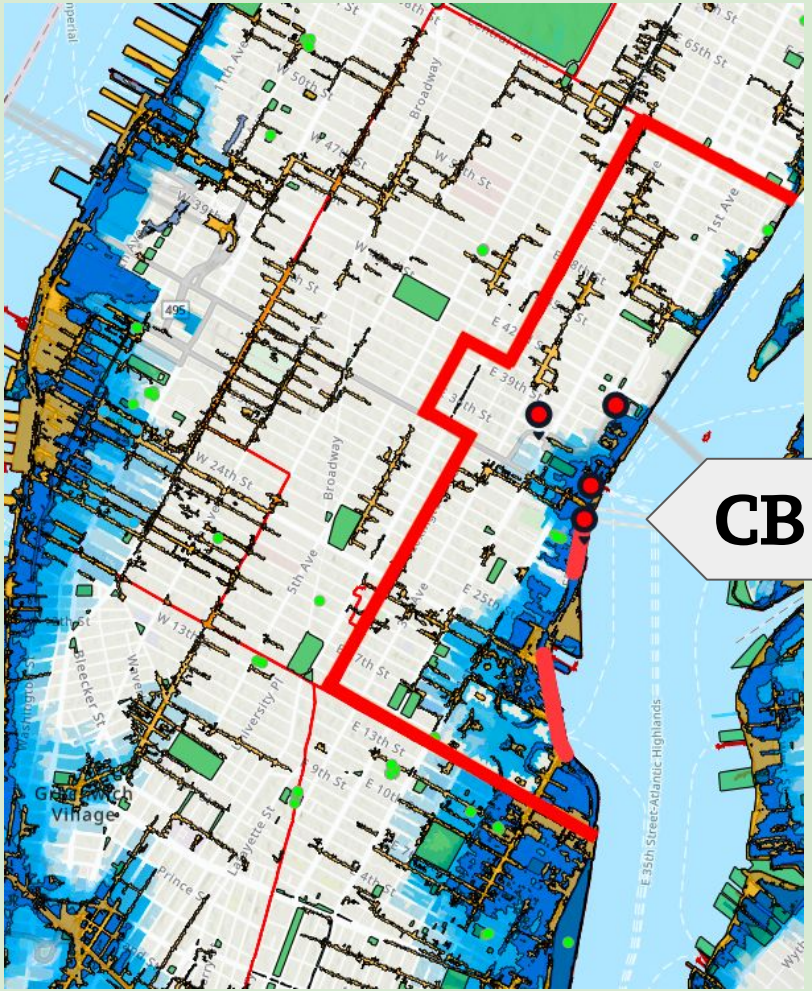


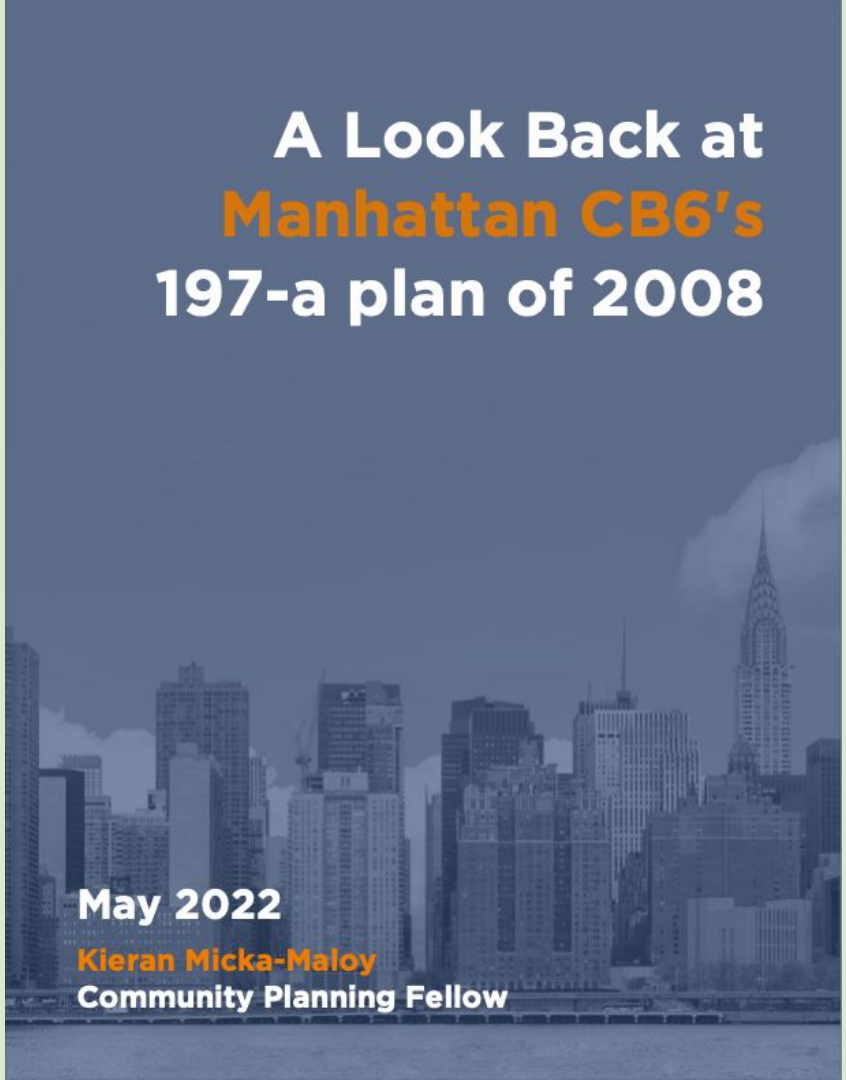
Green Infrastructure & Waterfront Sustainability in Manhattan Community Board 6

