Department of Design and Construction

TECHNO ENGINEERS & CONSTRUCTION MANAGERS | M&S Malick & Scherer, P.C.

Joint Venture

Mallick Engineering, P.C. dba "Techno" | Malick & Scherer, P.C.

6/18/25 Broad Channel Civic Association

HWQ1182SD – East 6th Rd Capital Project Scope Development Study

06/18/2025

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Recap

HWQ1182SD: East 6th Rd CPSD Study

Study was previously presented to Civic Association on 5/22/24. As discussed, this DOT Capital Project Scope Development (CPSD) Study is an early-stage process that involves collection of data and use computer modeling for the goals of:

- Analysis of Probable Cause of Flooding
- Identifying Immediate Mitigation Options
- Providing Options for Future Resiliency

This effort will produce a final report that will inform on a future capital project from DOT and DEP.

Project Updates – Current Status

HWQ1182SD: East 6th Rd CPSD Study

Topographic Survey Completed

- Topographic Survey utilized UAV Aerial Lidar and Conventional Survey
- Utility Survey

Hydraulic Modeling of Existing Base Conditions

- Modeled existing pipe network and drainage structures based on survey and as-built data
- Analyzed tide data from nearby gauging stations
- Modeled connected sewer network with surface flow
- Calibrated model based on field observations
- Analyzed existing system for compliance with current NYCDEP Design Standards
- Completed and Submitted to NYCDEP for Review

Existing Flood Conditions

HWQ1182SD: East 6th Rd CPSD Study

Three types of flooding to address:

1. Tidal Surcharging of the existing drainage system due to High Tide in Jamaica Bay
    - Flooding that occurs within the roadway as a result water backing up through the drainage system as a result of daily tide cycles
        - “Sunny Day Flooding” with no rainfall
2. Overland Flooding from the National Parks Service Wetlands
    - Flooding that occurs over E 6th Rd properties due to high tides in the wetlands
    - Typically coincides with the pipe system surcharging due to tides
    - Could occur independently due to storm related factors:
        - I.e. Wind, waves, etc. that would have less impact on the drainage system
3. Runoff from Rainfall
    - Flooding caused by excessive rainfall and inability for current system to manage the amount of water
    - Also influenced by tidal elevations

Existing Topography

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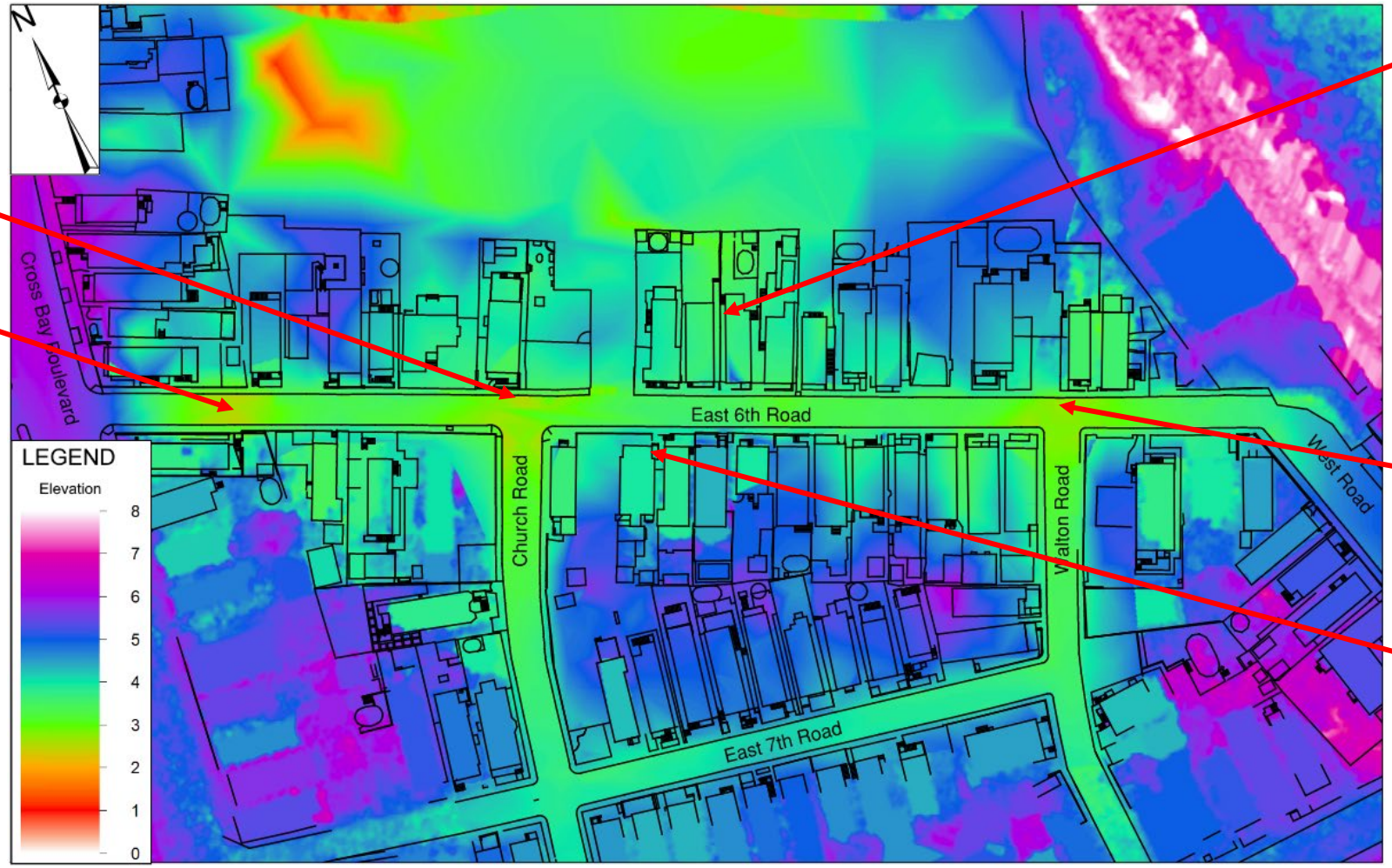

