

# CONEY ISLAND CREEK RESILIENCY STUDY UPDATE

July 21<sup>st</sup>, 2015



# Presentation Agenda

- Overview
- Regional Resiliency
- Long-term Flood Protection Recommendations
  - Creek Side Alignment
  - Floodgate Typologies
  - Water Quality and Ecology
- Outreach and Next Steps

# Current Study Status

# Overview

**Purpose of feasibility study:** *Develop long-term strategy to protect Coney Island & Gravesend from effects of storm surge and sea level rise*

- Conduct robust technical analysis of large-scale tidal barrier & wetlands concept presented in SIRR report
- Identify specific measures to provide near-term flood protection
- Recommend comprehensive flood protection plan and define implementation steps

**Coordinated interagency effort:**

- Managed by NYCEDC on behalf of ORR
- Close partnership with DEP, Parks, City Planning
- State and Federal agencies (e.g., DEC, Army Corps) also involved

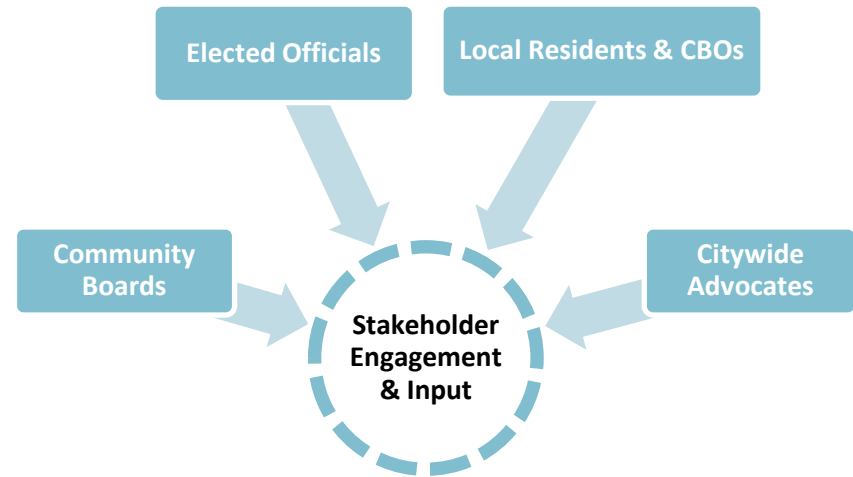
**Funding:** 100% from first tranche of Sandy CDGB funds



