

# Schematic Design of the Brooklyn Waterfront Greenway as a Flood Barrier in Red Hook and Flood Protection Study for the Greenway in Sunset Park

NEWEA Annual Conference

January 22, 2018



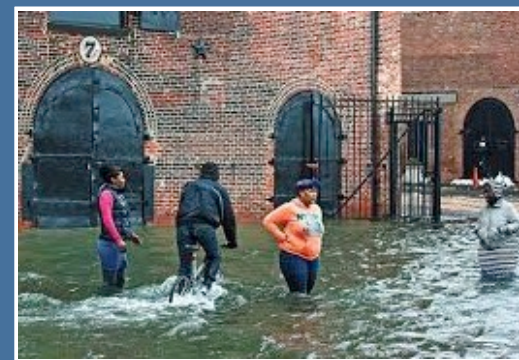
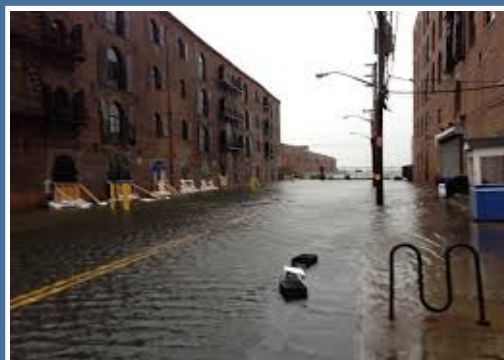
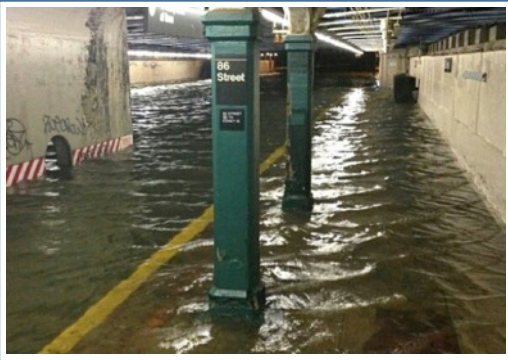
SCAPE

# Agenda

- History and Background
- Schematic designs for the Greenway in Red Hook
- Sunset Park Feasibility Study for the Greenway integrated with flood protection



# Superstorm Sandy in NYC





# Brooklyn Greenway Initiative (BGI)



- 14 mile-long bike and pedestrian route
- Connecting neighborhoods along the Brooklyn waterfront





# Brooklyn Greenway Initiative (BGI)



Schematic Design of the Brooklyn Waterfront Greenway as a Flood Barrier in Red Hook and Flood Protection Study for the Greenway in Sunset Park



# Project Overview – RED HOOK

Develop schematic designs with the following goals

- Incorporate the Red Hook IFPS with the Brooklyn Waterfront Greenway
- Provide flood protection
- Provide emergency route in and out of Red Hook during a flood
- Close proximity to the Red Hook waterfront
- Designs were coordinate with agencies (MORR and NYCDOT)