Low Point Elevation: 2.73

Low Point Elevation: 2.78

Ground Elevations
Approximately 4.10+/-

Low Point Elevation: 2.93

Finished Floor: 5.40

Existing Flood Conditions

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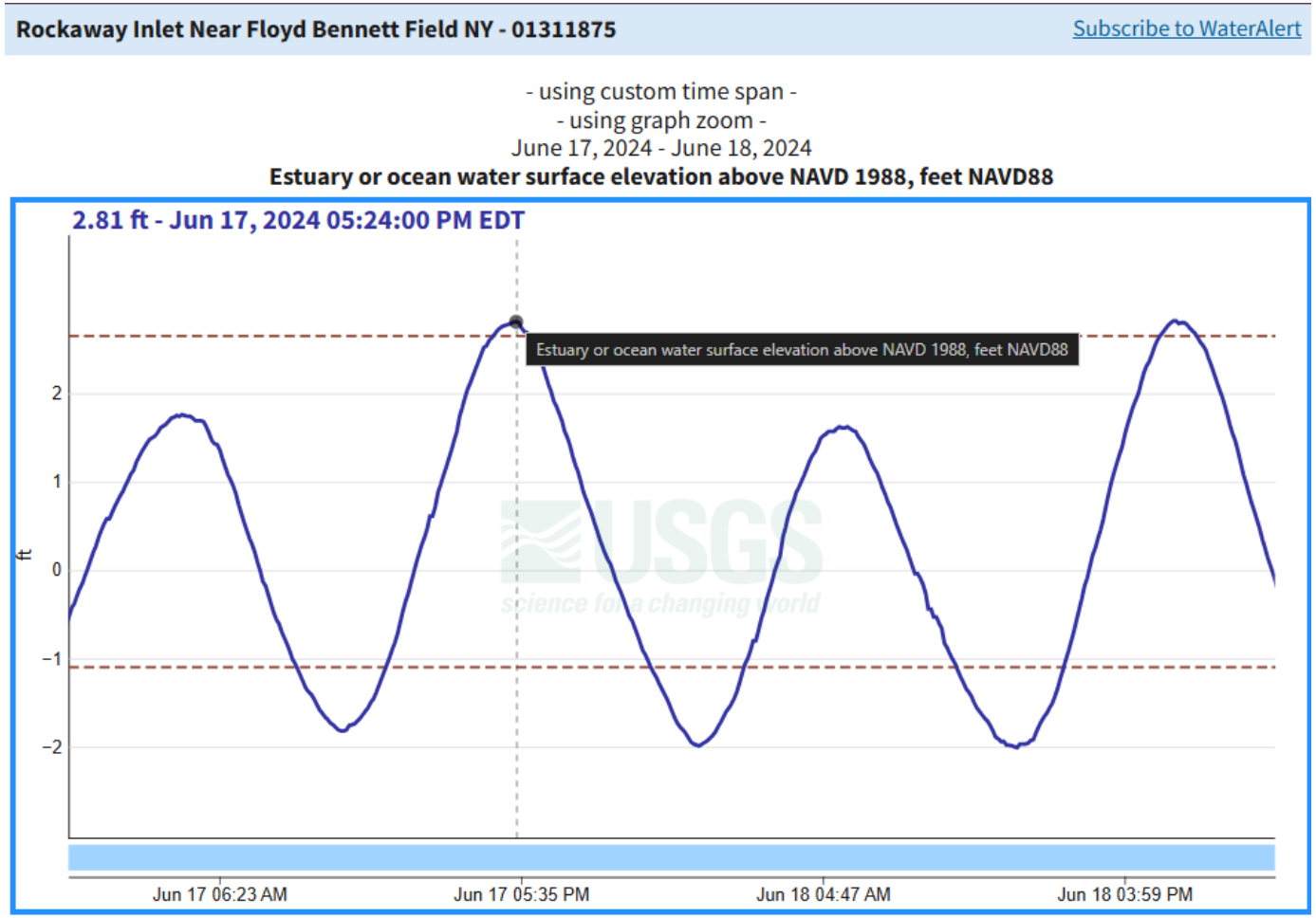

