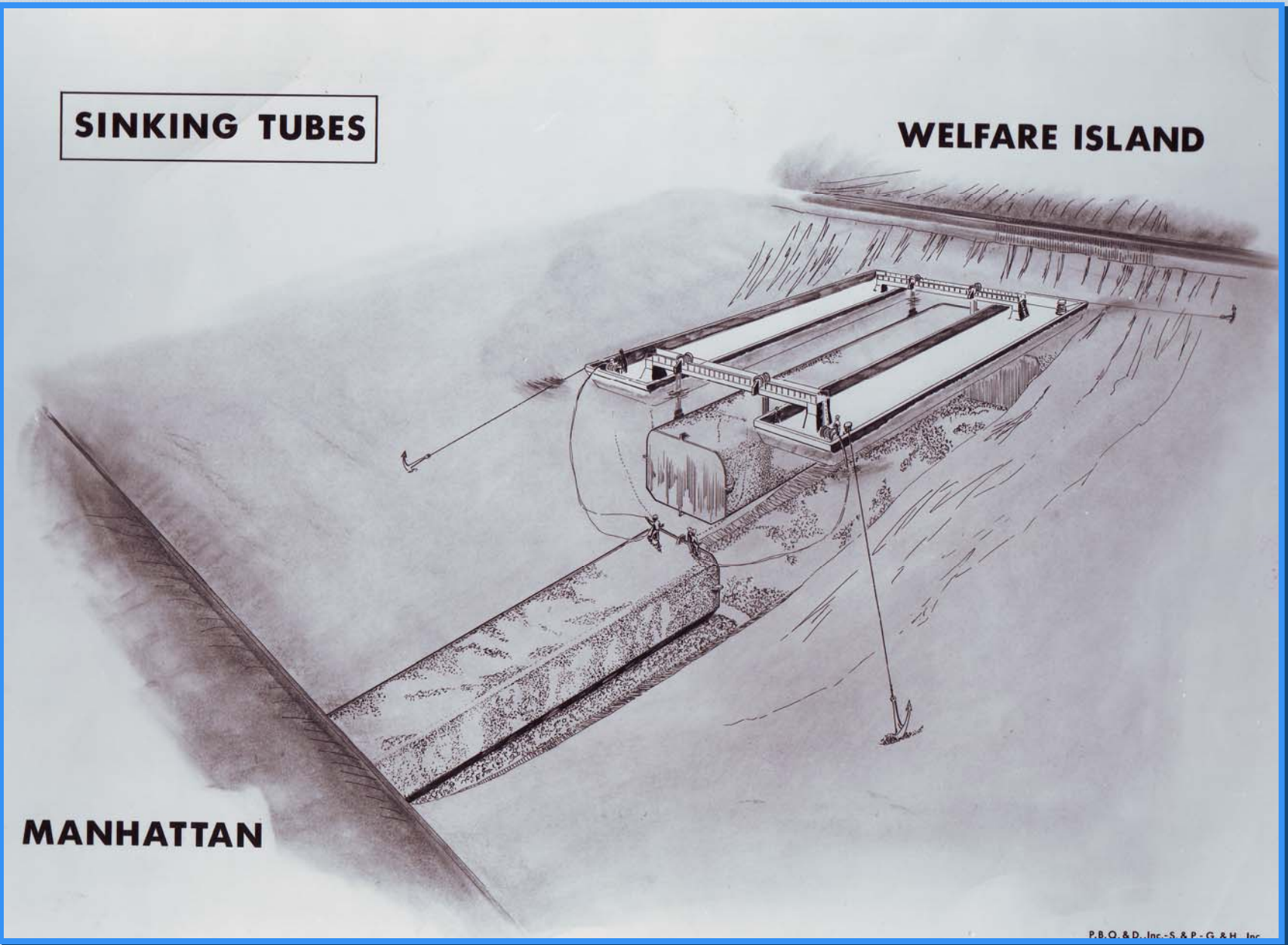
P.B.Q.&D., Inc. - S.&P. - G.&H., Inc.



