Challenging Dredge Operation Over Active Utilities in New York Harbor

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HATCH

Presentation Outline

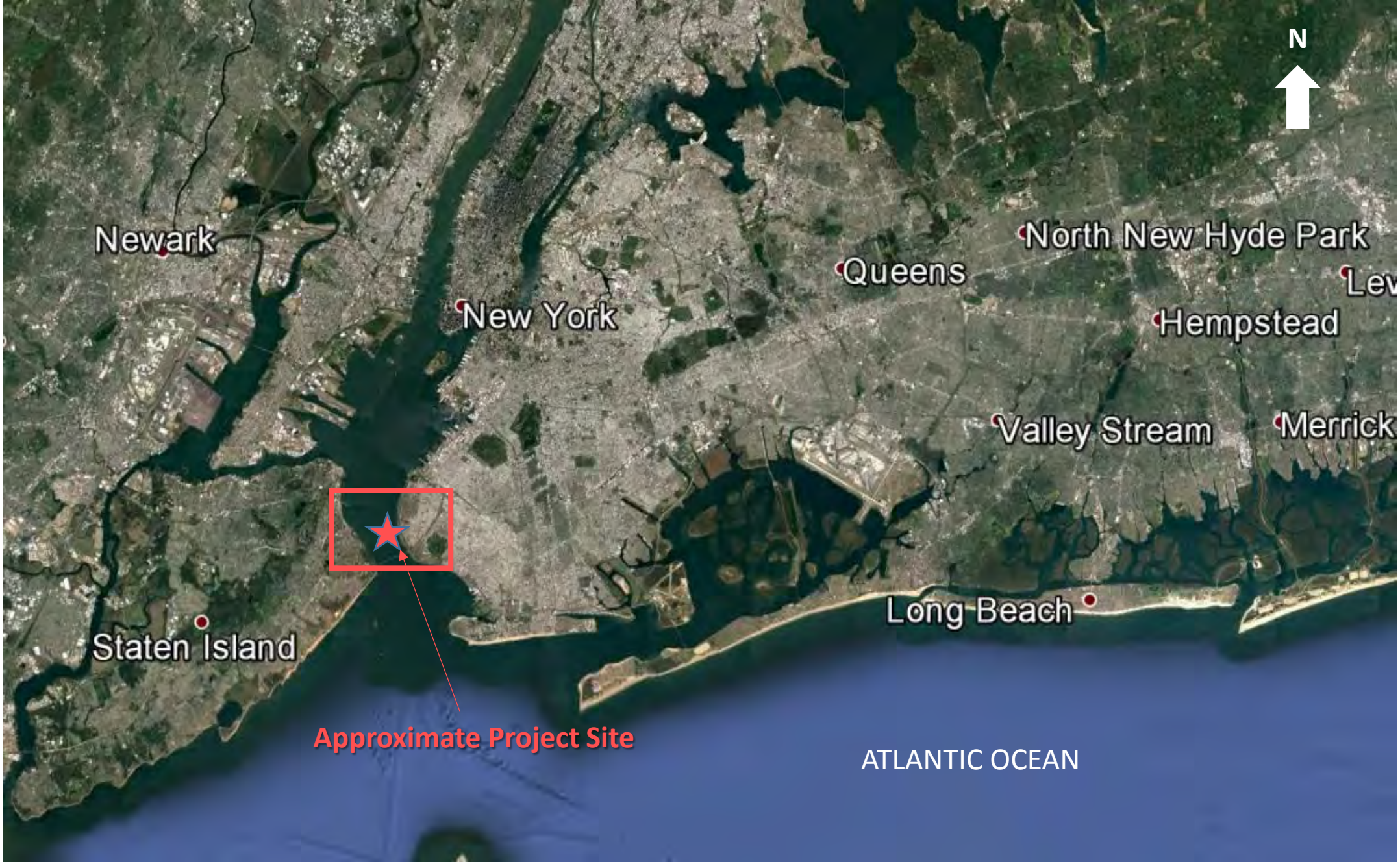
1. Project Purpose and Location;
2. Existing Conditions and Associated Risks;
3. Preparation for Dredging;
4. Observations During Construction;
5. Conclusions.