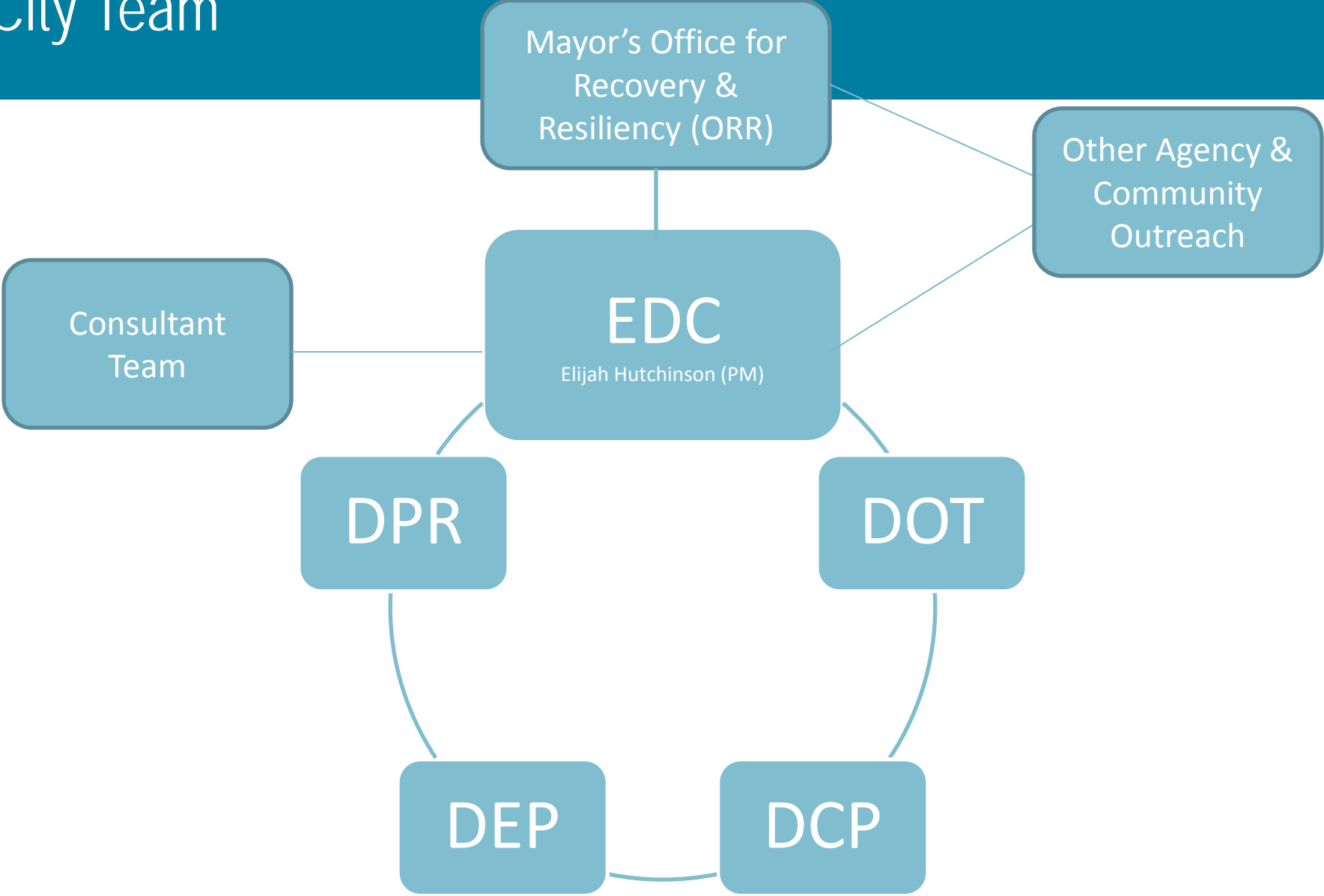
# Scope of Study

## Questions to be answered:

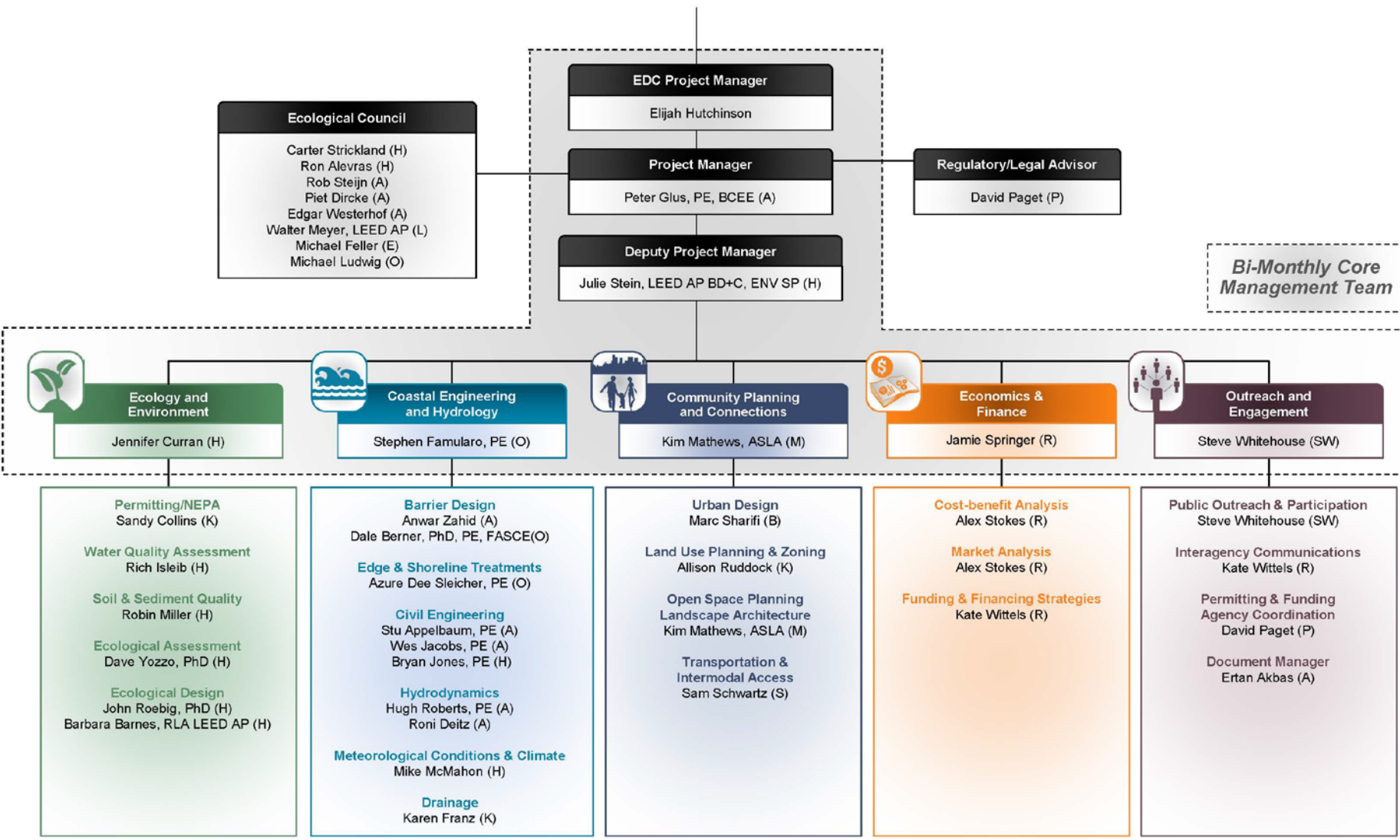
1. Is the tidal barrier & wetlands concept **technically feasible**? What are the environmental, engineering, and regulatory challenges, and how could they be overcome?
2. Is this a **cost-effective** way of addressing the threats severe weather and sea level rise pose to Coney Island and Gravesend?
3. What measures can be advanced to provide **near-term flood protection**?
4. Are there opportunities to provide other **community benefits**, such as improved access to waterfront recreation, without compromising the primary goal of flood protection?
5. What do community stakeholders think about the Creek proposal and how it could **best address their needs**?



# City Team



**HANDOUT A: Organizational Chart**



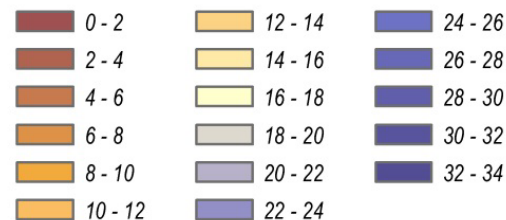
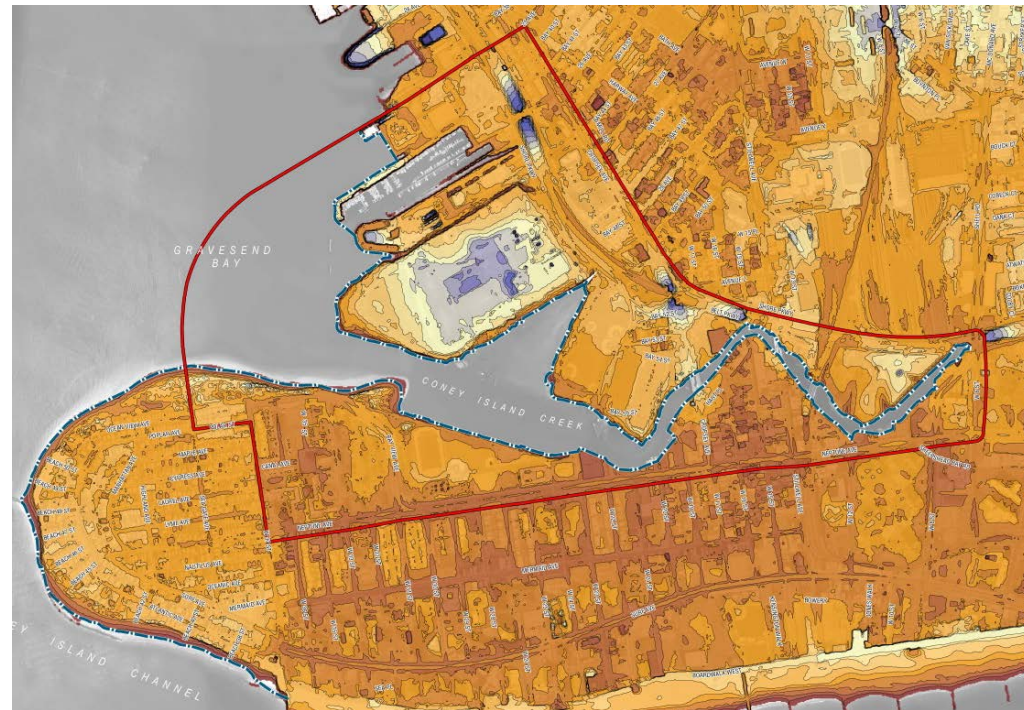
LEGEND: **A** – ARCADIS of New York, Inc. **H** – HDR, Inc. **O** – Ocean and Coastal Consultants, Inc. **K** - AKRF, Inc. **M** - Mathews Nielsen **L** – Local Office Landscape Architecture **E** – eDesign Dynamics, LLC  
**R** – HR&A Advisors, Inc. **B** – Beyer Blinder Belle Architects and Planners, LLP **S** – Sam Schwartz Engineering, D.P.C. **P** – Sive, Paget & Riesel P.C. **SW** – Starr Whitehouse