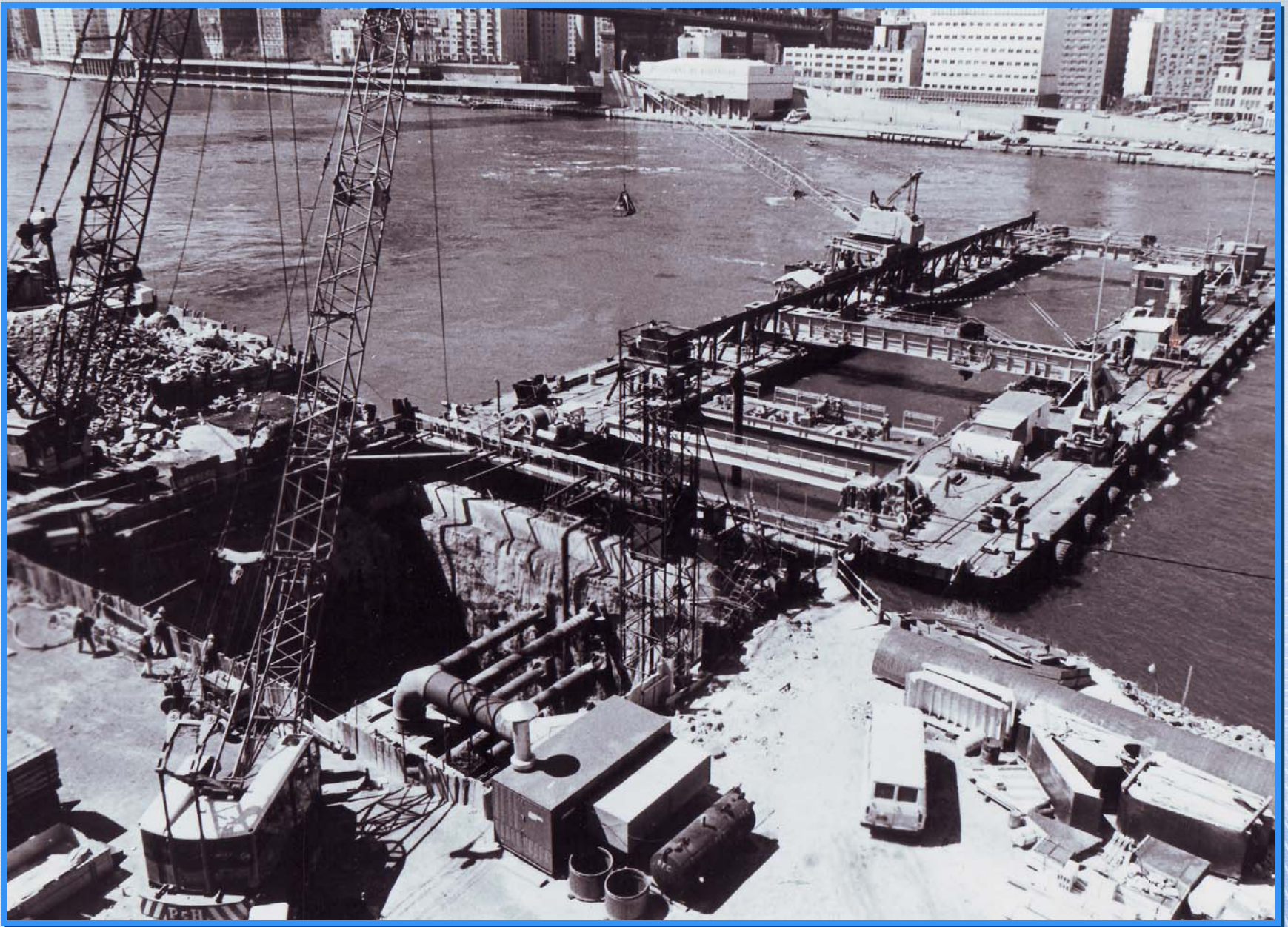
SINKING TUBES

WELFARE ISLAND

MANHATTAN

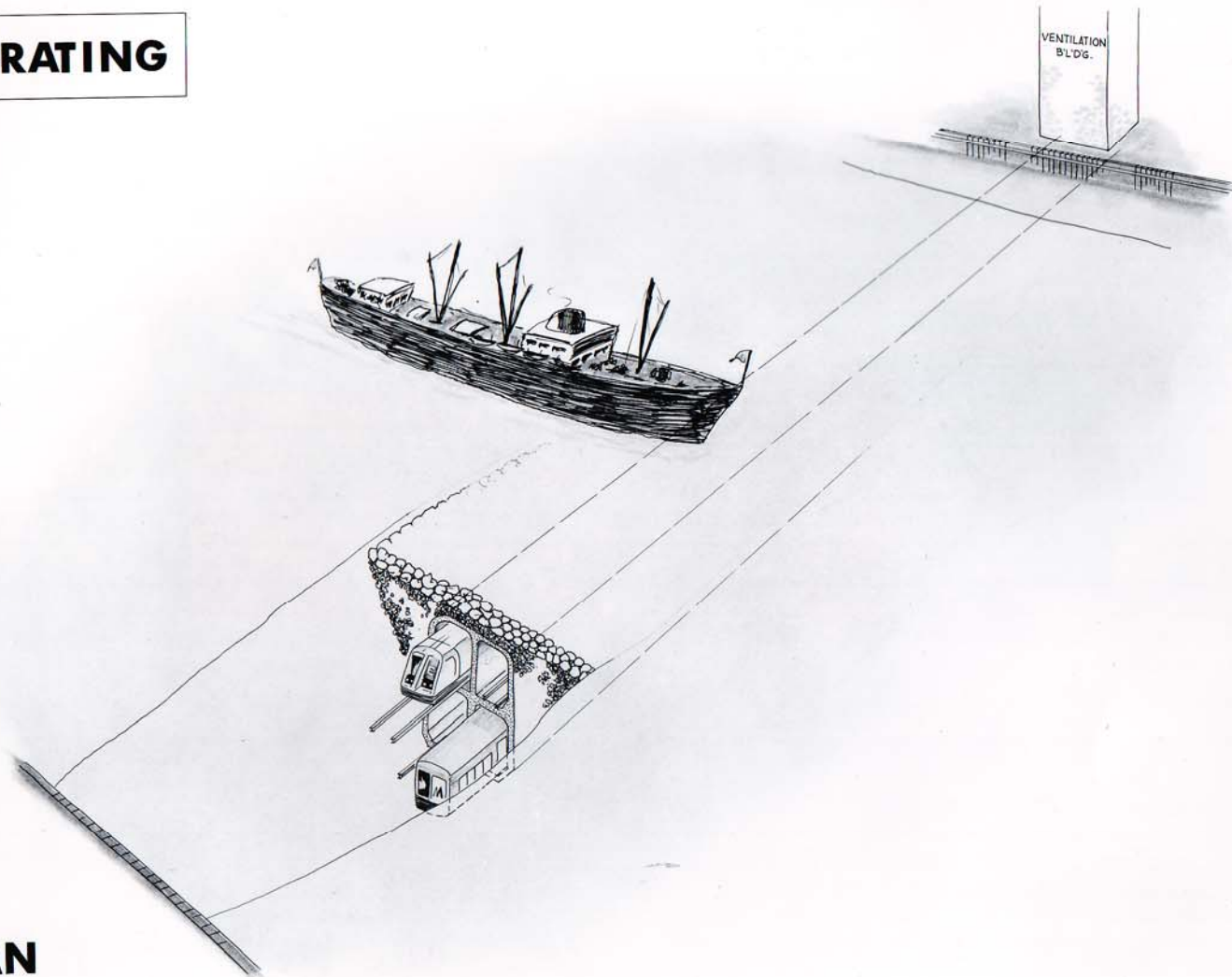


P.B.O.&D., Inc. - S & P - G & H, Inc.



WELFARE ISLAND

OPERATING



MANHATTAN

P.B.Q. & D., Inc. - S & P. - G. & H., Inc.