Project Purpose

The Port of New York and New Jersey combine to form the largest Port on the East Coast and the third largest Port in the United States. As part of the PNYNJ Harbor Deepening Program, initiated in 2004 (ending in 2016) by the United States Army Corps of Engineers (USACE), 20+ dredging projects were completed for the purposes of:

- **Deepening navigable waterways to 50 feet (MLW);**
- **Facilitating beneficial reuse of dredged material;**
- **Rectifying impacts of Hurricane Sandy; and**
- **Establishing new habitat through mitigation.**


Maine
N
Vermont
Lake Ontario
New York
New Hampshire
Lake Erie
Massachusetts
Connecticut
Pennsylvania
Project Site
New Jersey
ATLANTIC OCEAN
Maryland
West Virginia
Virginia
204 mi
Data LDEO-Columbia, NSF, NOAA
© 2017 Google
Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google


N
Newark
New York
Queens
North New Hyde Park
Hempstead
Valley Stream
Merrick
Long Beach
Staten Island
Approximate Project Site
ATLANTIC OCEAN

Existing Conditions and Associated Risks

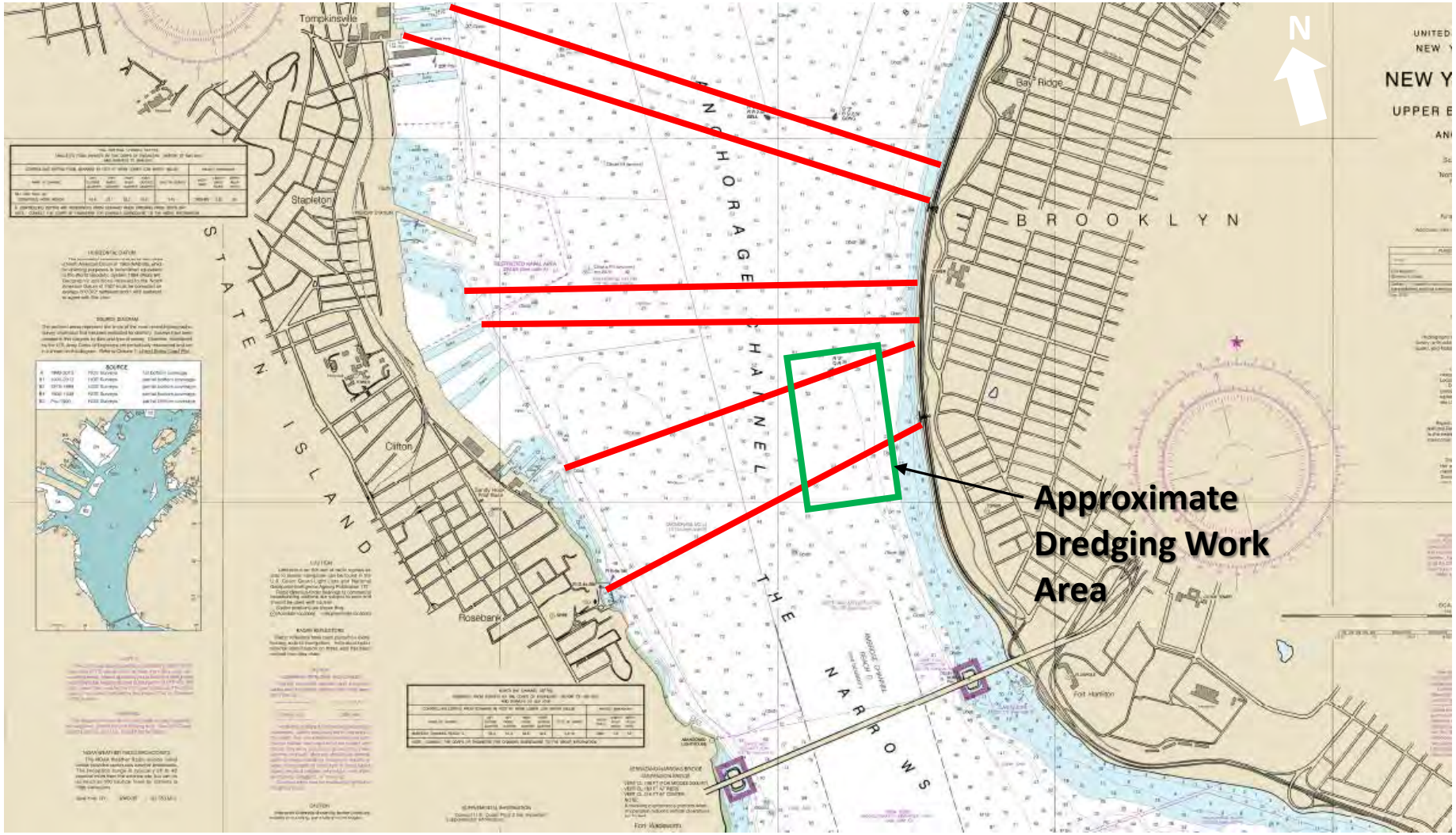


Figure 1. Some of the Designated Utility Crossings (red lines) at New York Harbor Navigation Channel

Existing Conditions and Associated Risks

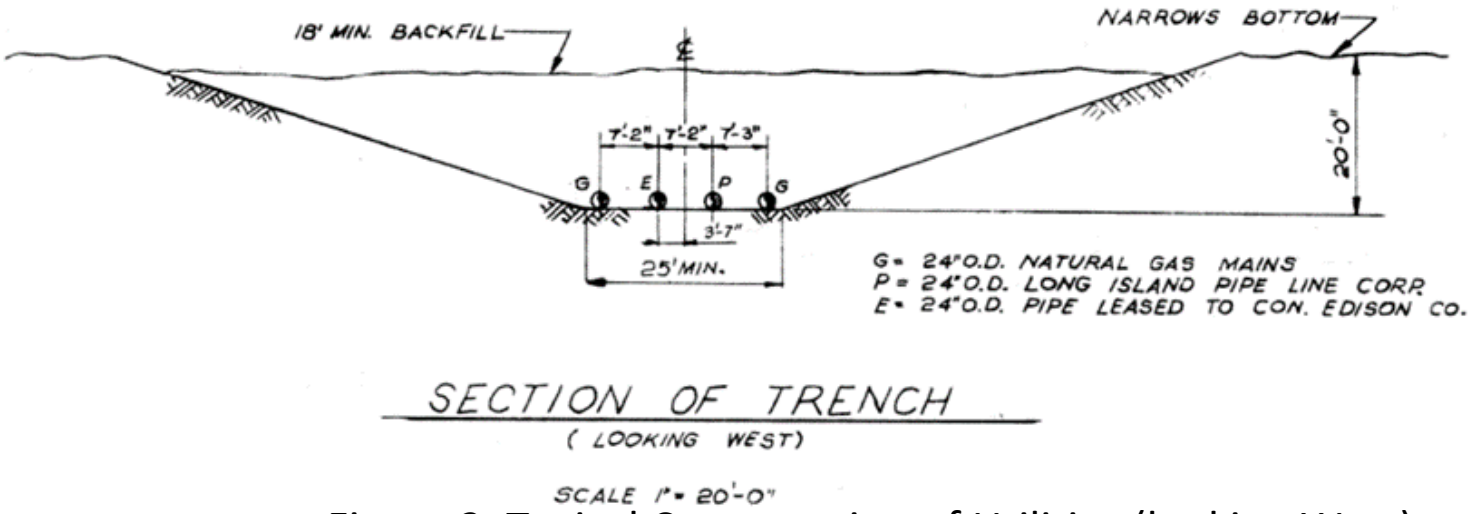


Figure 2. Typical Cross-section of Utilities (looking West)

- Oil & Gas utility line infrastructure installed in 1960's
- Trench originally excavated 6.1 m (20ft) below mudline; backfilled to 5.5 m (18ft)