# Study Area – Coney Island Creek

- Shoreline is primarily low-lying
  - Majority of the shoreline between 6 and 9 feet NAVD88
  - Regions below 6 feet NAVD88 are easy entryways for flood waters during low- and high-frequency storm events
- Low-lying areas are often adjacent to important community facilities, including public schools, NYCHA, senior housing developments, and community clinics

**Elevation (feet NAVD88)**





# Rapid Waterfront Inspection Assessment

## *Shoreline Condition*

- Rapid Waterfront Inspection Assessment was
- Some engineered shorelines in “serious” condition along the Creek



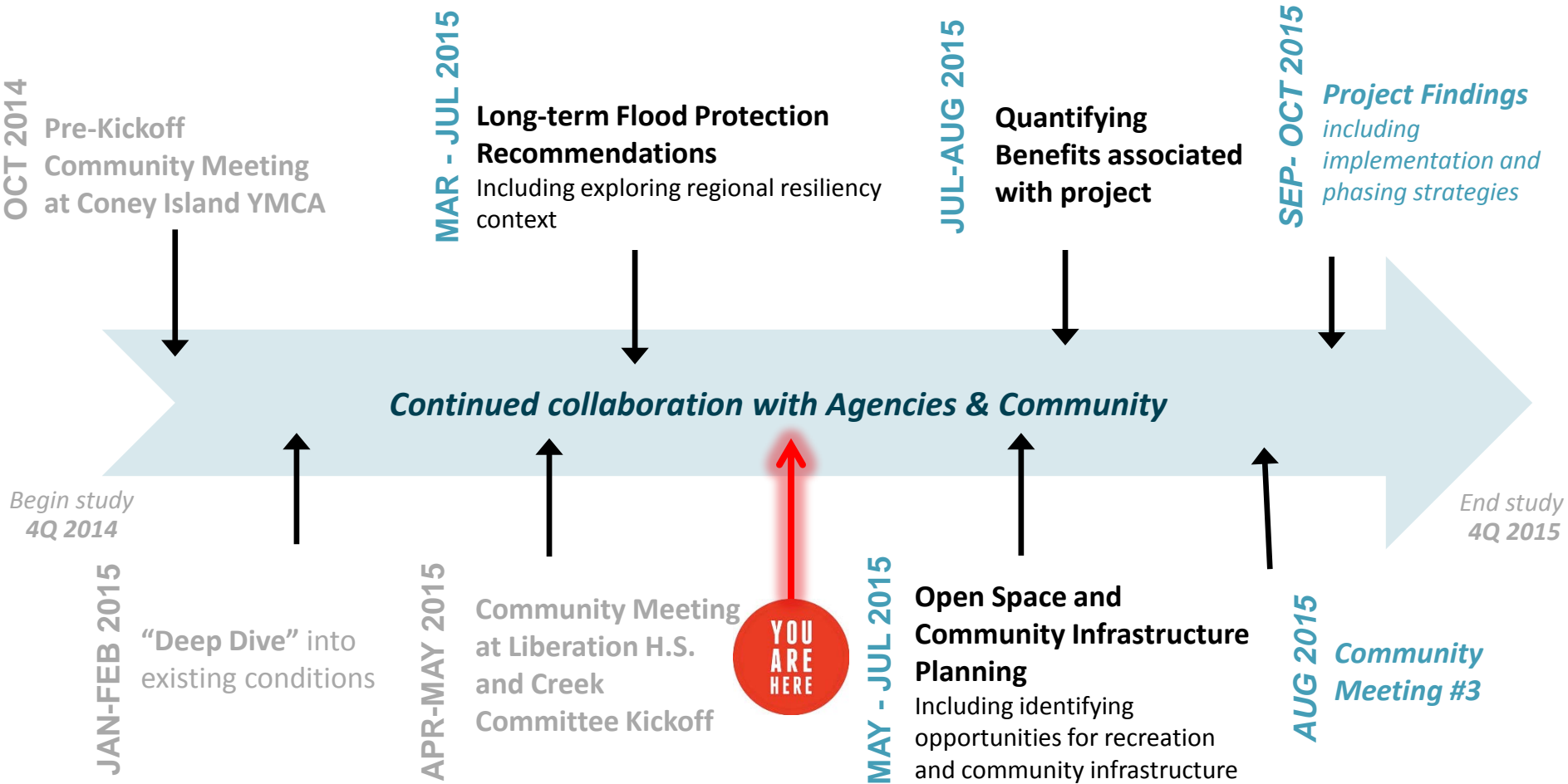
# Rapid Waterfront Inspection Assessment

## *Shoreline Types*

- Shoreline configurations include:
  - Engineered structures:
    - Bulkhead
    - Revetment
  - Non-engineered shorelines
    - Debris-strewn embankments
    - “Homemade” bulkheads