- Performed analysis of surrounding tide gauge data
- Mean Higher High Water (MHHW) – Average height of the higher of the two high tides each day
- Published MHHW is based on measurements from 1982-2001
- MHHW: El. 2.65
- NYCDEP design requires adding 0.44’ to account for sea level rise from 2001 to the present
- Adjusted MHHW: El. 3.09
- Existing Inlet elevation at E 6th Rd and Church Rd is at El. 2.73

Existing Flood Conditions

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1) Tidal surcharge from Jamaica Bay:

- Minimum overflows at tidal elevations above El. 2.73
    - Gauge data suggests 230 occurrences on average a year
- Field observation of flooding at approximately elevation El. 3.5
    - Gauge data suggests 92 occurrences on average a year

Existing Flood Conditions – Tidal Surcharge

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Tidal Surcharge on E 6th Road between Cross Bay Blvd and West Rd for flooding observed in field

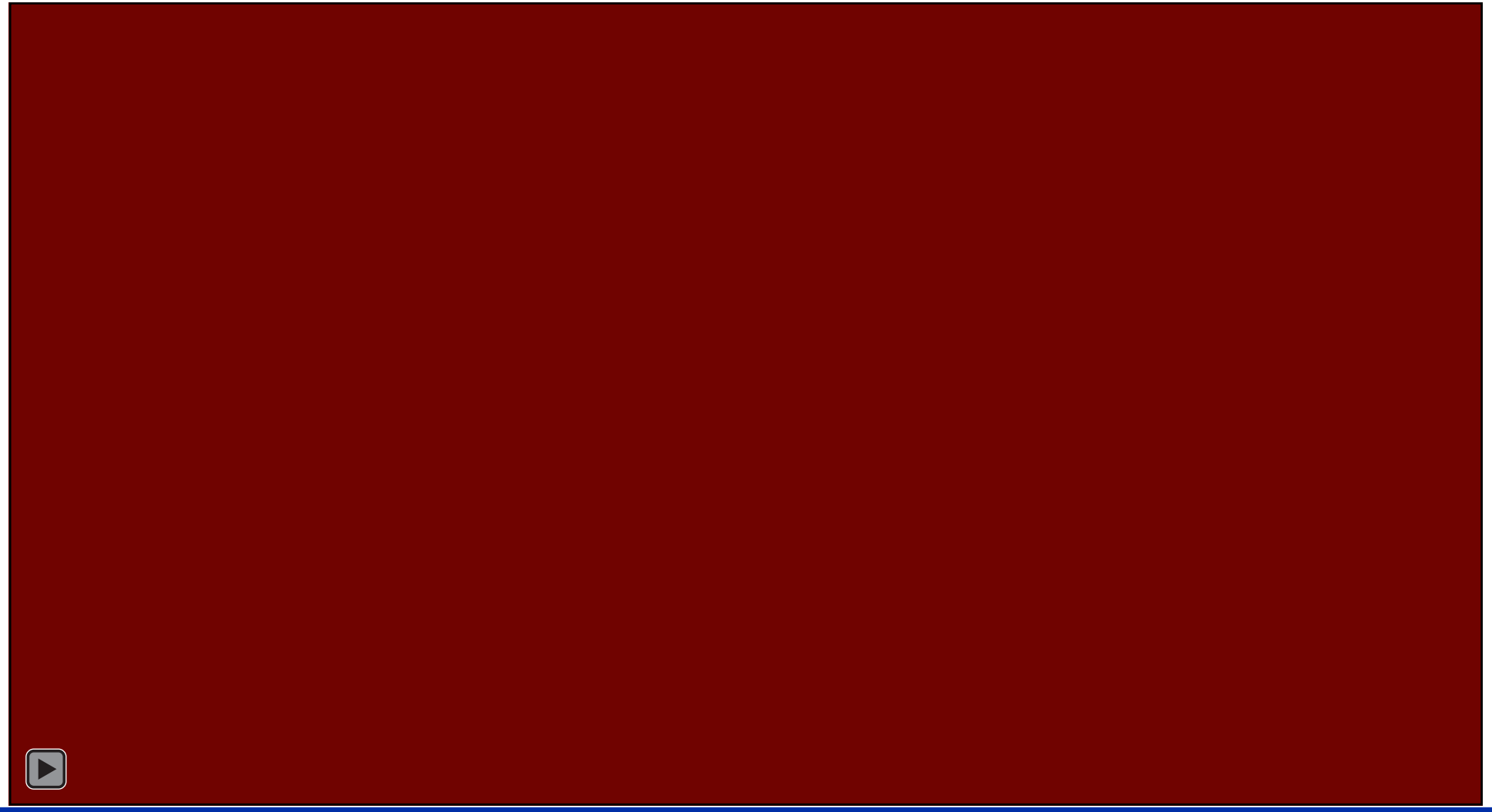
Stormwater Manhole at Cross Bay Blvd. and E 6th Rd.

Outfall at end of West Rd

Existing Flood Conditions – Tidal Surcharge

HWQ1182SD: East 6th Rd CPSD Study

Tidal Surcharge on E 6th Road between Cross Bay Blvd and West Rd for flooding observed in field



Existing Flood Conditions – Overland Flooding

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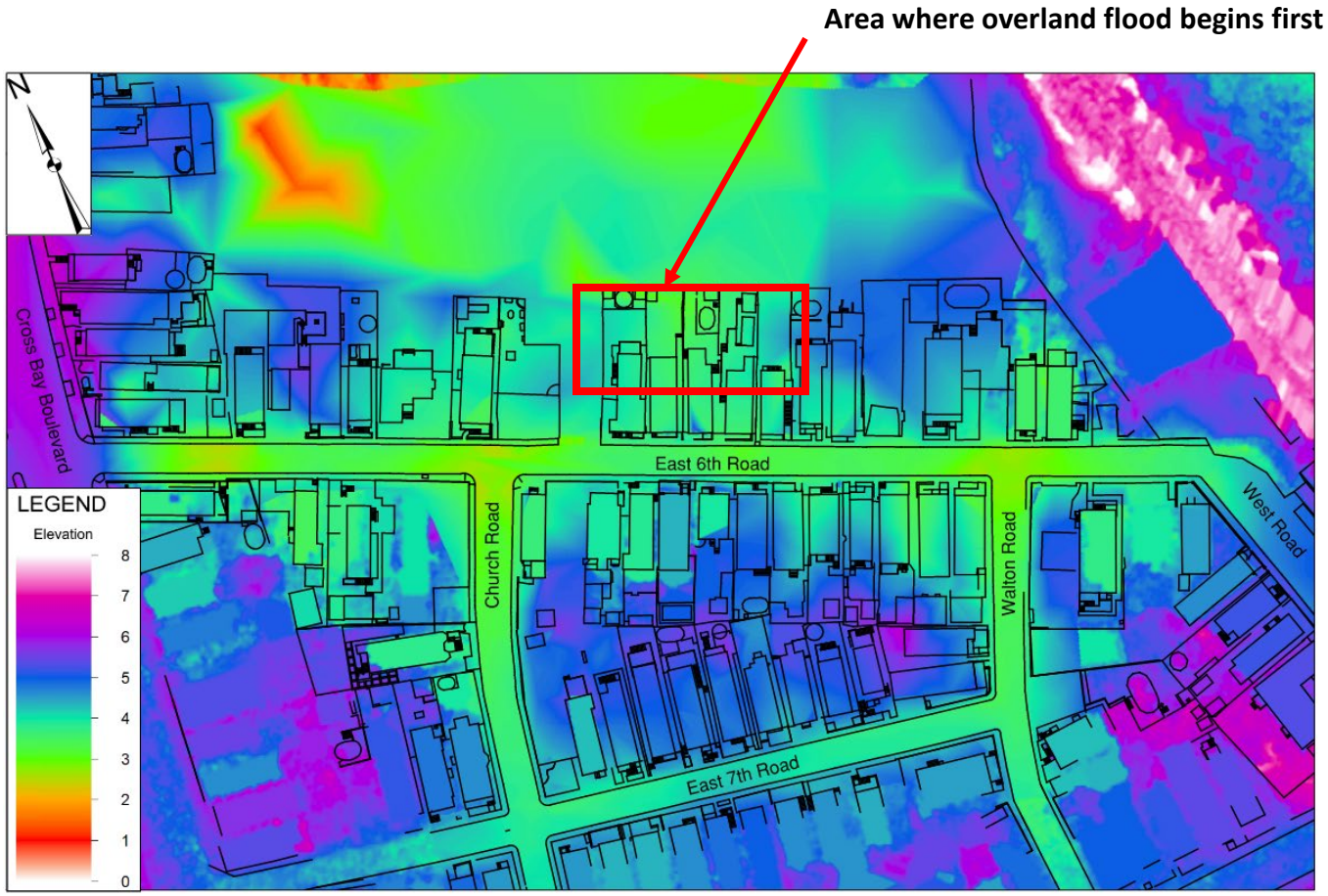