Fund for the City of New York
Community Planning Fellow Laureen Makar

Introduction

FUND FOR THE CITY OF NEW YORK

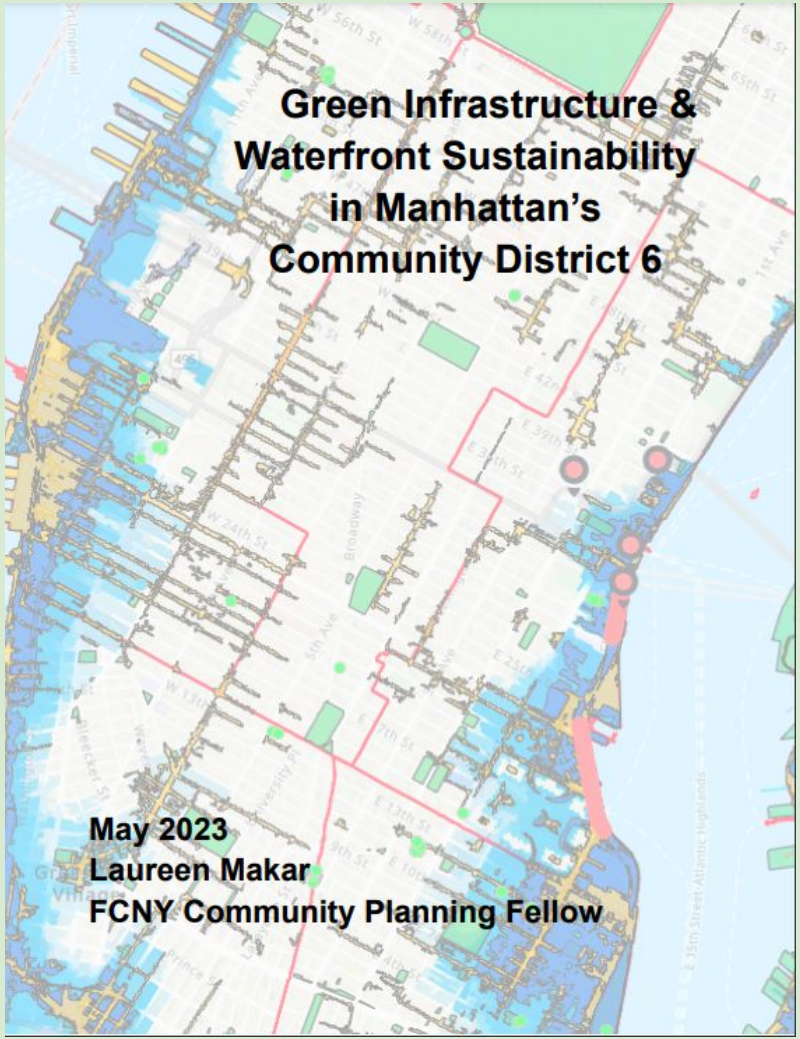
Researching and highlighting possible green infrastructure opportunities and waterfront adaptive strategies that CB 6 may refer to for future Statements of District Needs and/or coastal resiliency projects.



Deliverables

- Interactive map of district's flood risks, DEP green infrastructure assets, and key vacant/parking lots that may be possible opportunity sites for green infrastructure

- Recommendations/ideas for green infrastructure & coastal resiliency that the CB may use in future statements of district needs and/or when assessing future development projects

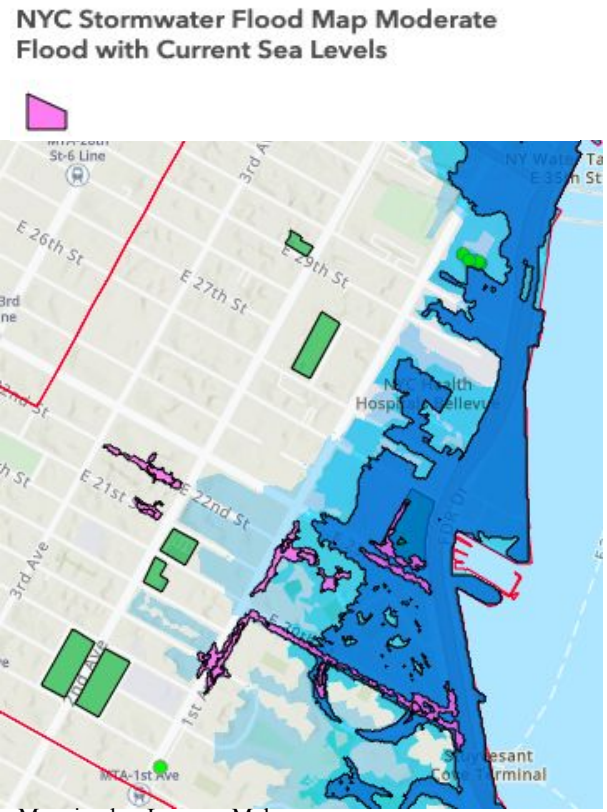


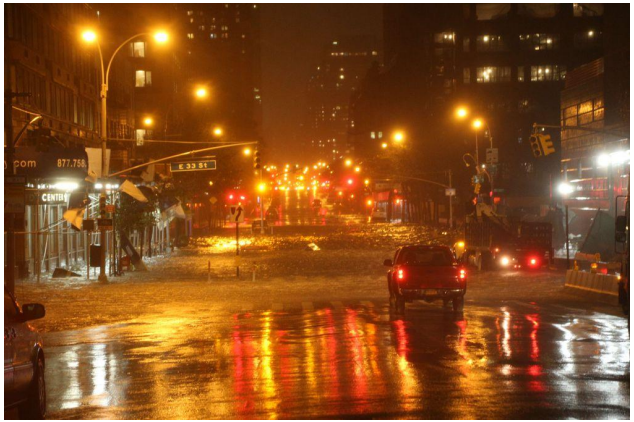
Scope and **Limitations**

- Building off of previous fellow's look at CB 6's 197-a plan, which found a lack of sustainability and resiliency needs.
- Serve as a stepping stone for further GI, sustainability, resiliency considerations for future district development.
- Lack of environmental engineering knowledge
- Lack of data for flood risks with adaptive strategies in place

Part I: CD 6 Map - Flood Risk

2020s Future Floodplain



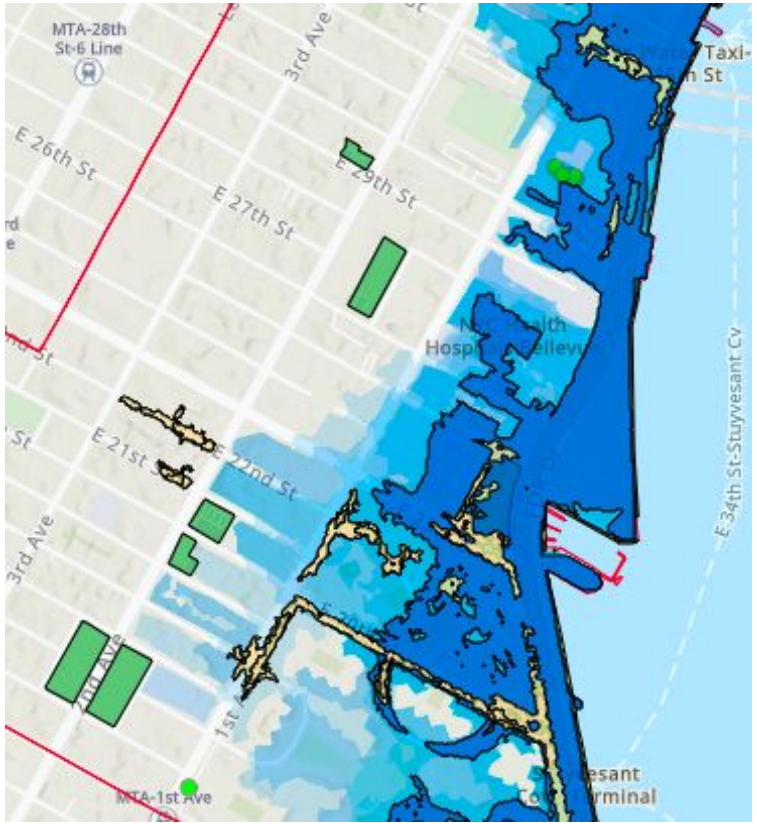


Mapping by: Laureen Makar
Data Sources:
NYC DCP Flood Zone Hazard Mapper; NYC Mayor's Office of Resiliency Stormwater Flood Maps; NYC SBS Sandy Inundation Zone Map