# Study Milestones

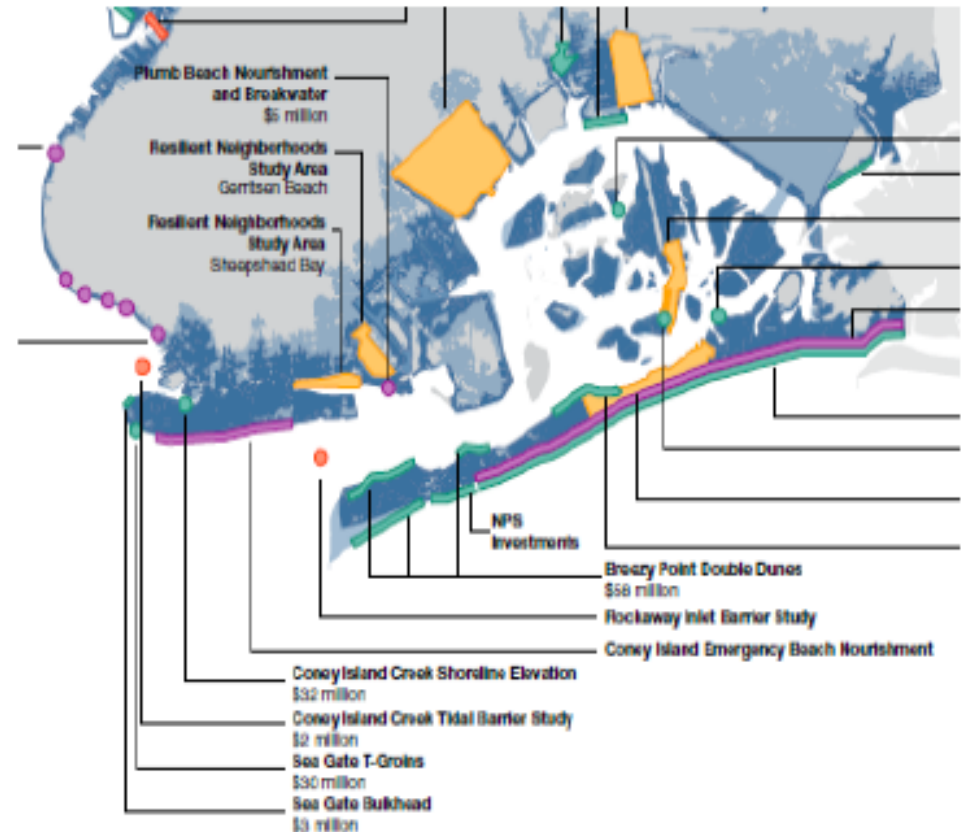
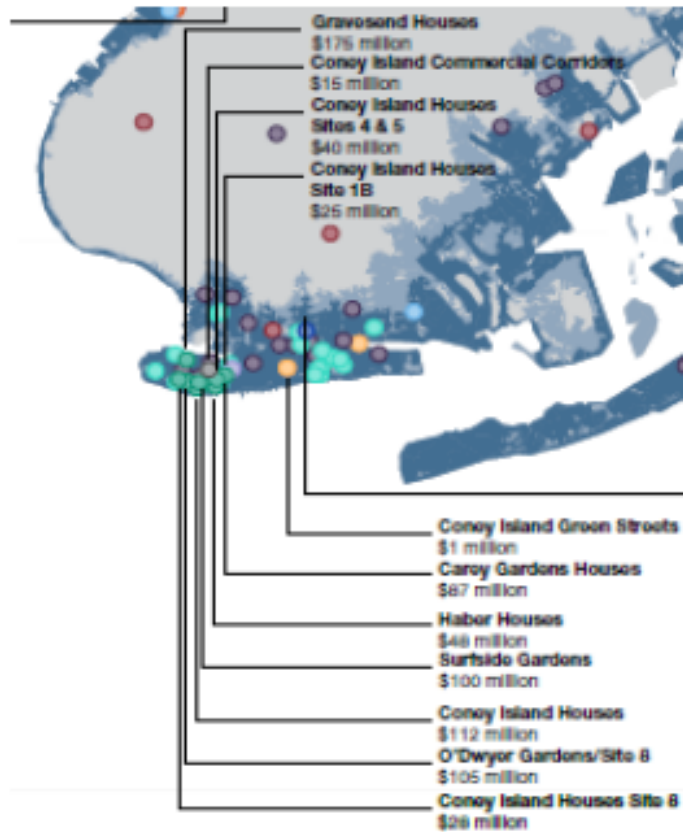