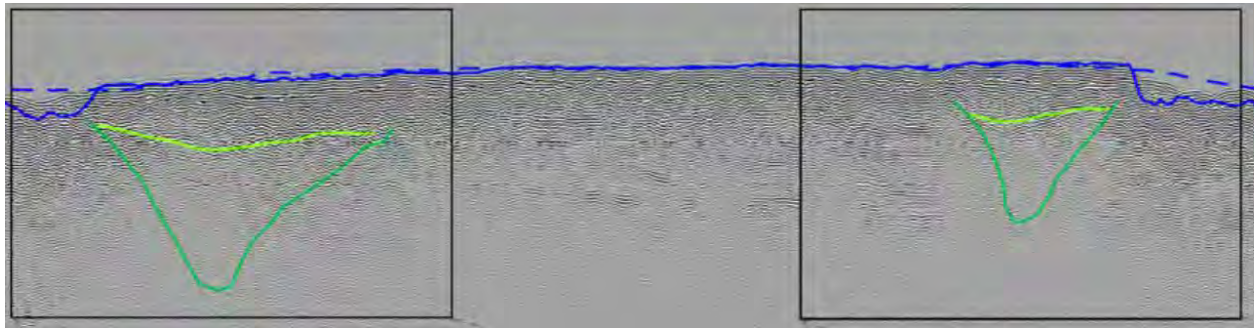


Figure 3. Sub-bottom profile imagery Indicating Utility Trench Location (looking East/West)

- Sub-bottom profiler and magnetometer data was obtained and interpreted.