2) Overland flooding from the wetlands:

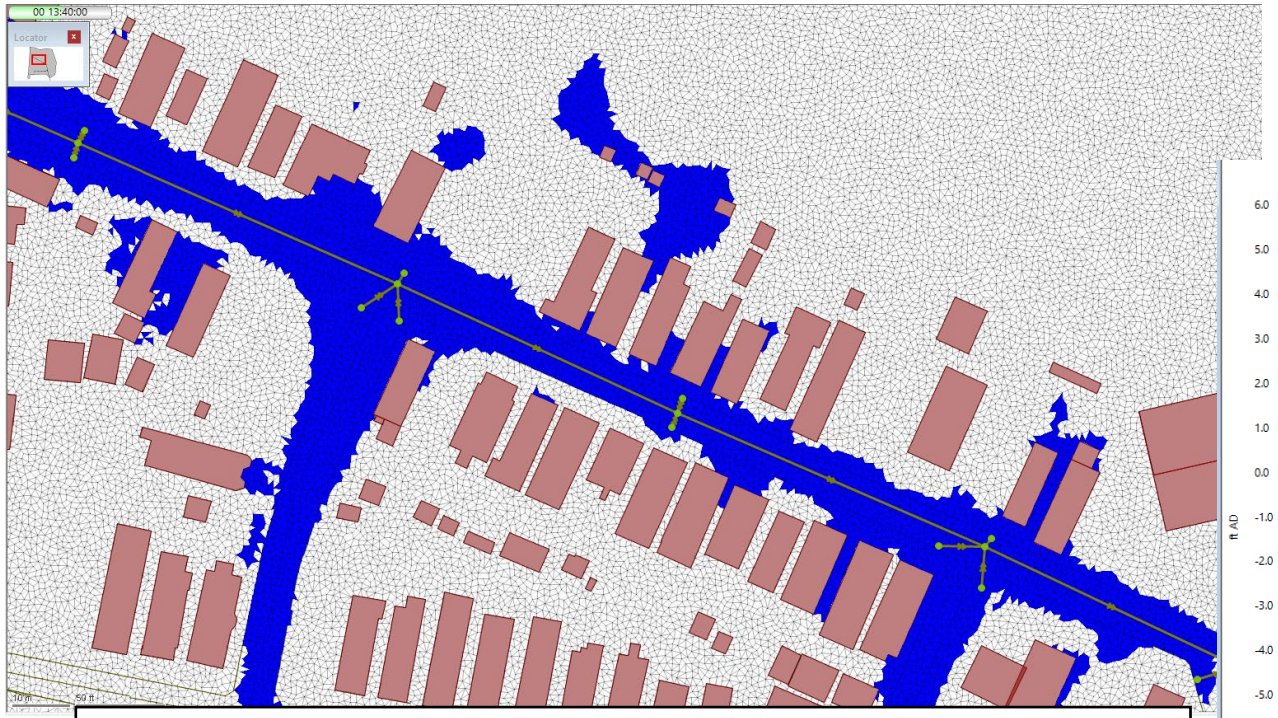
- Overland flood events occur locally above El. 4.1, when water comes over the wetland
  - Gauge data suggests 20 occurrences a year
- More widespread at El. 4.5
  - Gauge data suggests 11 occurrences a year