# Project Overview - SUNSET PARK

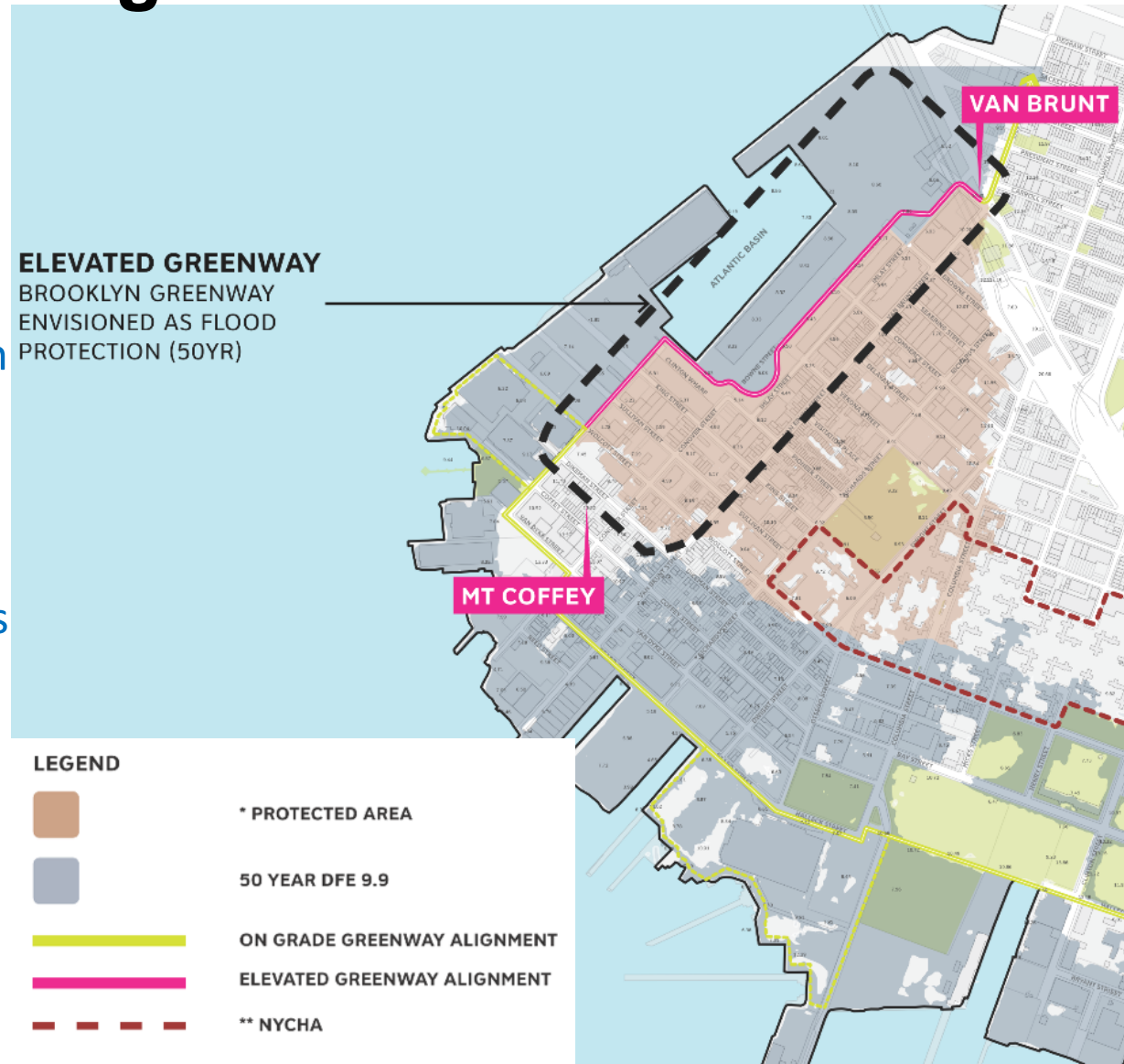


## Integrated Flood Protection System Feasibility Study

- Review of past studies, utilities, data
- Existing Conditions from site visits
- 3 alternatives were developed for Greenway and flood protection alignments based on site constraints
- Benefits matrix from feasibility report
- Construction costs were estimated
- Next steps identified

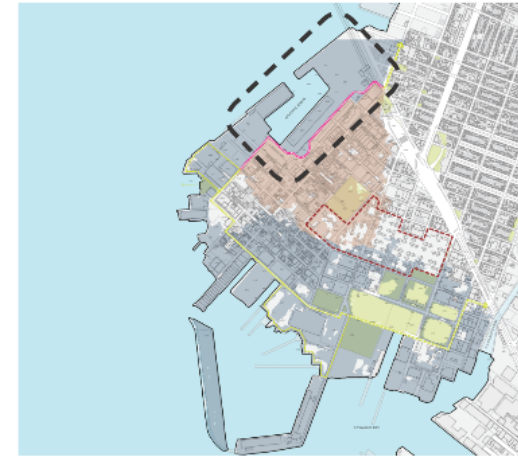
# Schematic Designs in Red Hook

- Protection from 50-Year flood event
- Provide emergency egress
- Provide physical separation between vehicular traffic and Greenway
- Investigate stormwater management opportunities
- Create public amenity spaces
- Close proximity to the waterfront