# Regional Resiliency Efforts

# A Regional View

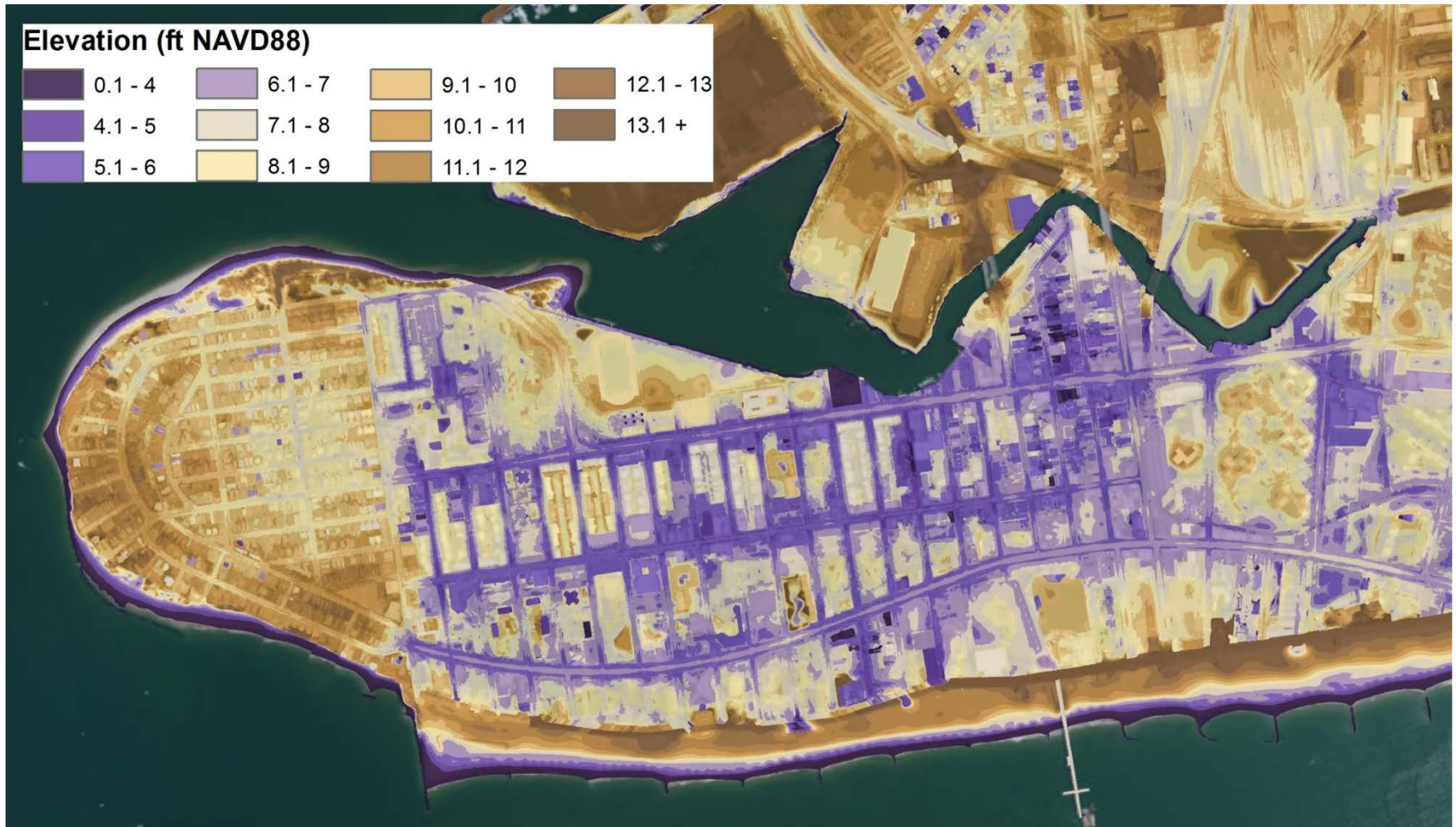


# Regional Resiliency Efforts



# Long-term Flood Protection Recommendations

# Elevation (ft NAVD88) in Coney Island



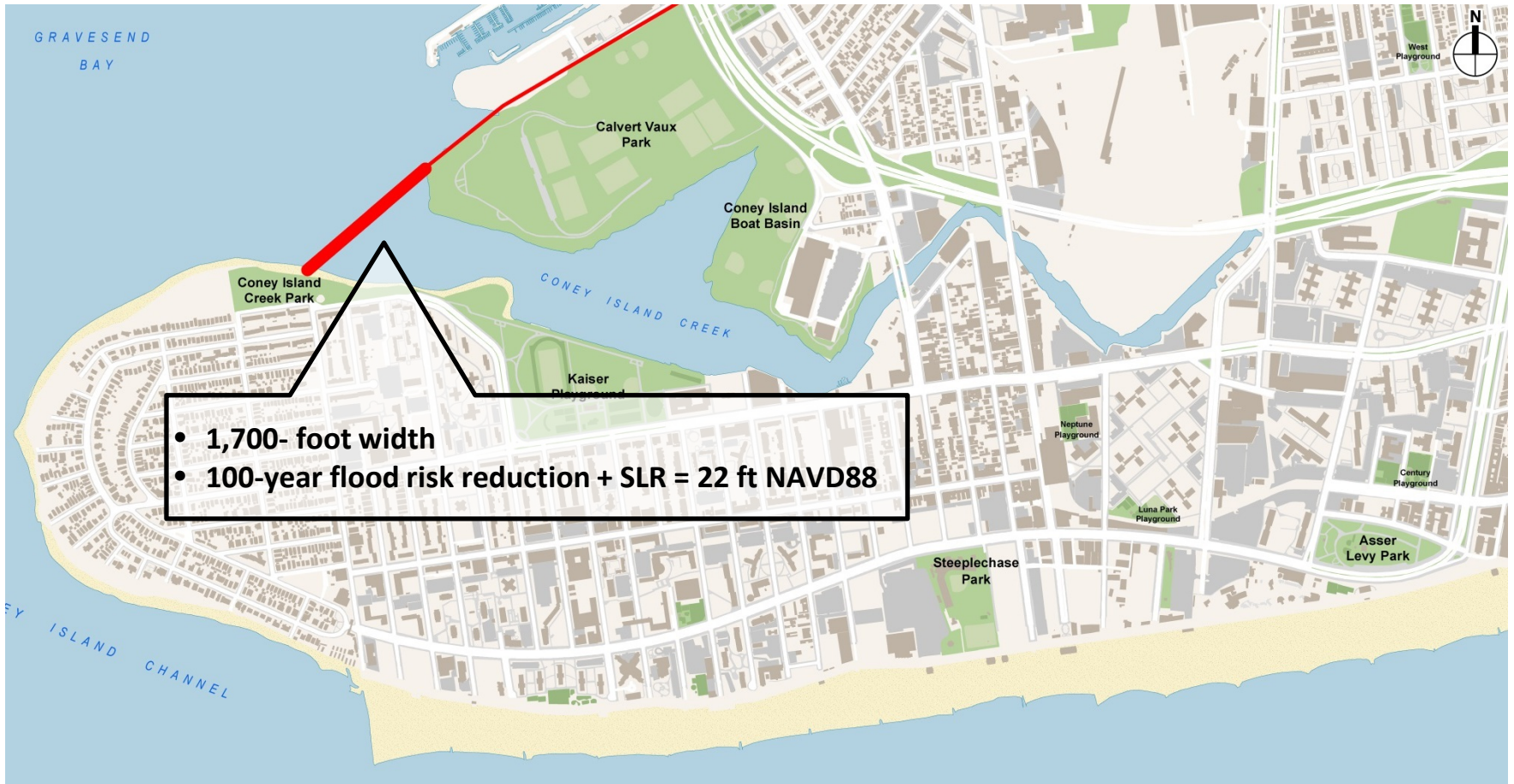


# Creek Side Opportunities

# West Barrier Alignment



# West Barrier Alignment



# Flood Protection Strategies and Considerations

## Feasibility Considerations:

- Flood Risk Reduction
- Ecological Enhancement
- Drainage
- Community Infrastructure
  - Recreation
  - Connectivity
  - Economic Opportunities
- Implementability / Feasibility



**West Barrier**



**West Barrage + Wetlands**



**East Barrier**



**East Barrage + Wetlands**



**Perimeter Flood Protection**



**All Wetlands**

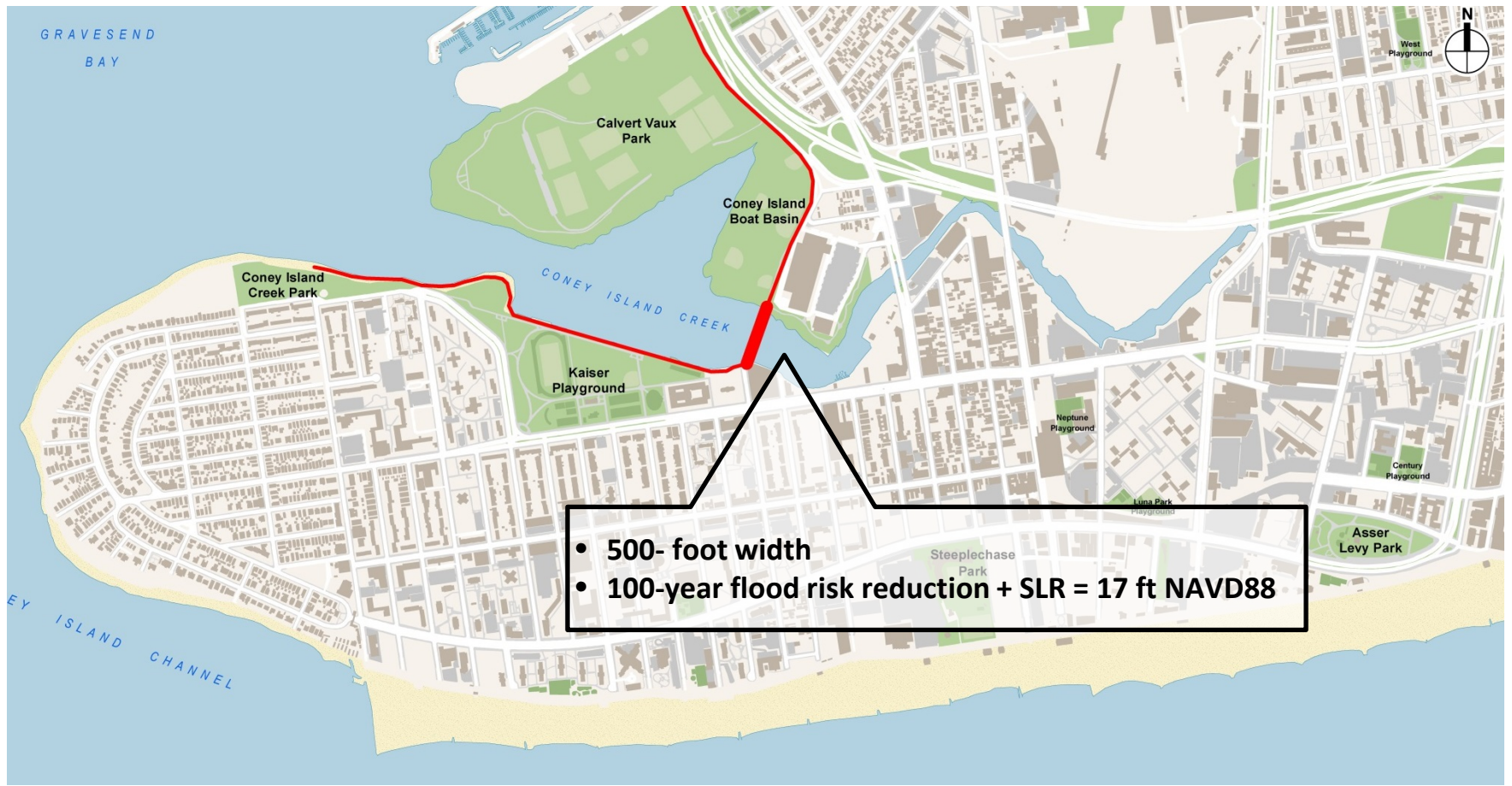
# Flood Protection Strategies Comparison