Existing Flood Conditions – Runoff From Rainfall

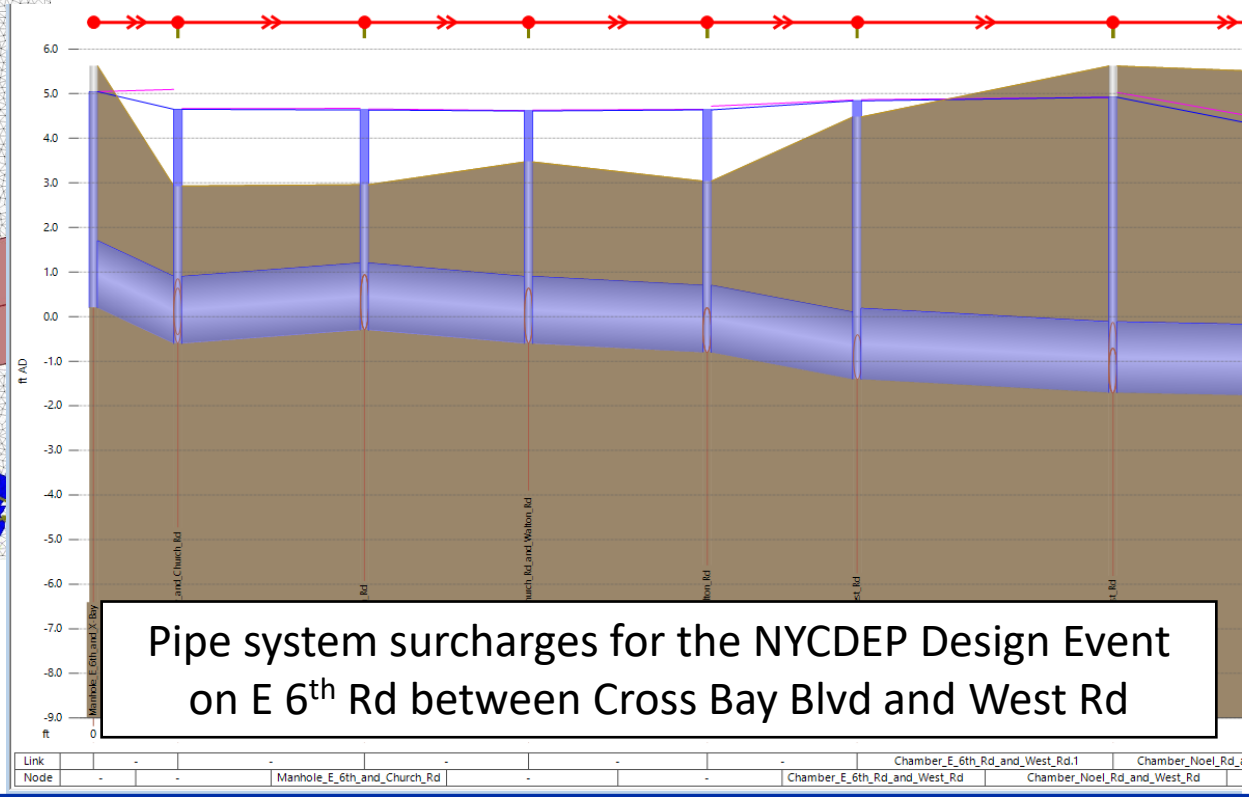
HWQ1182SD: East 6th Rd CPSD Study

3) Runoff from rainfall:

- NYCDEP requires the drainage system to pass a 5-year storm – one with a 20% chance of occurring any given year – at the same time the tide is at MHHW elevation.