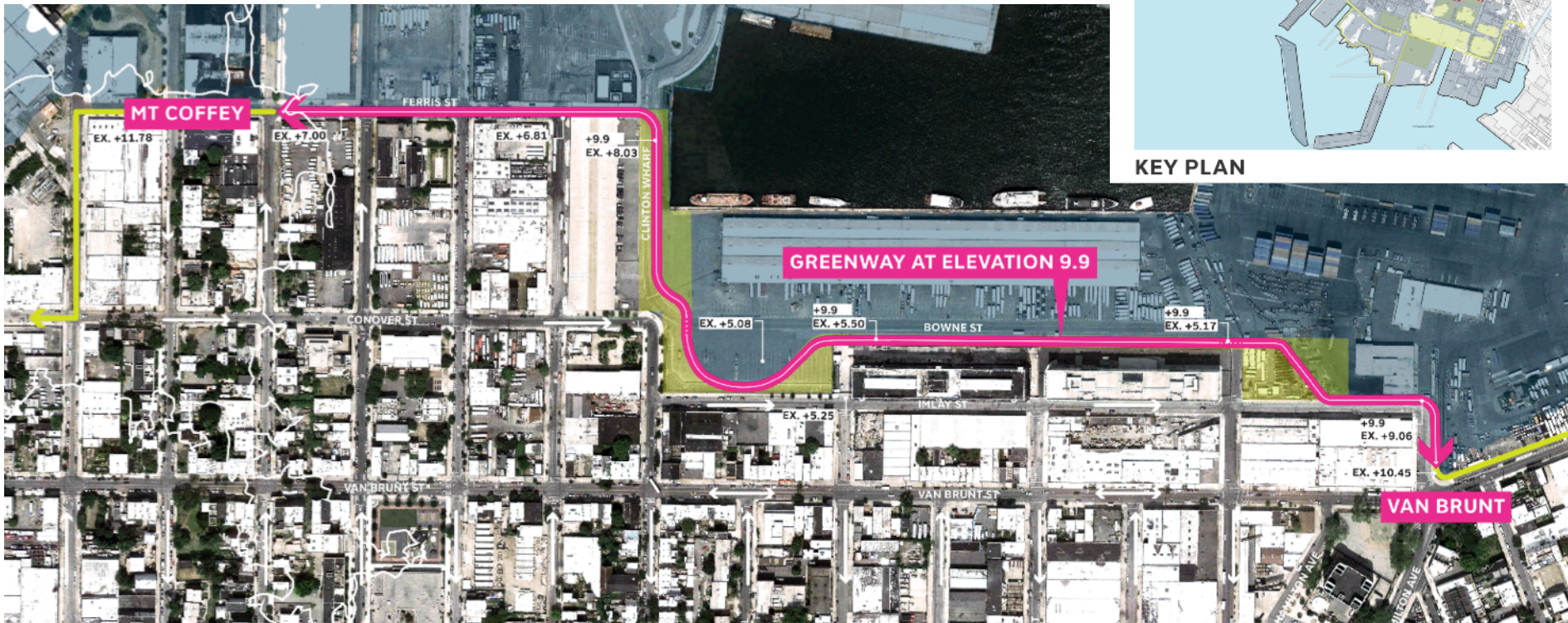




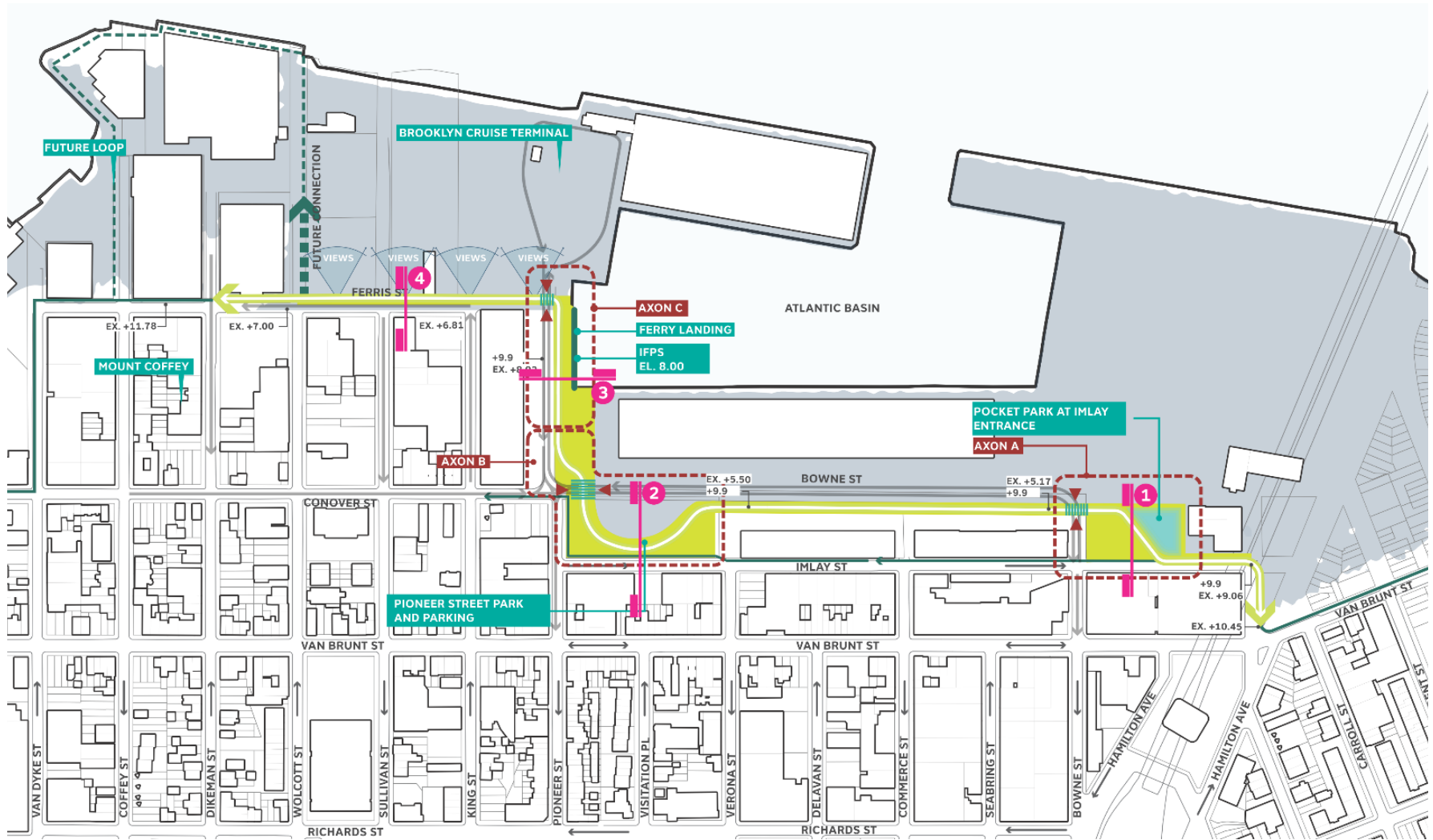
# Layout of the Greenway in