Existing Conditions and Associated Risks

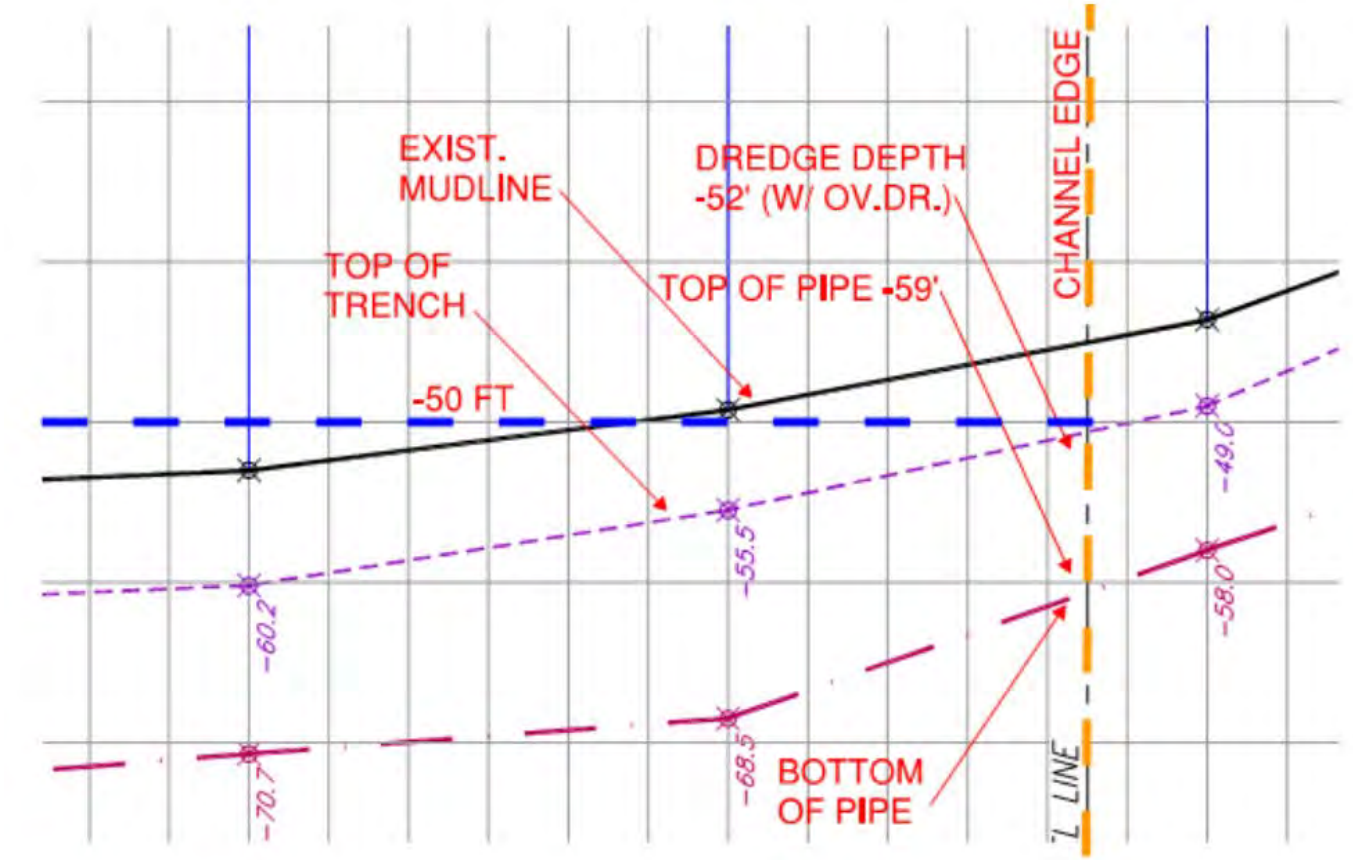


Figure 4. Assessed Location of Utility (looking North)