Part I: CD 6 Map - Flood Risks

2050s Future Floodplain

Large Areas of CB6 Are At Risk of Significant Future Flooding



NYC Stormwater Flood Map Moderate Flood with 2050 Sea Level Rise

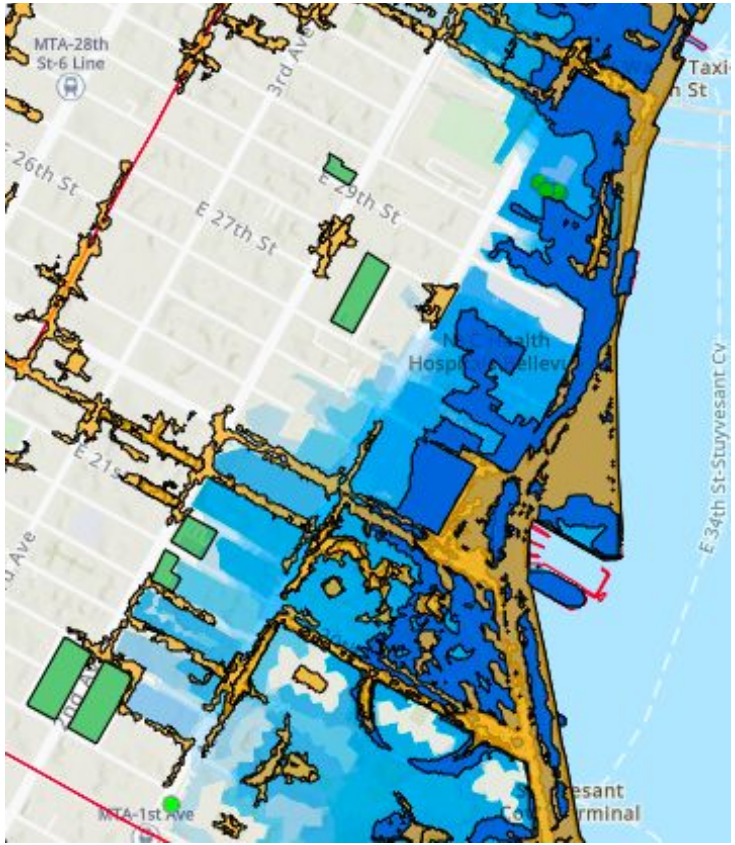
Sandy Inundation Zone - Sandy Inundation Zone

Mapping by: Laureen Makar
Data Sources:
NYC DCP Flood Zone Hazard Mapper; NYC Mayor's Office of Resiliency Stormwater Flood Maps; NYC SBS Sandy Inundation Zone Map

Part I: CD 6 Map - Flood Risks

2080s Future Floodplain

Large Areas of CB6 Are At Risk of Significant Future Flooding



NYC Stormwater Flood Map Extreme Flood with 2080 Sea Level Rise

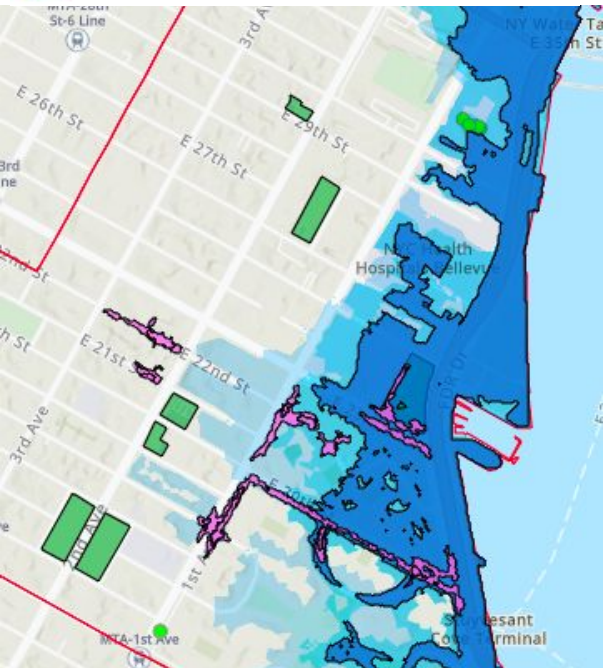
Sandy Inundation Zone - Sandy Inundation Zone

Mapping by: Laureen Makar
Data Sources:
NYC DCP Flood Zone Hazard Mapper; NYC Mayor's Office of Resiliency Stormwater Flood Maps; NYC SBS Sandy Inundation Zone Map