Red Hook



KEY PLAN

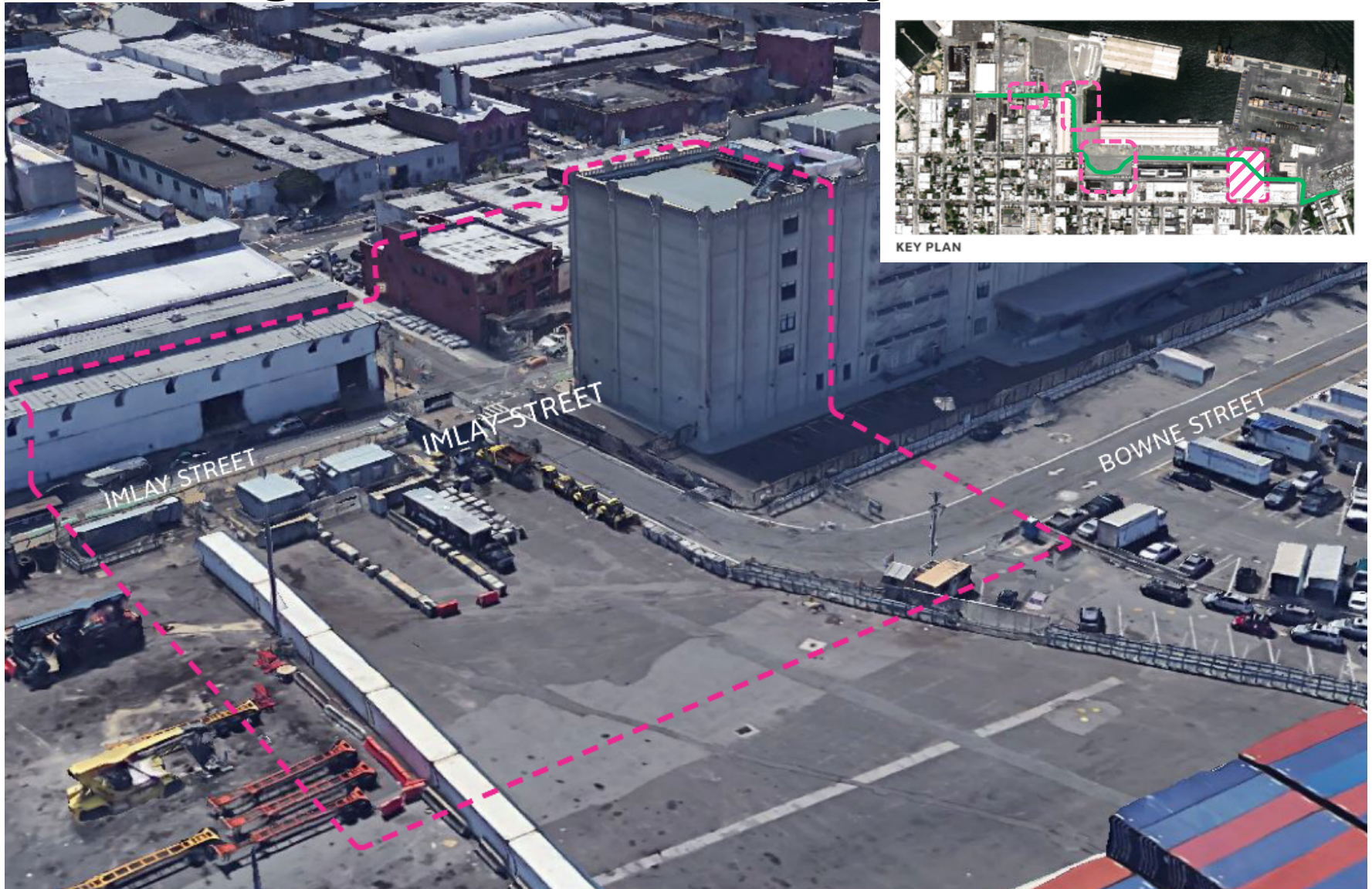


# Greenway Opportunities Plan