Existing Conditions and Associated Risks

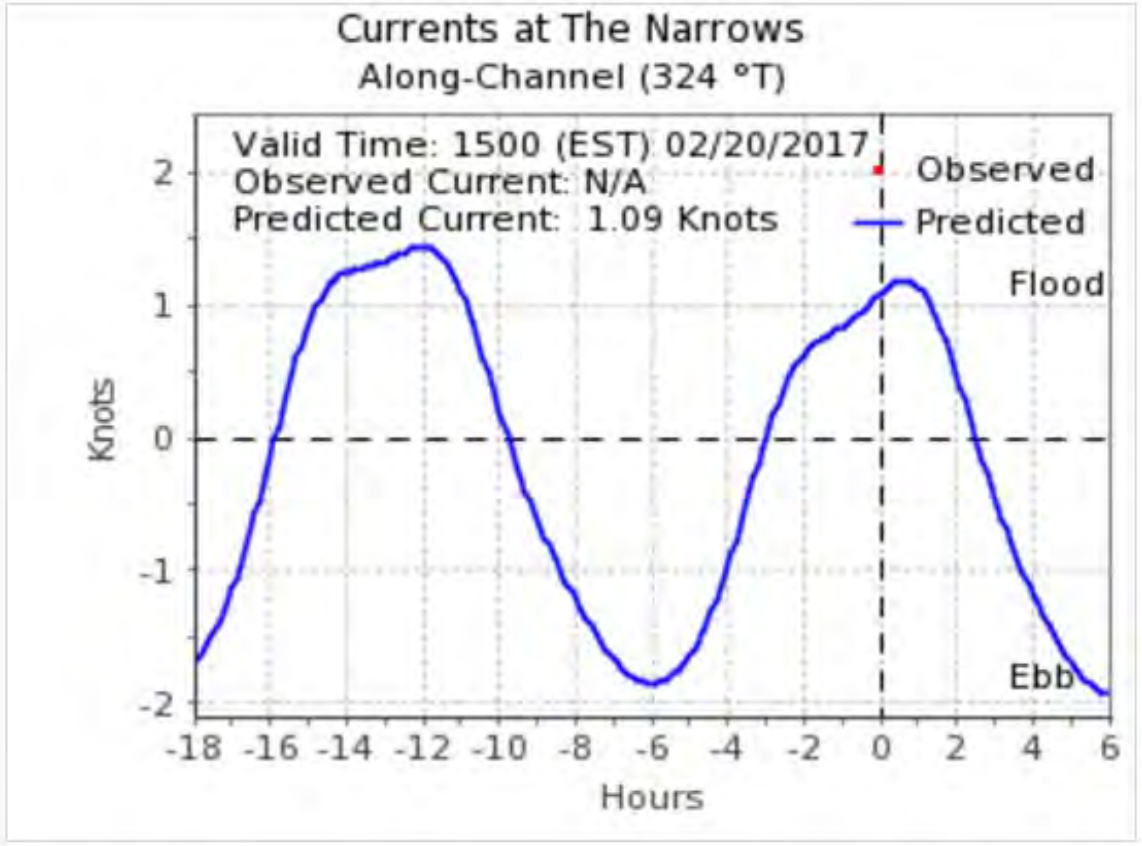


Figure 5. Typical Current Speeds at Project Site

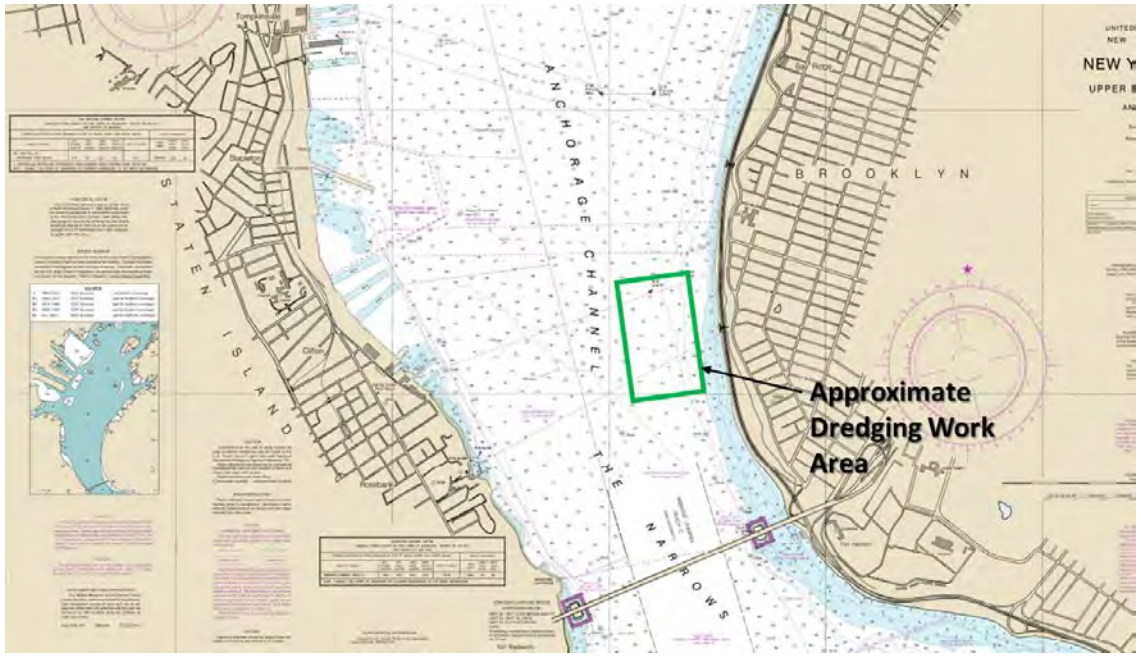


Figure 6. Channel configuration in the vicinity of the dredging work area.

Preparations for Dredging

Initial Planning and Contingency Plans discussions included:

- **Procedures** to **shut-down** and **re-open pipelines**;
- **Timing** and **duration** of **shutdown windows** tolerable by end users;
- **End-user preparation** for pipeline shutdown;
- Points of contact and **communications** protocols **during construction**;
- Dive personnel and **emergency pipeline repair** contractors;
- Details of **dredging equipment and procedures**;

Preparations for Dredging

Horizontal Positioning of the Dredge Plant

- Differential global position system (DGPS);
- Spudding/anchoring restrictions within utility easements;