Part I: CD 6 Map - Flood Risks

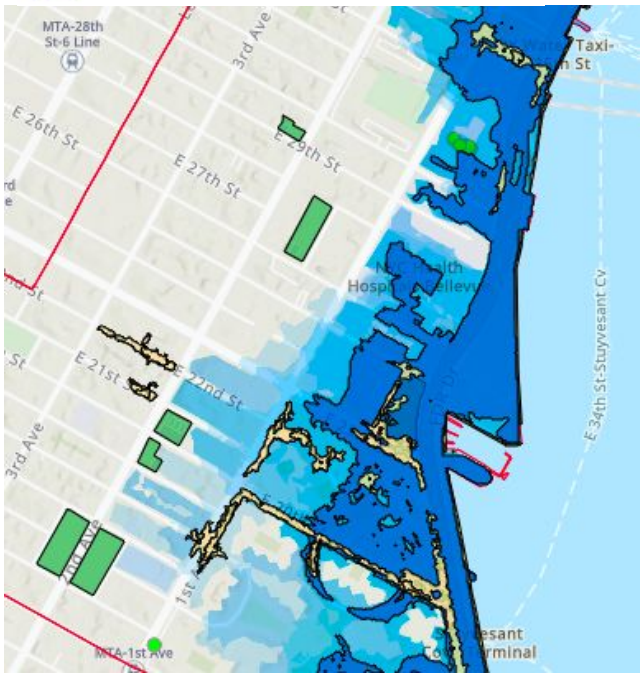
2020s Future Floodplain

NYC Stormwater Flood Map Moderate Flood with Current Sea Levels



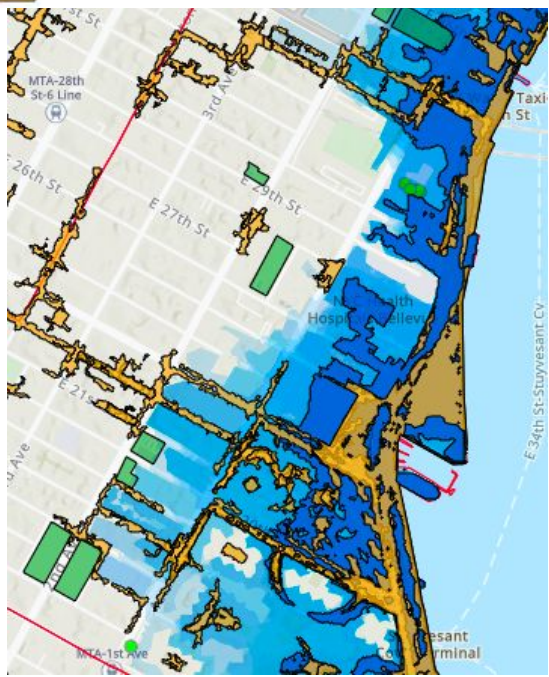
2050s Future Floodplain

NYC Stormwater Flood Map Moderate Flood with 2050 Sea Level Rise



2080s Future Floodplain

NYC Stormwater Flood Map Extreme Flood with 2080 Sea Level Rise

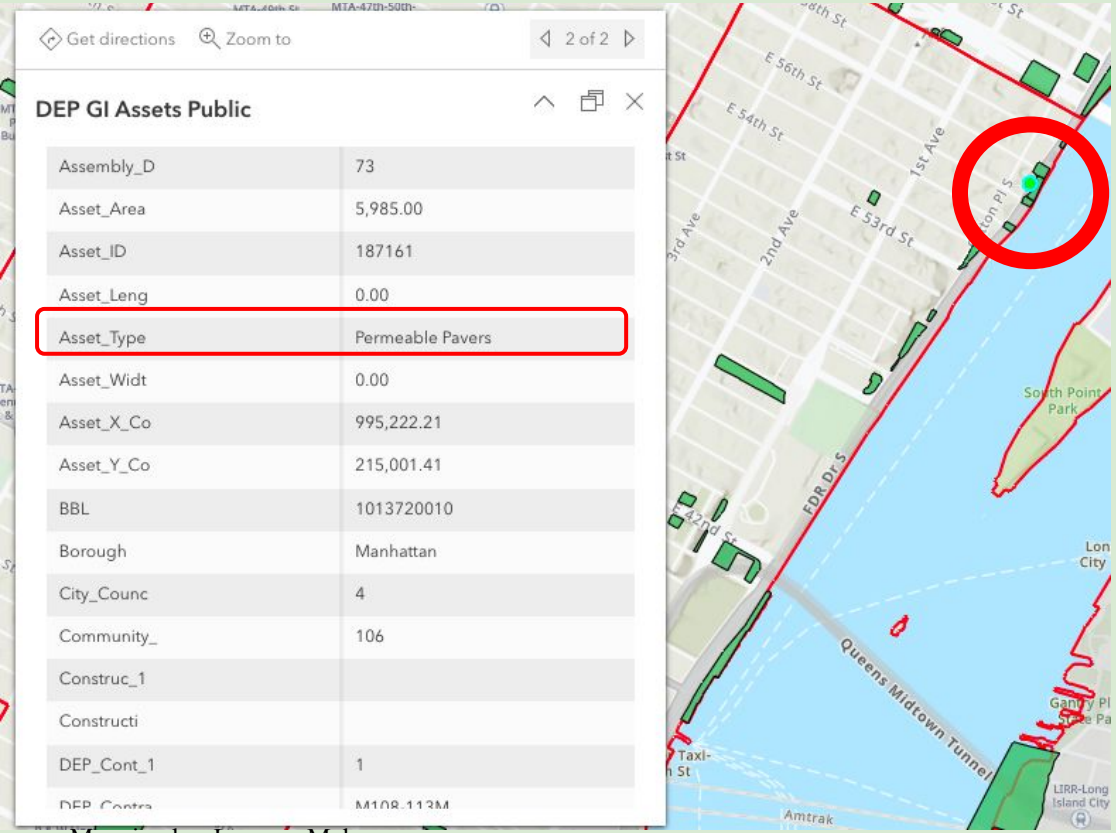


Mapping by: Laureen Makar

Data Sources: NYC DCP Flood Zone Hazard Mapper; NYC Mayor's Office of Resiliency Stormwater Flood Maps; NYC SBS Sandy Inundation Zone Map