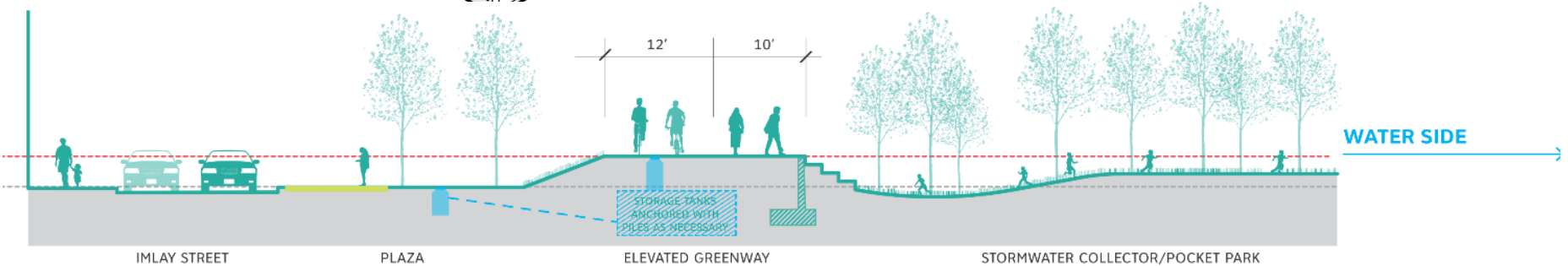
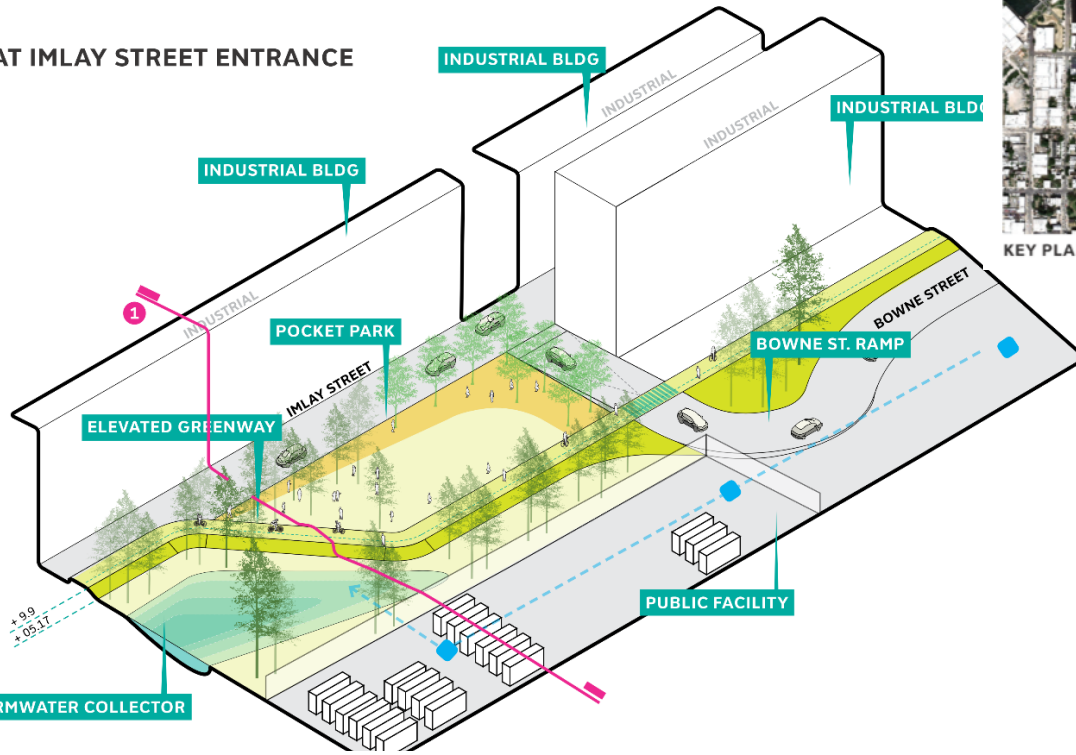


# Existing Conditions – Imlay & Bowne St.