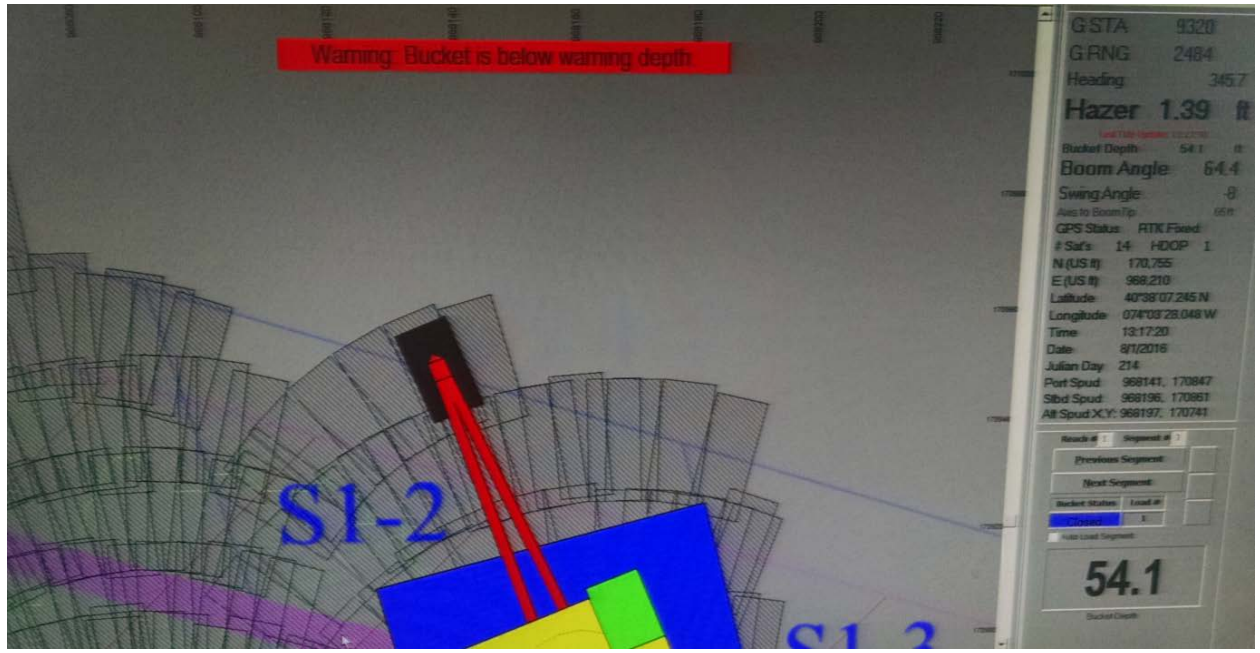


Figure 6. Screen Shot of Contractor's Dredge Control Software

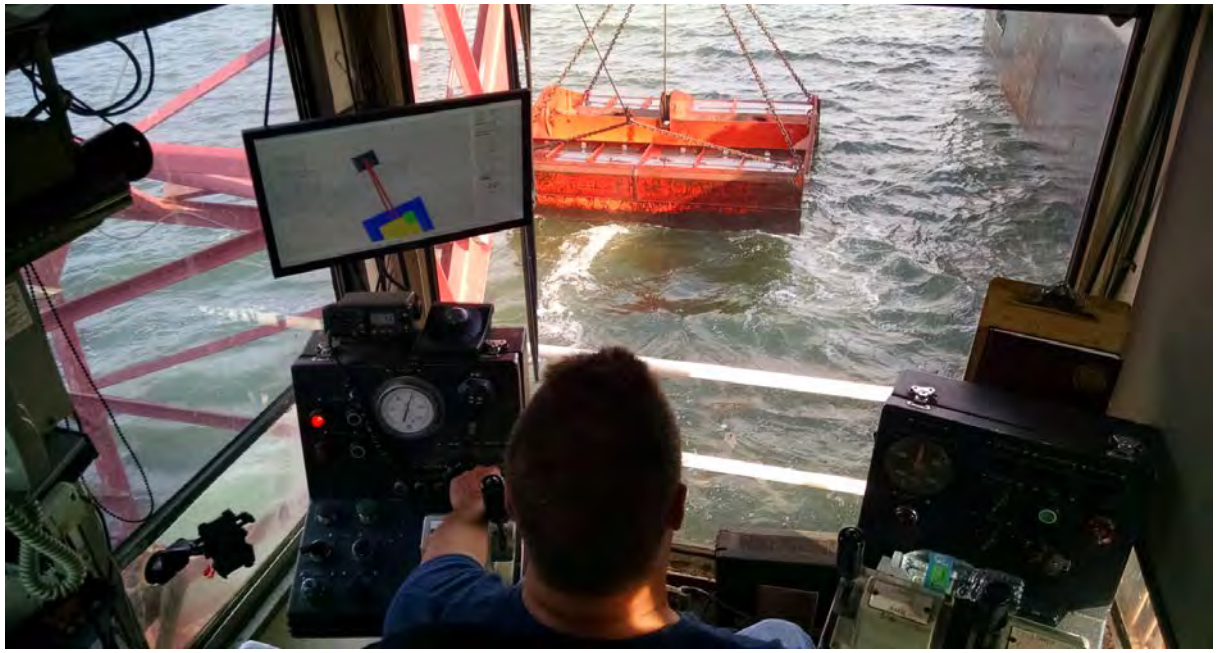


Figure 7. Dredging Operation – View from Operator Cabin

Preparations for Dredging

Dredge Bucket Depth Control

- Manual and electronic depth control measures;
- Visual calibration per each bucket;
- Physical cable markings;
- RTK-GPS tide gauge (electronic) + onshore tide board (visual);
- On-site bathymetric survey vessel.