Part I: CD 6 Map; Green Infrastructure

Sutton Place Park

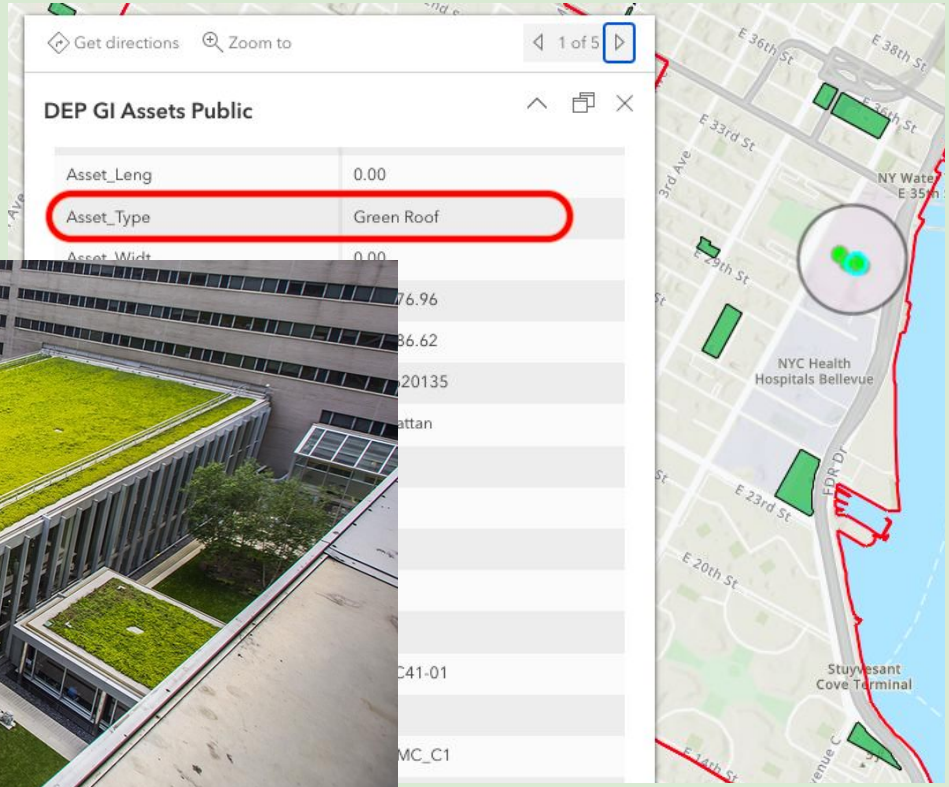


Mapping by: Laureen Makar
Data source: NYC DEP

Image source: https://commercial.unilock.com/projects/parks/sutton-place-park/

Part I: CD 6 Map; Green Infrastructure

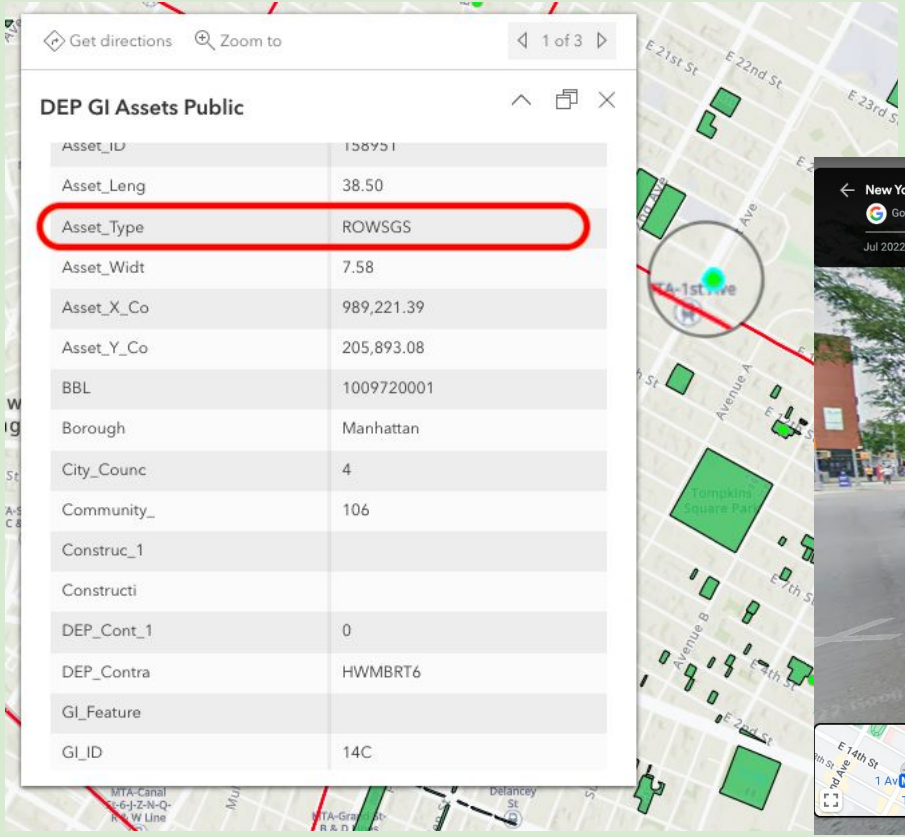
NYU Langone Medical Center - Alumni Hall



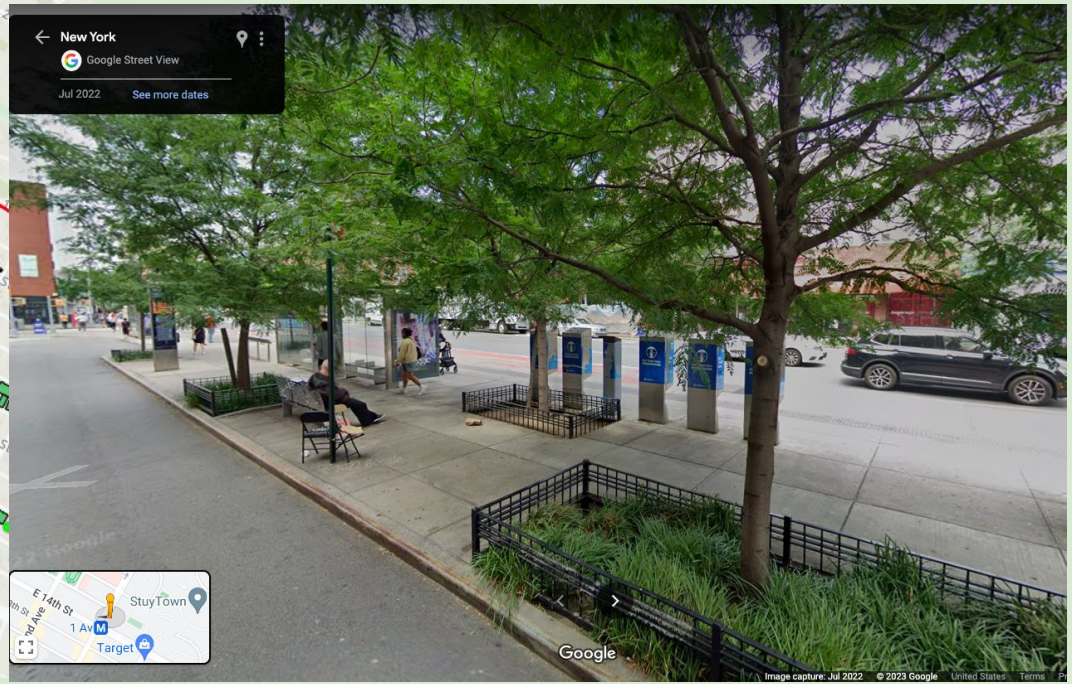
Mapping by: Laureen Makar
Data source: NYC DEP

Image source: https://nyulangone.org/news/nyu-langone-health-receives-top-environmental-awards