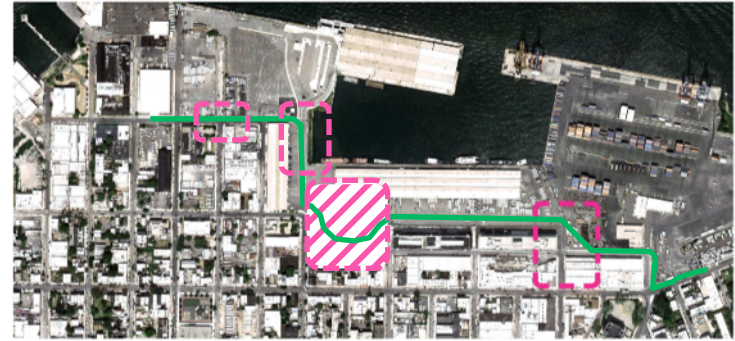
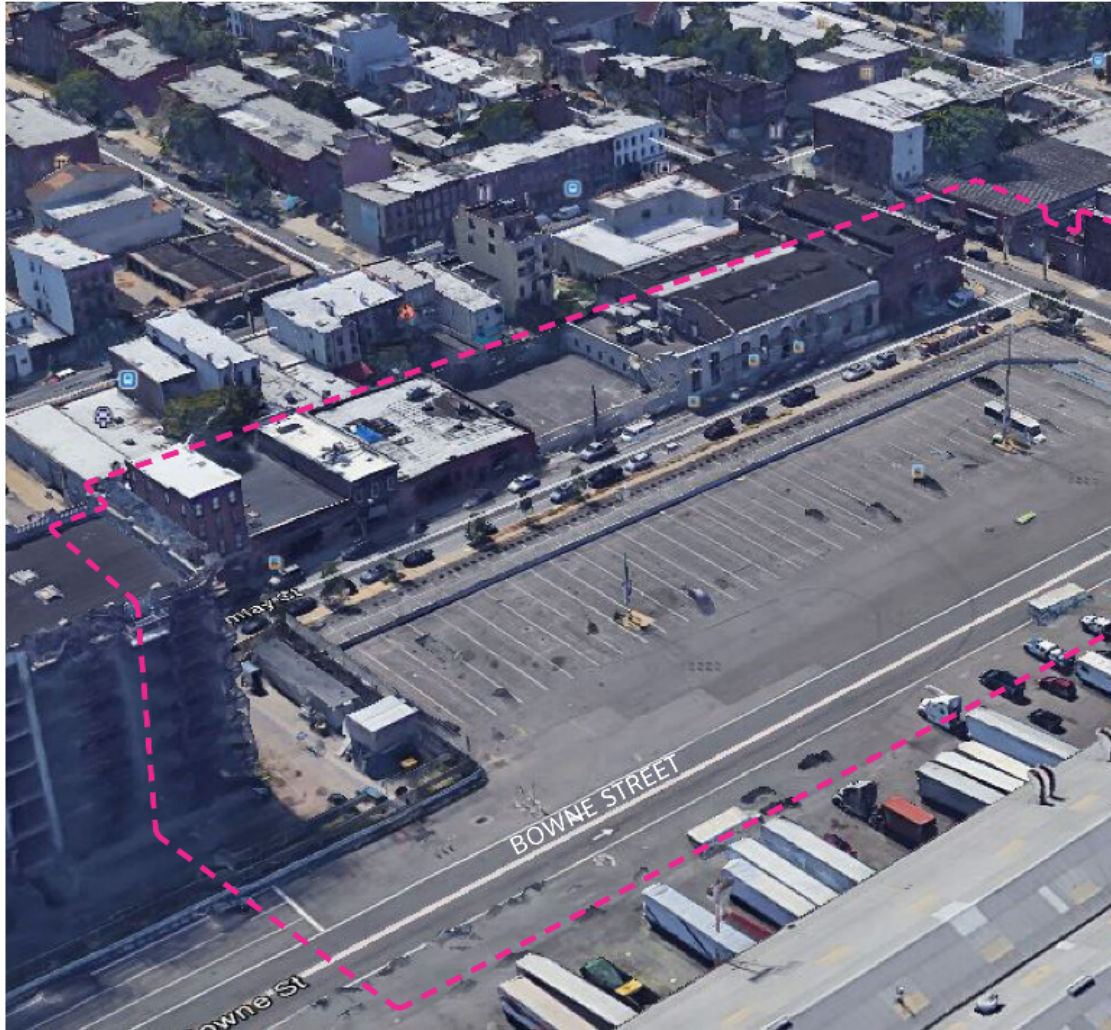
# Schematic Design – Imlay & Bowne St.