Extents of surface flooding for NYCDEP Design Event on E 6th Rd between Cross Bay Blvd and West Rd

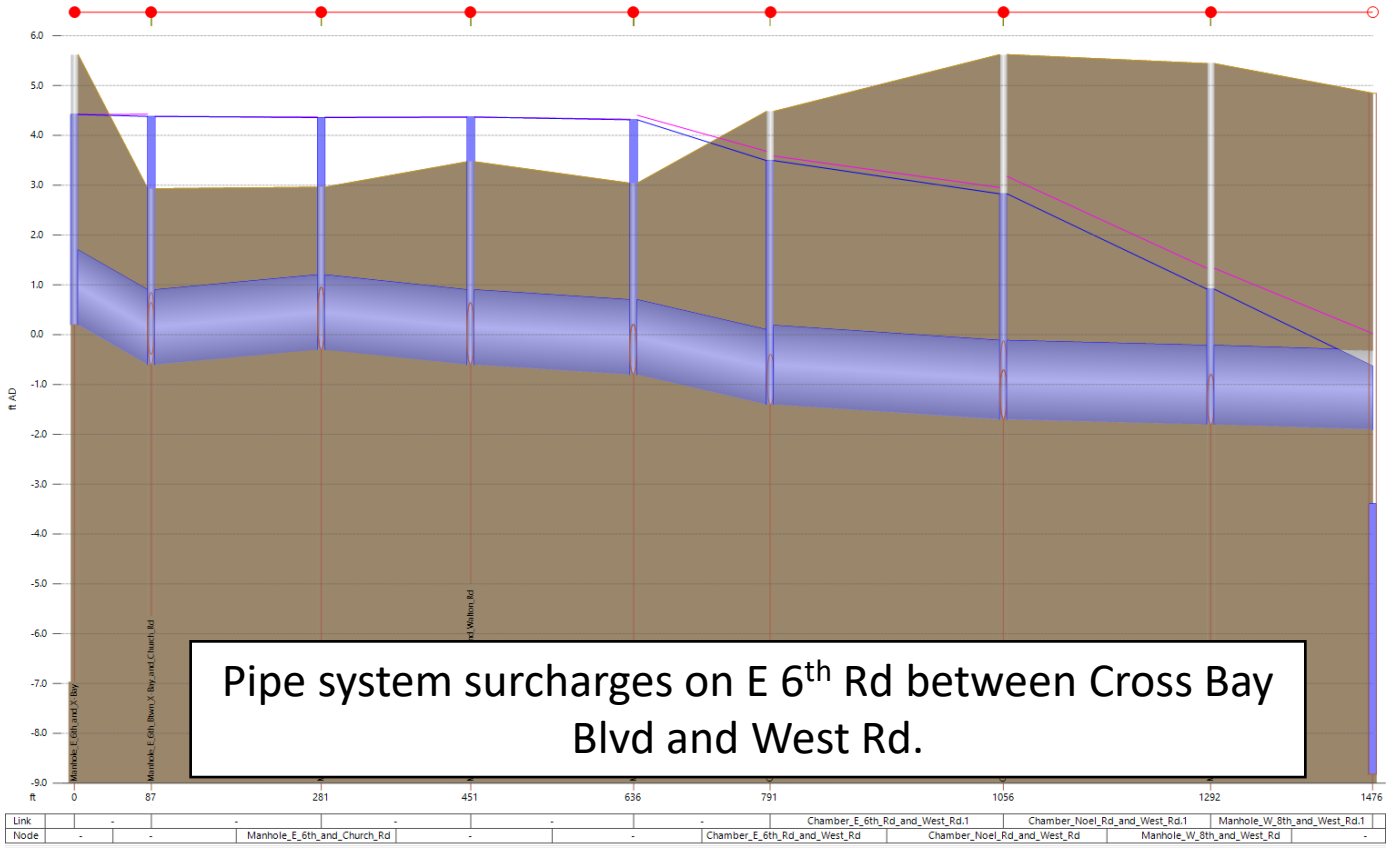


Pipe system surcharges for the NYCDEP Design Event on E 6th Rd between Cross Bay Blvd and West Rd

Existing Flood Conditions – Runoff From Rainfall

HWQ1182SD: East 6th Rd CPSD Study

Modeling suggests failure for NYCDEP design rainfall event (5-Year) even at Mean Lower Low Water.