Part I: CD 6 Map; Green Infrastructure



E 15th St. & 1st Ave. Intersection

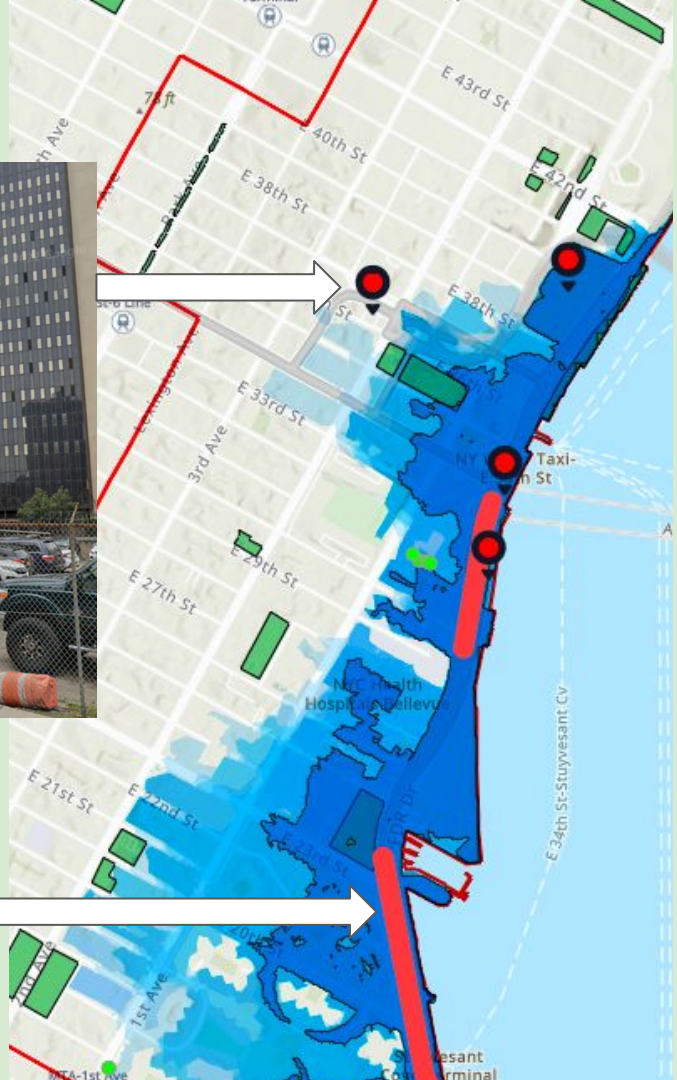


Mapping by: Laureen Makar
Data source: NYC DEP

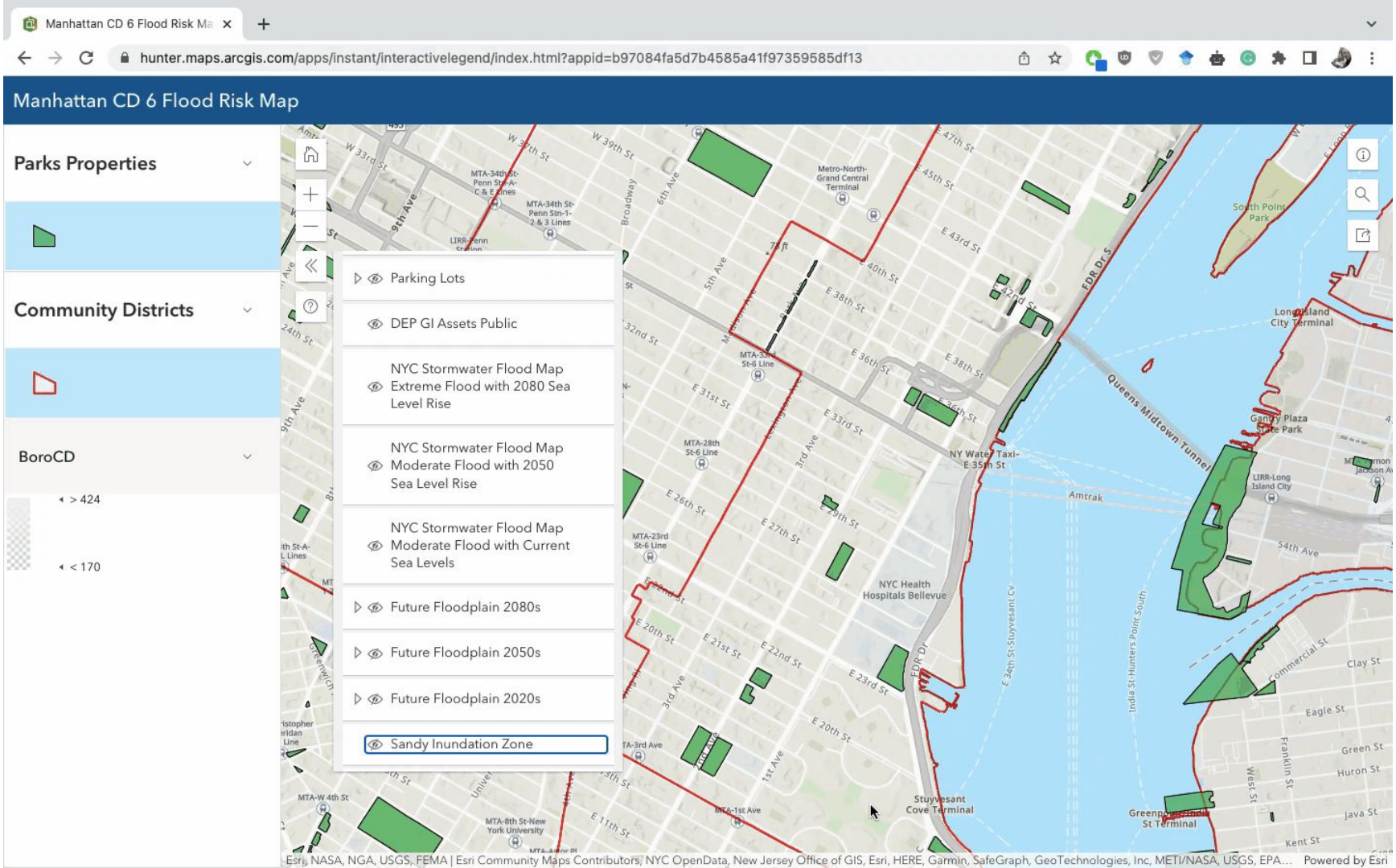
Image source: Google Maps

Part I: CD 6 Map - Vacancies

- Soloviev Lot;
- Parking lot on 36th and 2nd
- Parking underneath elevated portions of FDR Drive near 20th St, 23rd St, 30th St, & 34th St.



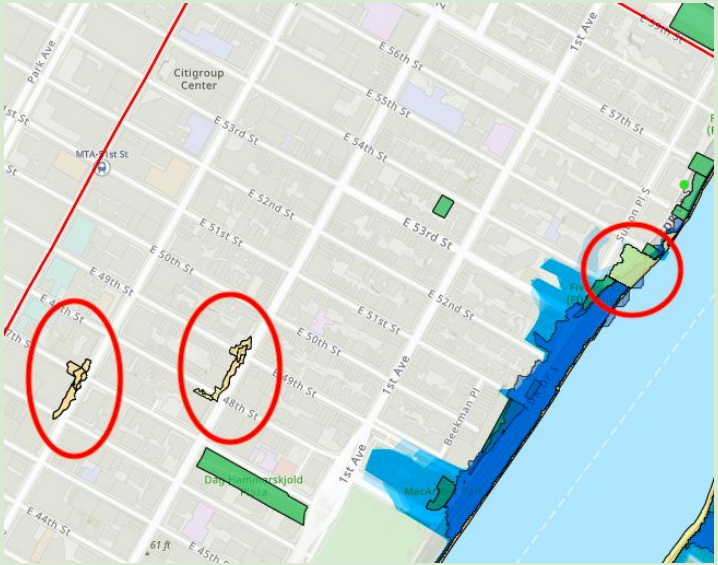
Mapping by: Laureen Makar
Images and Data source: Google Maps