POCKET PARK AT IMLAY STREET ENTRANCE





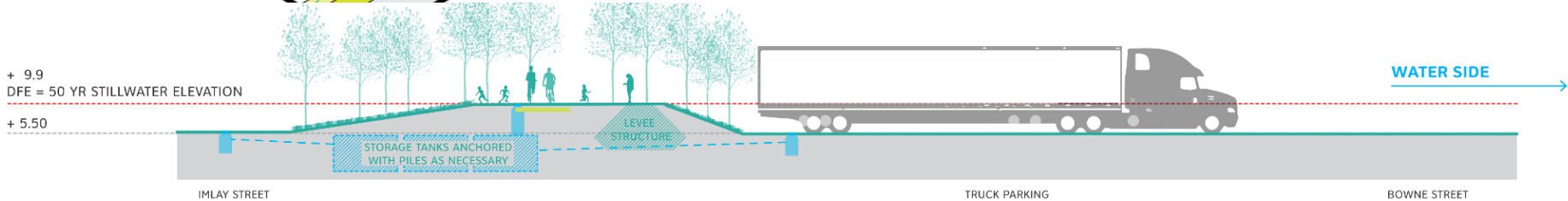
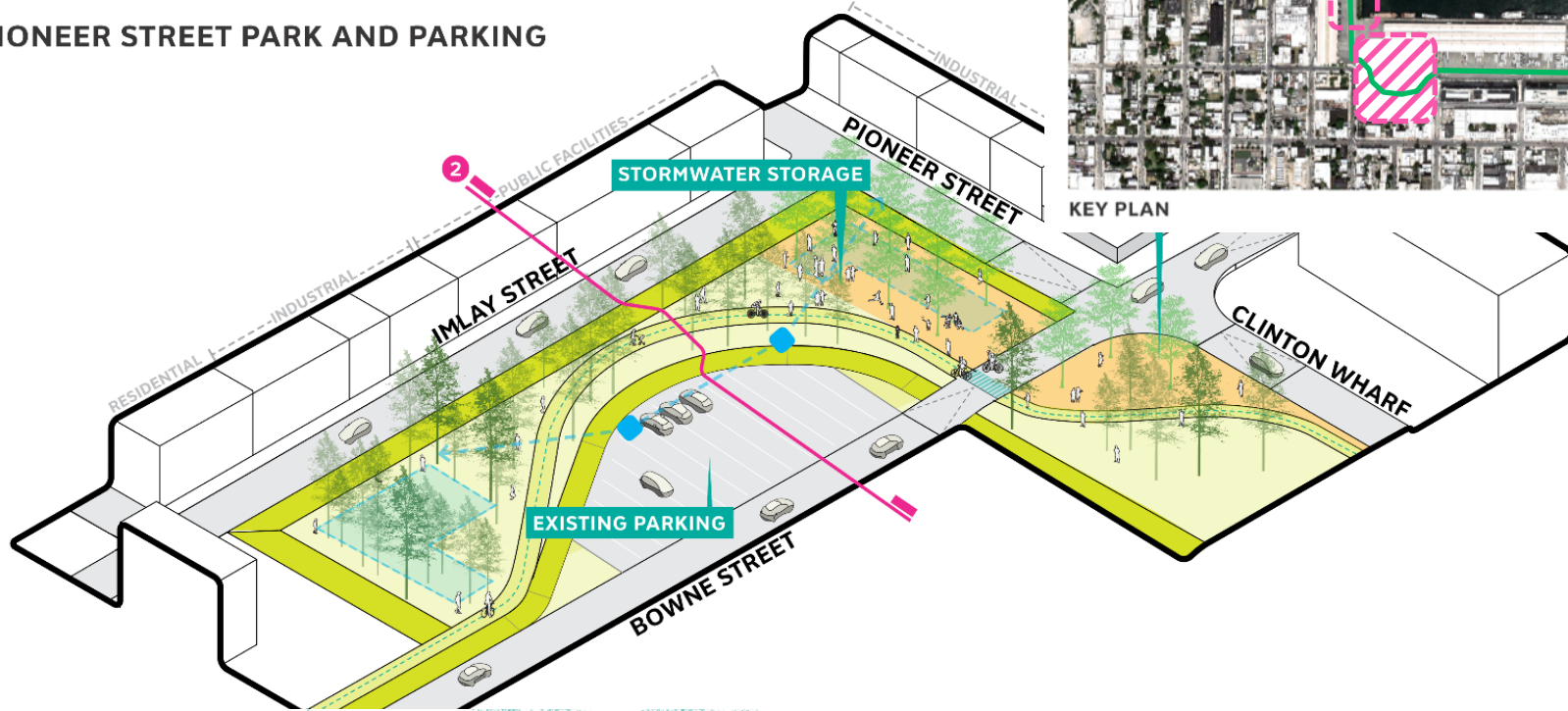
# Existing Parking at Bowne Street