Figure 8. Dredging Operation in Progress (yellow arrows indicate cable markings for depth control and dredge bucket open/close check)

Observations during Construction

- Communications protocols were effective;
- Strong currents limited the effectiveness of the dredging operation;
- Dredge bucket requirements combined with variable in-situ soils decreased production rates requiring re-dredging;

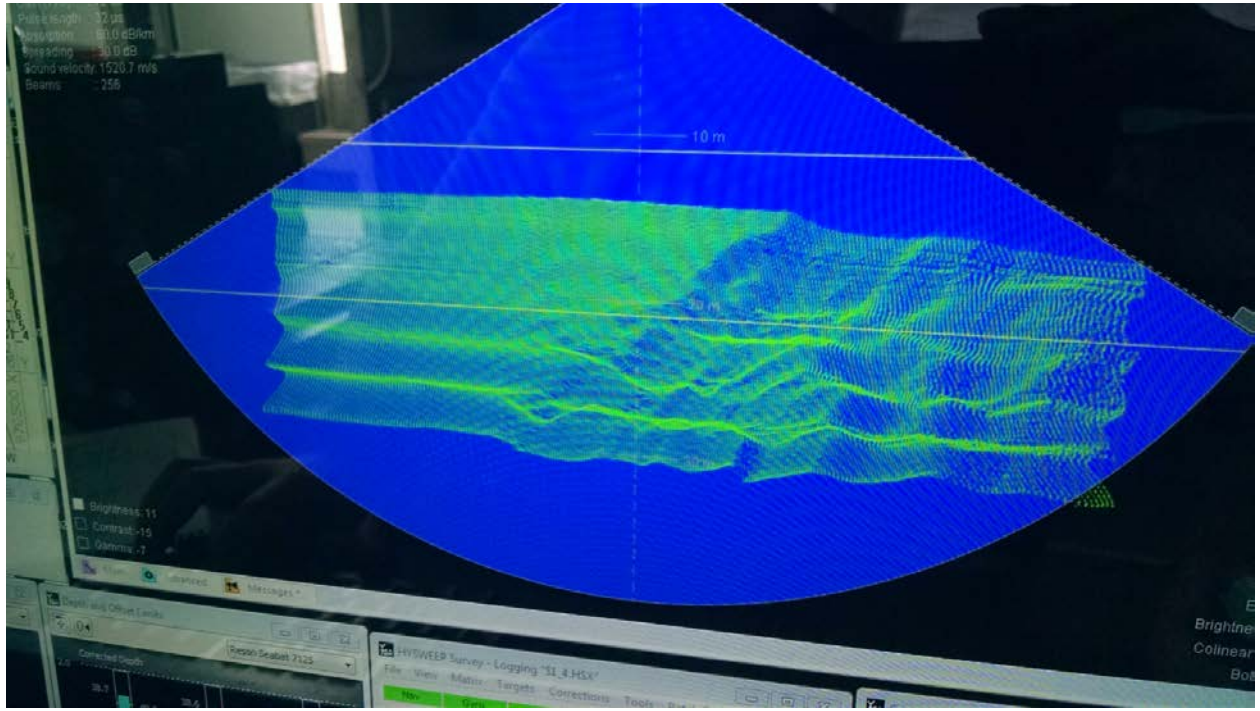


Figure 9. Bathymetry Survey at Site after Dredging

Conclusions

The success of this project was the result of:

- Understanding the **existing site conditions and associated risks**;
- **Stakeholder communications** and **contingency plans**;
- **Redundant systems** (electronic, visual, and physical) to locate the dredge plant and equipment;
- A **Highly Skilled Marine Contractor**!

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Existing Conditions and Associated Risks

- Active utility corridors;
- Unknown elevations of active utility pipelines (Old Drawings, unprocessed date;
- Variable in-situ sediment types;
- Project site physical conditions;
- Vessel traffic.

REMOVE SLIDE