Manhattan CD 6 Flood Risk Ma
hunter.maps.arcgis.com/apps/instant/interactivelegend/index.html?appid=b97084fa5d7b4585a41f97359585df13
Manhattan CD 6 Flood Risk Map
Parks Properties
Community Districts
BoroCD
> 424
< 170
Parking Lots
DEP GI Assets Public
NYC Stormwater Flood Map Extreme Flood with 2080 Sea Level Rise
NYC Stormwater Flood Map Moderate Flood with 2050 Sea Level Rise
NYC Stormwater Flood Map Moderate Flood with Current Sea Levels
Future Floodplain 2080s
Future Floodplain 2050s
Future Floodplain 2020s
Sandy Inundation Zone
Queens Midtown Tunnel
Amtrak
NYC Health Hospitals Bellevue
Stuyvesant Cove Terminal
Esri, NASA, NGA, USGS, FEMA | Esri Community Maps Contributors, NYC OpenData, New Jersey Office of GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA…
Powered by Esri

Part II: GI & Sustainability Recommendations

Prioritize the implementation of green infrastructure in areas at risk of flooding such as:

- East 21st and East 22nd Streets between 2nd and 3rd Avenues
- East 34th Street between the FDR Drive and 1st Avenue
- 3rd Avenue between East 46th and East 47th Streets
- 2nd Avenue between East 48th and East 49th Streets
- The block between the FDR Drive and Sutton Pl S & between 54th and 55th Streets



Mapping by: Laureen Makar Data source: NYC DEP

Part II: GI & Sustainability Recommendations - Examples

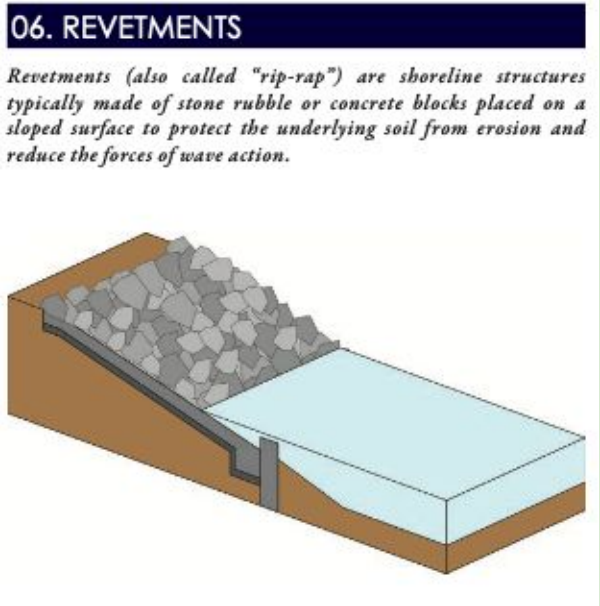
- **Prioritize the implementation of green infrastructure** in flood-prone areas for city-owned buildings/spaces such as schools, public housing, and city parks.

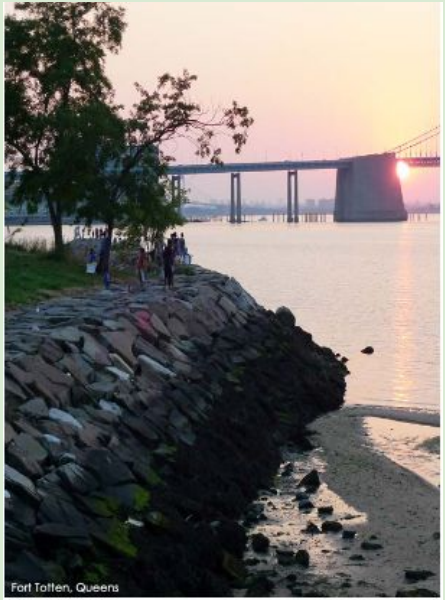
- **Encourage private property** owners within the district to **take advantage of the city's Green Infrastructure Grant Program and the Resilient NYC Partners Program** to receive funding for installation of green infrastructure on their properties.

- Pursue the implementation of porous and permeable pavements and other green infrastructure in vacant lots, parcels owned by the city, and spaces along and under the FDR Drive that are managed or owned by city agencies.

Part III: Waterfront Adaptive Strategies

- Currently no city resiliency plan for east side above 25th street
  - Possible appropriate adaptive strategies include revetments, bulkheads, waterfront parks, living shorelines, etc.



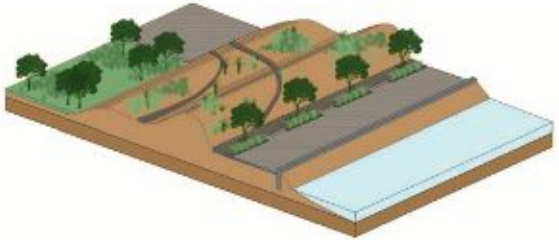


Source: NYC DCP "Coastal Climate Resilience Urban Waterfront Adaptive Strategies"

Part III: Waterfront Adaptive Strategies

03. WATERFRONT PARKS

Waterfront parks are open spaces designed with landscape features such as floodable areas, elevated land masses and other adaptive park design features that can quickly recover following storm events and help protect upland areas from coastal flooding.

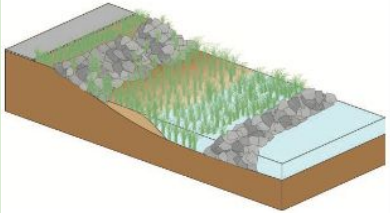


Ability to Address Coastal Hazards

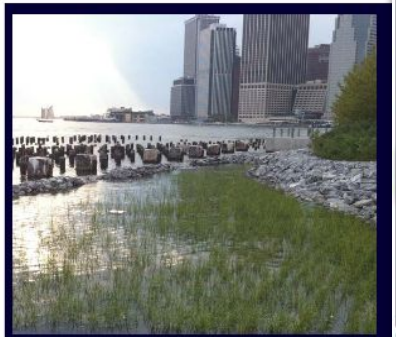
EVENT-BASED	Storm Surge (High)	◐
	Storm Surge (Low)	●
	Wave Force	◐
	Sudden Erosion	◐
GRADUAL	Frequent Flooding due to Sea Level Rise	●
	Erosion	●

07. LIVING SHORELINES

Living shorelines are a bank stabilization technique that use plants, sand/soil, and limited use of hard structures to provide shoreline protection and maintain valuable habitat.



Living shorelines are an alternative to bulkheads or revetments that provide for a stable shoreline resistant to erosion while also providing for intertidal habitat and coastal vegetation. Living shoreline design remains an emerging field, and as such, what is often called a "living shoreline" can vary greatly and is a topic of much discussion among practitioners.