Strategy	Flood Risk Reduction	Ecological Impact	Drainage	Recreation & Connectivity	Economic Opportunities	Implementation Feasibility
West Barrier	High	High	Medium	High	Medium	High
West Barrage + Wetlands	Medium	Low	Low	High	Medium	Low
East Barrier	High	High	Medium	Medium	Medium	High
East Barrage + Wetlands	Medium	Low	Low	Medium	Medium	Low
Perimeter Protection	Medium	High	High	High	High	Low
All Wetlands	Low	Medium	Medium	High	Low	Low

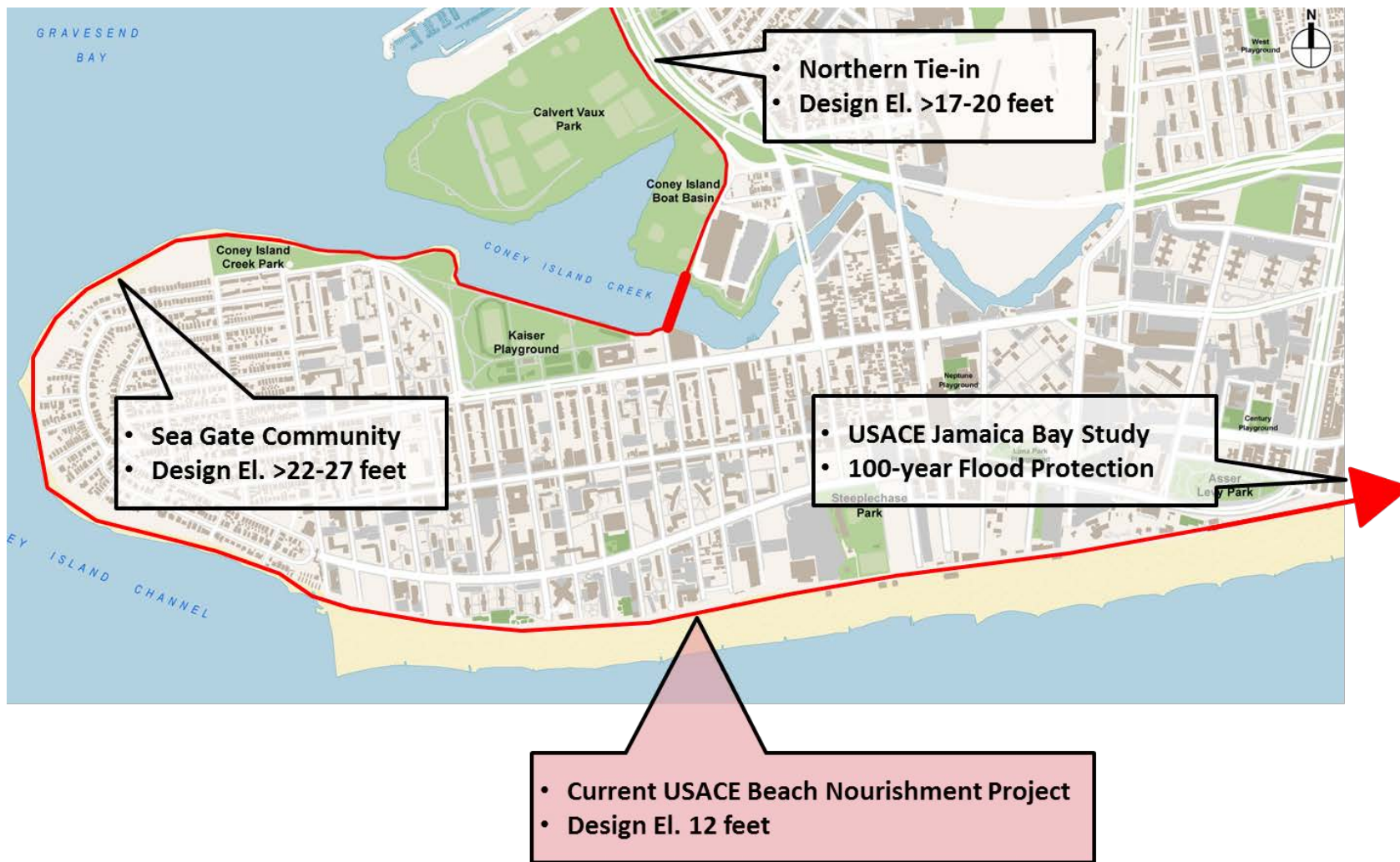
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West Barrier	High	High	Medium	High	Medium	High
West Barrage + Wetlands	Medium	Low	Low	High	Medium	Low
East Barrier	High	High	Medium	Medium	Medium	High
East Barrage + Wetlands	Medium	Low	Low	Medium	Medium	Low
Perimeter Protection	Medium	High	High	High	High	Low
All Wetlands	Low	Medium	Medium	High	Low	Low