Prior Projects – West Side Street Raising

HWQ1182SD: East 6th Rd CPSD Study

Elsewhere in Broad Channel, streets were raised to El. 5.4 (4.9 for W 14th Rd) to mitigate flooding

- W 14th Street was raised 1.4’ from 3.5
- W 15th Street was raised 1.6’ from 3.8
- W 16th Street was raised 1.2’ from 4.2
- W 17th Street was raised 1.5’ from 3.9

Early Conclusions

HWQ1182SD: East 6th Rd CPSD Study

- As suspected, road raising alone may not be the best solution for this area.
- Extensive drainage planning and collaboration with DEP will be needed to achieve solution that adequately addresses all identified sources of flooding. Options like sewer upsizing and pump stations will be DEP assets.

These early conclusions have shifted the scope of the study since initial expectations. Based on data collected, a new up-to-date hydraulic base model was built to ensure accurate and effective results, and extra collaboration with DEP was established. This will ultimately help us move faster when we get to capital project execution.

Alternatives

HWQ1182SD: East 6th Rd CPSD Study

Three types of flooding to solve: Tidal surcharging, rainfall surcharging, and wetland overland flow.

Solving one may impact the other, and solutions exist on a scale of time and feasibility.

Overall solution may require a mixture of the potential solutions.

Short Term – Limited Impact

Long Term – Larger Impact

Tide Valve

Pump Station

Pipe System Upgrade

Flood Wall

Raising the Street/Properties

Alternatives – Tide Valve

HWQ1182SD: East 6th Rd CPSD Study

- Prevent water from outside the drainage system from backing up into it
- Can be installed on the outfall or further up in the system inside a manhole
- Decreases efficiency of existing drainage system during rainfall events
- Can be designed and implemented in a shorter timeframe than other alternatives

Alternatives – Pump Station

HWQ1182SD: East 6th Rd CPSD Study

- Remove water from a drainage system through mechanical means.
- Requires standing/pooling water to trigger the pump.
- Would require additional measure to prevent tide from backing up into the pump station, otherwise would run continuously.
- Would not mitigate overland flooding from the wetlands. Only would drain the area faster once tide recedes.
- Small scale ones could be installed within manhole drainage structures.
- Requires long term maintenance.

Alternatives – Pipe System Upgrade

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- Reconstruct the existing drainage system to meet NYDEP Design requirements
- Would mitigate flooding from rainfall events
- Would require additional improvements such as tide valves to address tidal surcharge
- Limited future resiliency due to overland flow from wetland.
- Would result in long term construction impacts through the neighborhood.

Alternatives – Flood Wall

HWQ1182SD: East 6th Rd CPSD Study

- Construct flood wall between E 6th Rd. properties and the National Parks Service wetland.
- Would mitigate flooding from overland flow.
- Would require additional improvements such as tide valves to address tidal surcharge.
- Would not mitigate rainfall flooding.
- Significant property acquisitions and permitting expected.
- Would require construction access through private properties or significant wetland impacts.

Alternatives – Street Raising

HWQ1182SD: East 6th Rd CPSD Study

- Reconstruct and raise the streets similar to West Side Street raising projects
- Would mitigate flooding from overland flow to the roadway.
- Would mitigate tidal surcharge from the drainage system by raising the road.
- Could be integrated with stormwater system upgrades to address rainfall flooding
- Significant long term construction impacts through the neighborhood.
- May impact private properties requiring improvements outside of the right of way.

Alternatives – Overview

HWQ1182SD: East 6th Rd CPSD Study

	Tidal Surcharging	Rainfall Surcharging	Wetland Overland Flow	Notes
Tide Valve	Improve	Worsen	No effect	Can be designed and constructed quickly
Pump Station	No effect	Improved	No Effect	Can be installed in manhole structures resulting in smaller/limited construction impacts
Pipe System Upgrade	No effect	Improved	No Effect	Longer design and construction durations with limited future resiliency due to overland flow from wetland
Flood Wall	No effect	No Effect	Improved	Regulatory permitting and property acquisitions would be required.
Street Raising	Improved	Improved	Improved	As a standalone measure, it can exacerbate flooding onto private properties. Property modifications to accommodate new roadway elevations can mitigate flooding issue from a new roadway.

Next Steps

HWQ1182SD: East 6th Rd CPSD Study

Next Steps

- Feasibility assessments of conceptual alternatives
- Proposed Hydraulic Models of conceptual alternatives utilizing the Existing Base Model once approved by NYCDEP
- Prepare Pre-Scoping Design Report and Schematic Drawings
- Submit Final Pre-Scoping Design Report in Spring 2026