Braddock Lock and Dam Construction 2003

Braddock Dam Construction



Braddock Dam Construction



Braddock Dam Construction



Braddock Dam Construction



Braddock Dam Construction



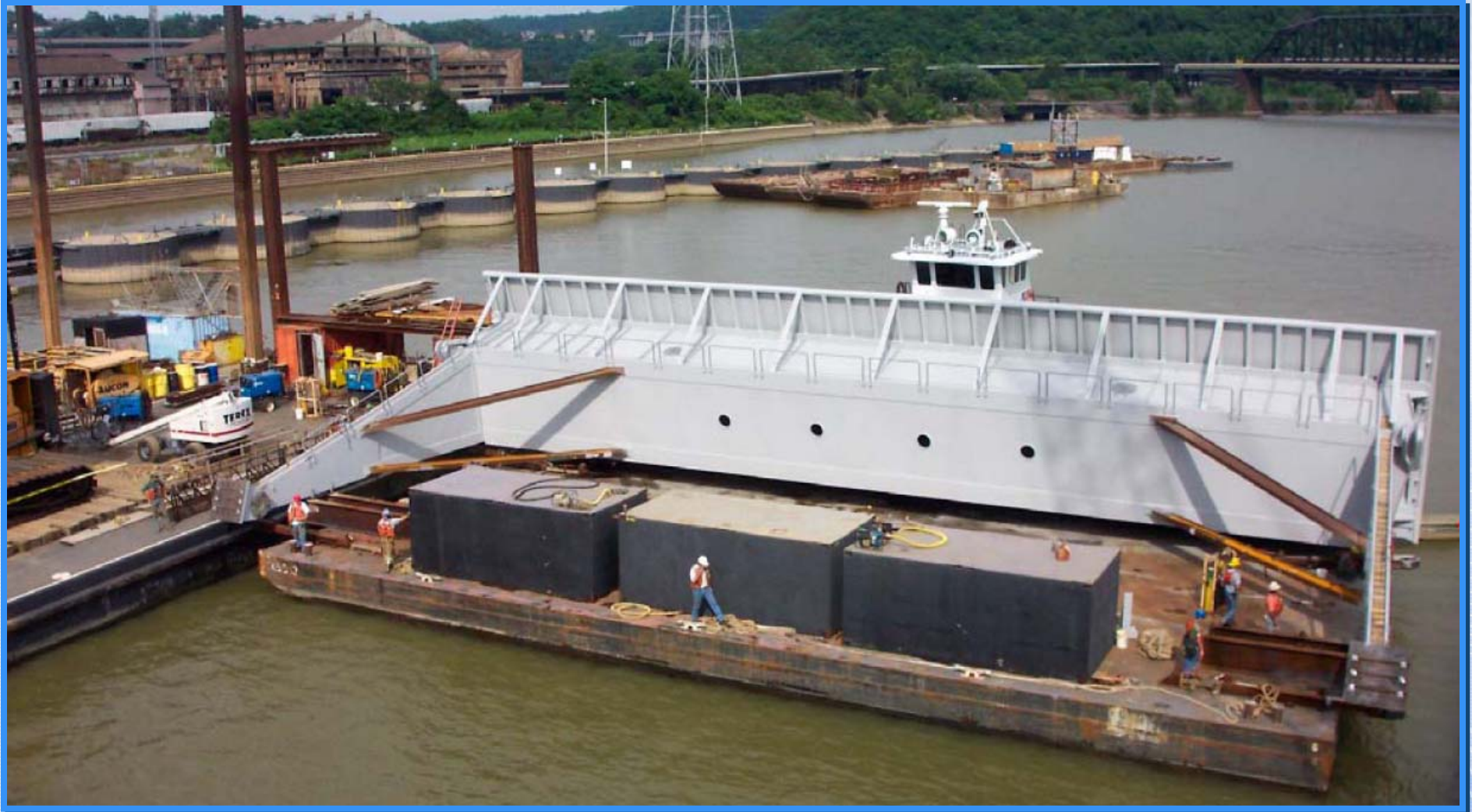
Braddock Dam Construction



Braddock Dam Construction



Braddock Dam Construction





Questions?

63rd St. Tunnel Construction 1973

Braddock Dam Construction