# East Barrier Alignment



# Regional Resiliency Context (100-Year Design Elevation 2050 SLR [NAVD88])

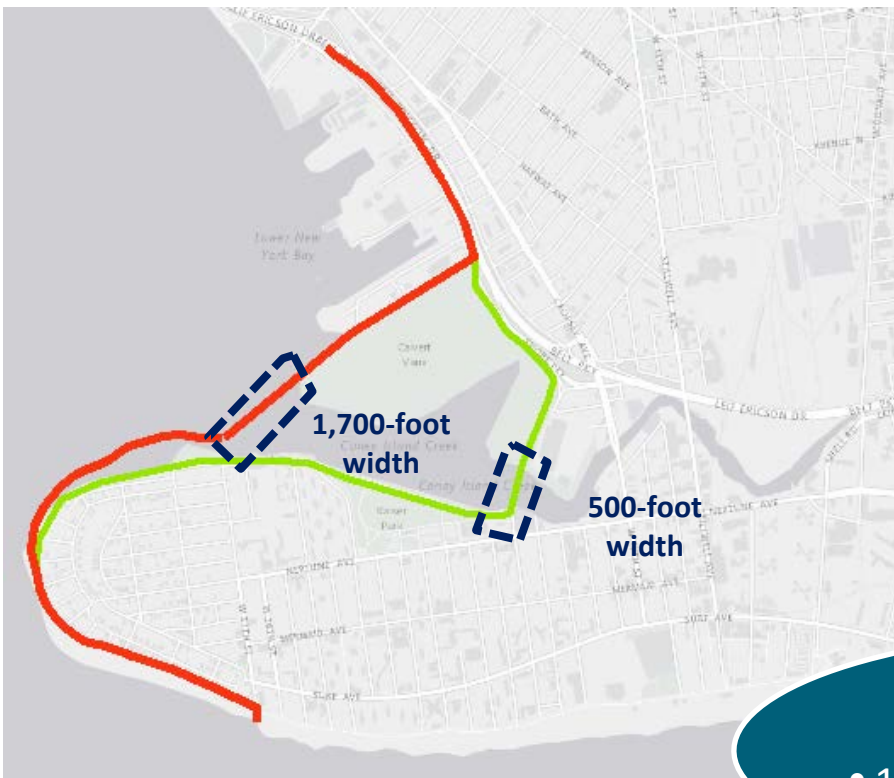




# Tidal Barrier Alignments

## *Level of Protection for in-water measures*

### ***Plan View***



### ***Bird's Eye View***



**East Barrier:**

- 500-foot width
- 100-year + SLR = 17 ft NAVD88

**West Barrier:**

- 1,700-foot width
- 100-year + SLR = 22 ft NAVD88

# Flood Protection Precedents

Rhode Island, USA



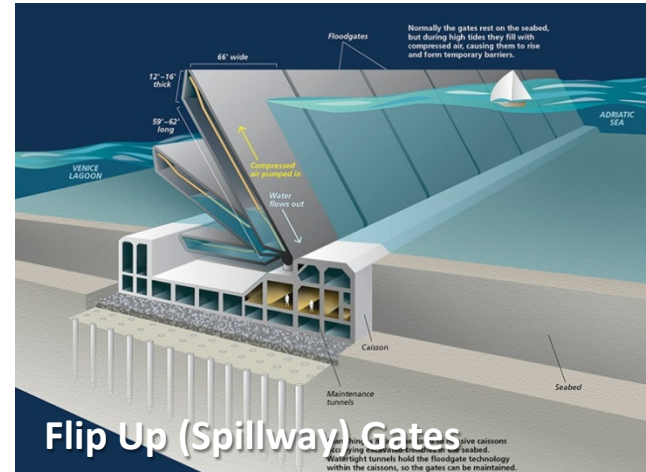
Tainter Gates

Marina Bay, Singapore



Barrage

Venice, Italy



Flip Up (Spillway) Gates

Thames River, UK



Rotating Gates

# Long-Term Flood Protection

## *Opening Size*



### No Opening

- **Passive Flood Protection is most reliable**
- Most cost-effective
- Connection across Creek
- Minimal O&M
- Pumps needed for WQ



### Narrow Opening

- Combination of passive and mechanical parts
- Cost-effective
- Connection across Creek is feasible with non-nav.
- O&M required to maintain and operate mechanical components
- Pumps needed for WQ



### Wide Opening

- Most mechanical parts; least reliable
- Most expensive option
- Connection across Creek is feasible with non-nav.
- Most O&M required
- **Least impact on WQ and aquatic habitat**

**FOR BOTH "WEST" AND "EAST" ALIGNMENTS**

# Ecological Considerations for Barrier

- Minimize impacts based on **opening size, footprint, alignment**
- East Alignment preferred:
  - **Decreases** substrate and habitat disturbance
  - **Avoids** existing aquatic habitat value
  - **Lessens** impact on water flow throughout Creek
  - Provides more opportunities for **restoration**