Ability to Address Coastal Hazards

EVENT-BASED	Storm Surge (High)	○
	Storm Surge (Low)	◐
	Wave Force	◐
	Sudden Erosion	●
GRADUAL	Frequent Flooding due to Sea Level Rise	●
	Gradual Erosion	●

Applicability to Geomorphology Type

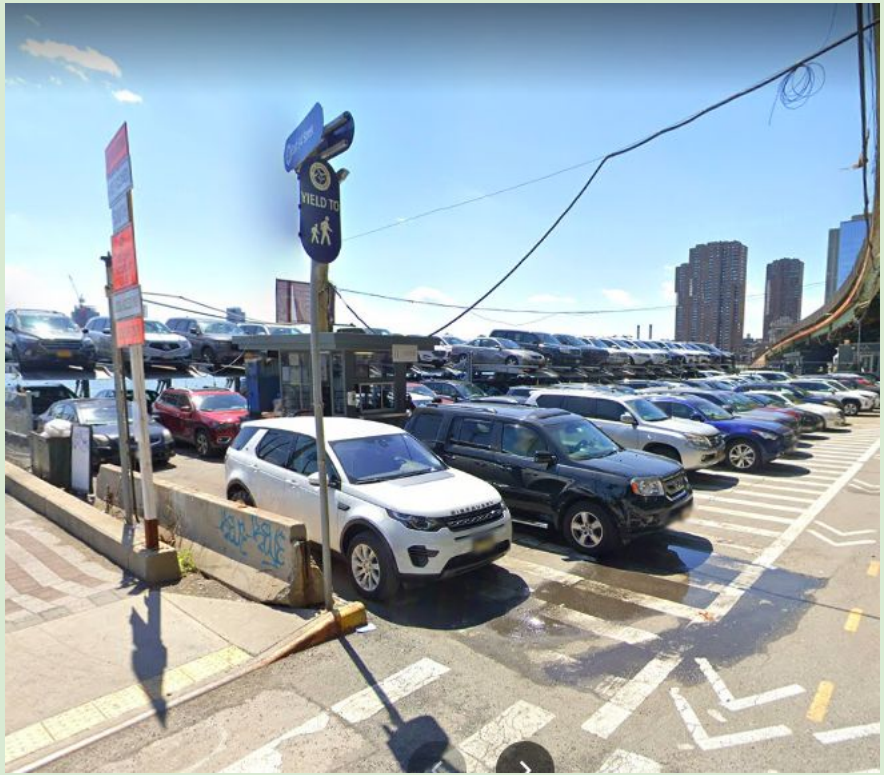
1	Oceanfront Beaches	○
2	Hardened Oceanfront Plains	○
3	Coastal Marshes	●
4	Hardened Sheltered Bay Plains	●
5	Oceanfront Slopes	○
6	Sheltered Bay Slopes	●
7	Hardened Sheltered Bay Slopes	●
8	Sheltered Bluffs	●
9	Hardened Sheltered Bluffs	●

● HIGH ◐ MEDIUM ○ LOW

Source: NYC DCP "Coastal Climate Resilience Urban Waterfront Adaptive Strategies"

Recommendations: Start with Waterfront Parks

34th St waterfront parking lot



Hunter’s Point South Waterfront Park

Images Sources: Google Maps & Hunter's Point South Park

Recommendations: Start with Waterfront Parks

Parking lot under FDR Drive E 18th St. - 23rd St.

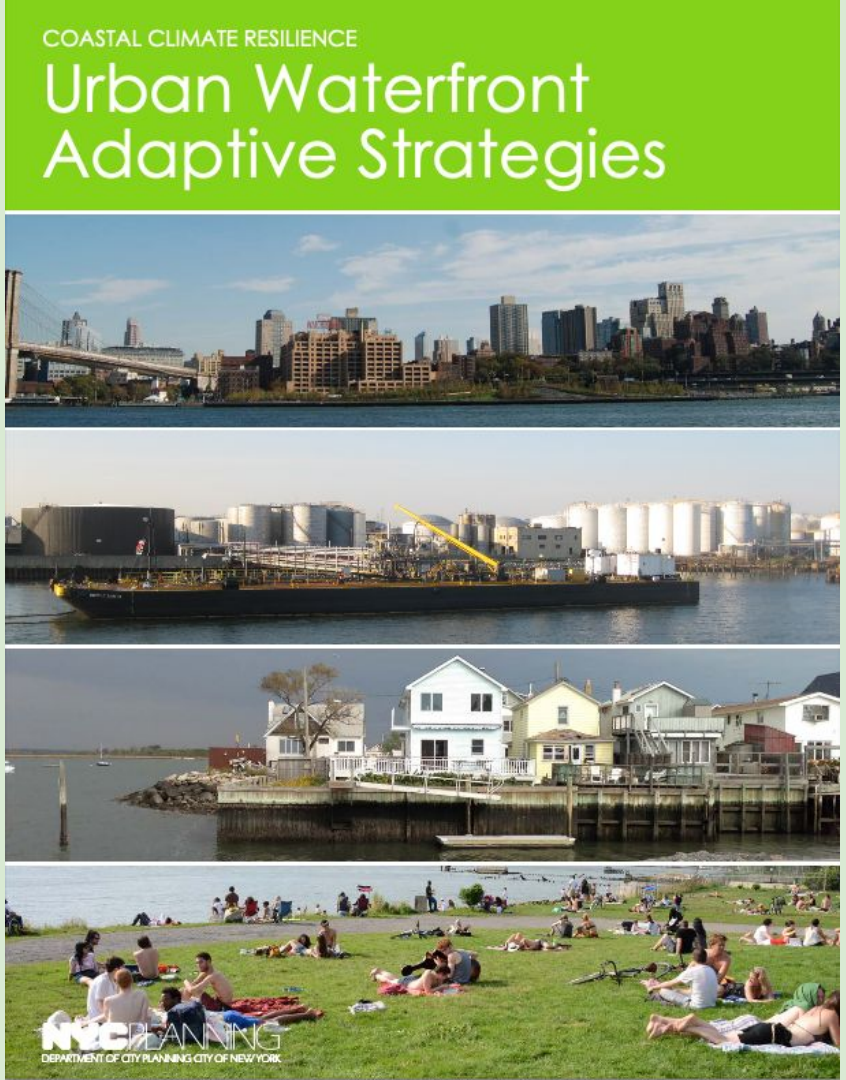
Stuyvesant Cove Park

Image Sources: Google Maps; https://untappedcities.com/2017/07/25/the-top-10-secrets-of-stuyvesant-cove-park/?displayall=true

Key Resources

- Research, reports, maps, plans, data sets, etc. from NYC:
  - Department of City Planning
  - Department of Environmental Protection
  - Mayor's Office of Climate Resiliency

- CB6's 197-a plan and Statement of District Needs; Other CB's 197-a plans and Statements of District Need



Thank You!