# Ecological Opportunities for Programming



Maritime Forest / Shrubland



Beach / Dune



Fishing



Salt Marsh



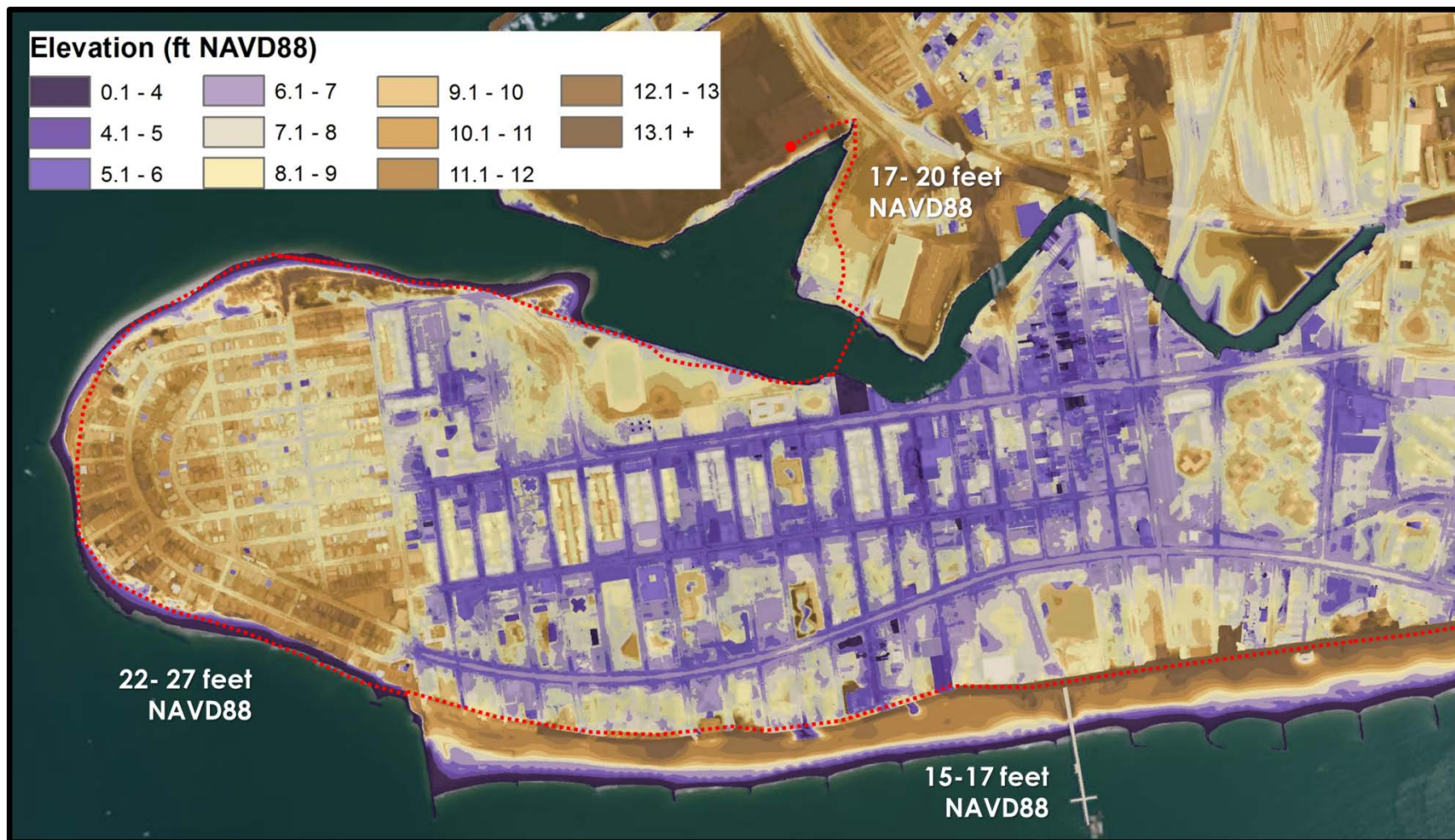
Boat Launch



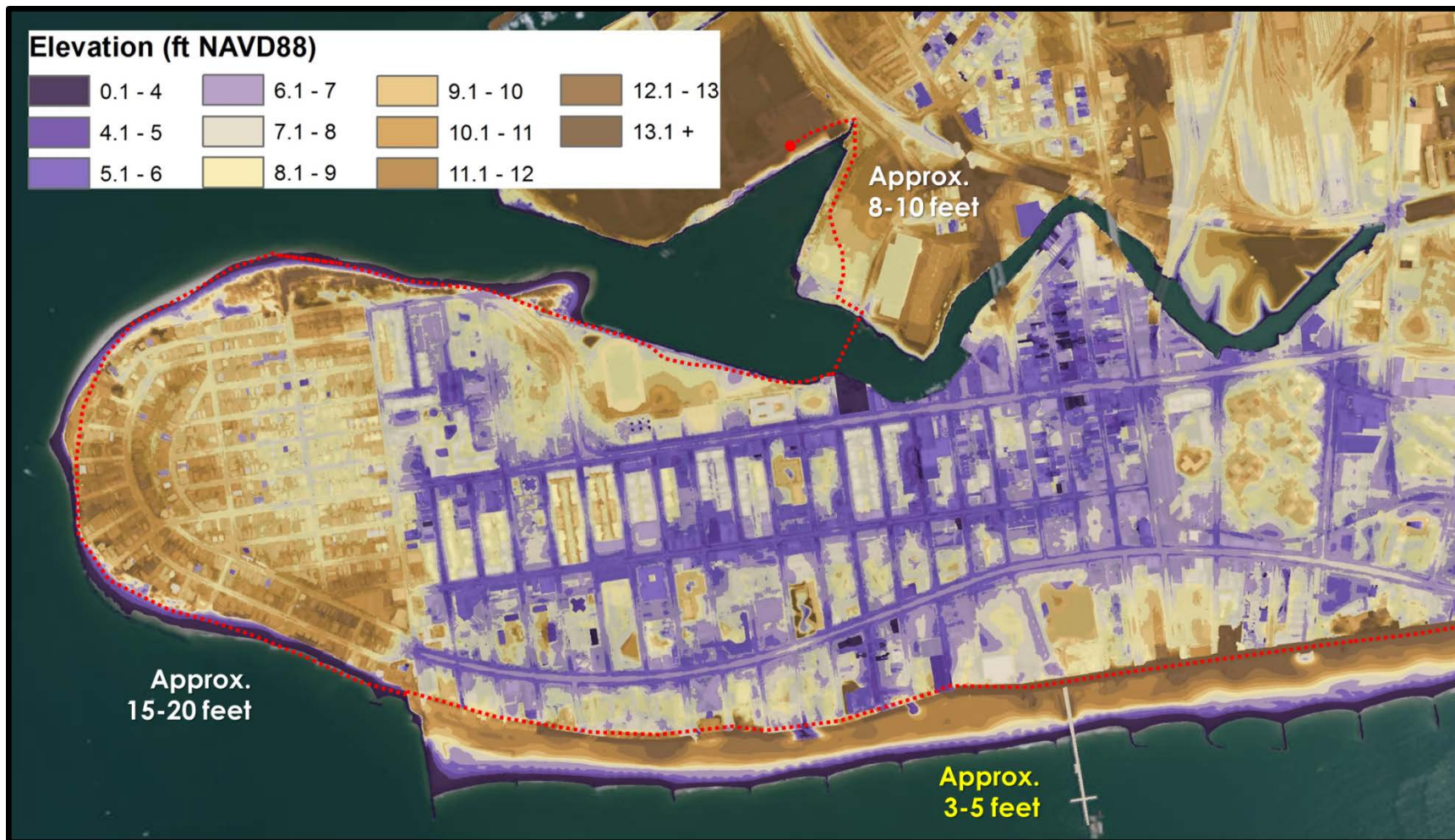
Passive Parkland

# Beach Side Opportunities

# 100-Year Flood Risk Reduction Design Elevations



# 100-Year Flood Risk Reduction Design Heights





# Design Precedents



*Coastal Promenade, The Netherlands*



*Vegetated Dunes, Ocean City, MD*



*Deployable Floodwalls, The Netherlands*



*Inflatable Dams, New Orleans, LA*

# Outreach and Next Steps

# Outreach Next Steps

- April - Community Meeting #1:  
*Existing Conditions; Community Needs & Vision*
- May – Coney Creek Committee:  
*Shoreline Conditions Assessments; Water Quality modeling; Barrier Options; Outreach Planning*
- Summer – Ongoing community events, presentations, and access to experts
- July 23<sup>rd</sup> – Coney Creek Committee:  
*Preliminary Findings; Outreach and Next Steps for Study; Community Meeting Planning*
- August 6<sup>th</sup> - Community Meeting #2:  
*Technical Analysis & Preliminary Recommendations; Trade-Off Considerations; Confirm Concept Options*
- Fall – Coney Creek Committee & Community meeting #3:  
*Present Community Vision; Refine Vision & Implementation Strategies*



# Study Next Steps

- Advance short-term recommendations
- Continue evaluation and case-making for long-term flood protection strategies
- Coordinate study findings and recommendations with key City Agencies, other stakeholders, and on-going coordination with Community Board
- Refine ecological analyses in coordination with DEP and DEC
- Advance Creek study in context of regional resiliency planning for City in coordination with Army Corps