KEY PLAN

# Schematic Designs at Bowne St.

## PIONEER STREET PARK AND PARKING

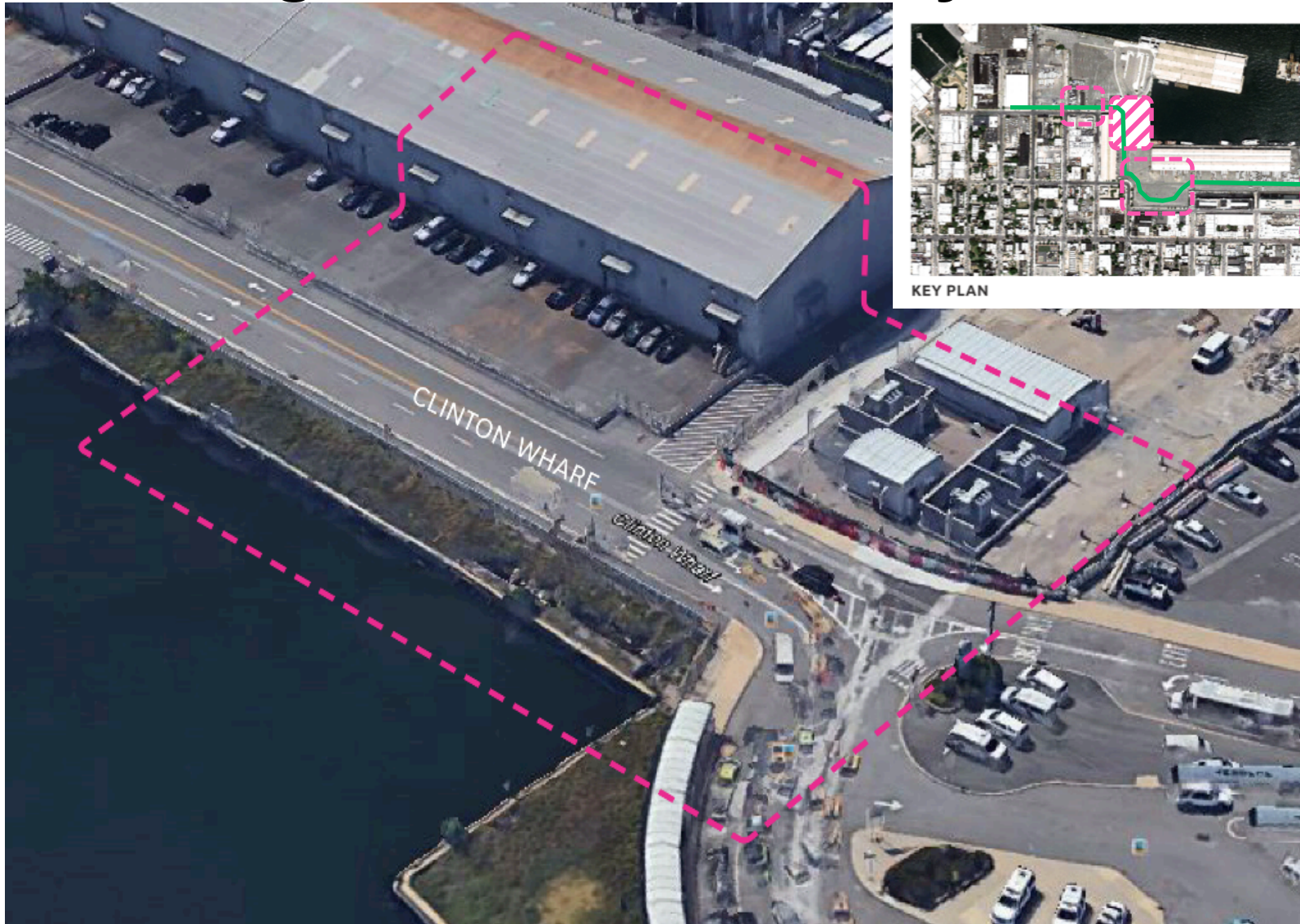


SECTION 2

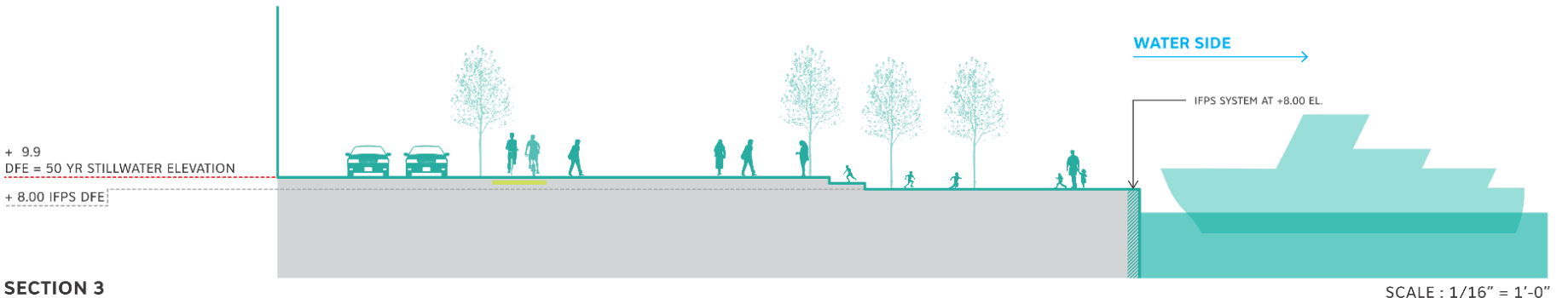
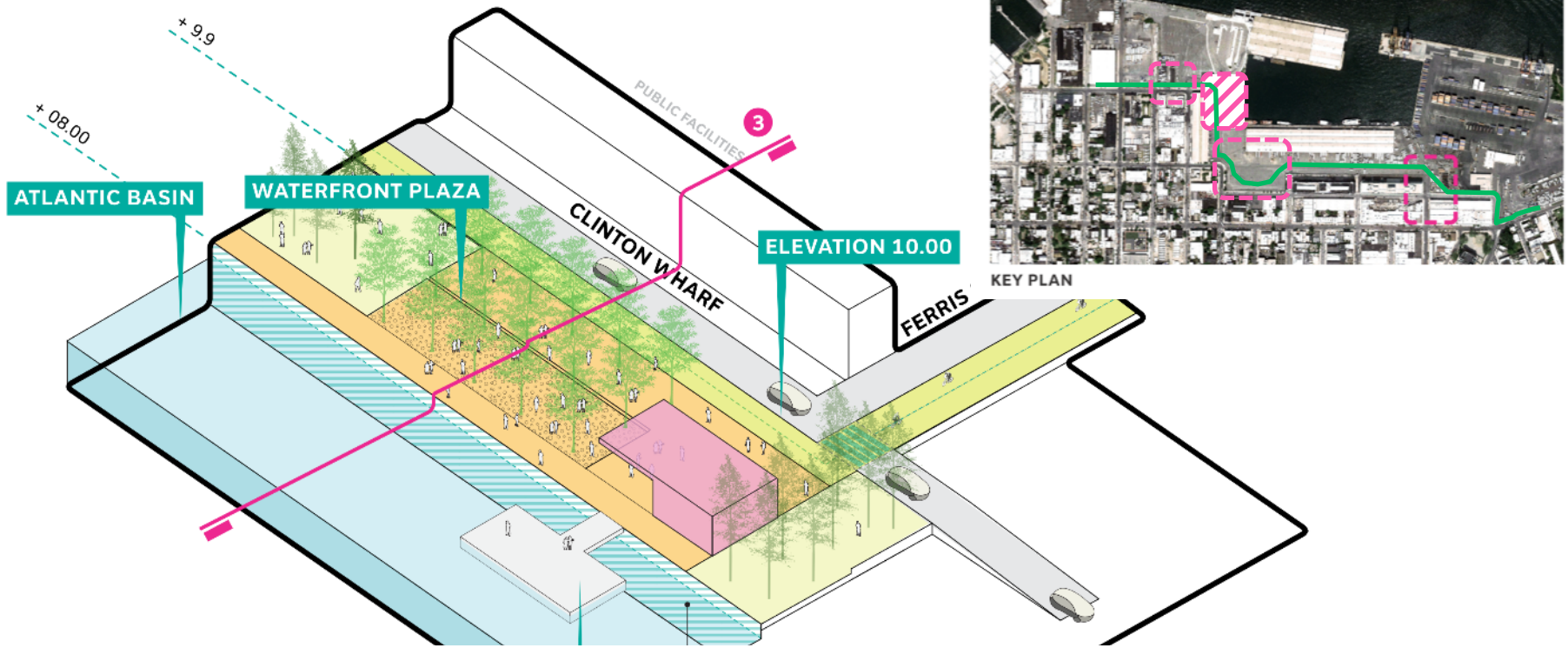
SCALE : 1/16" = 1'-0"



# Existing Conditions at Ferry Terminal

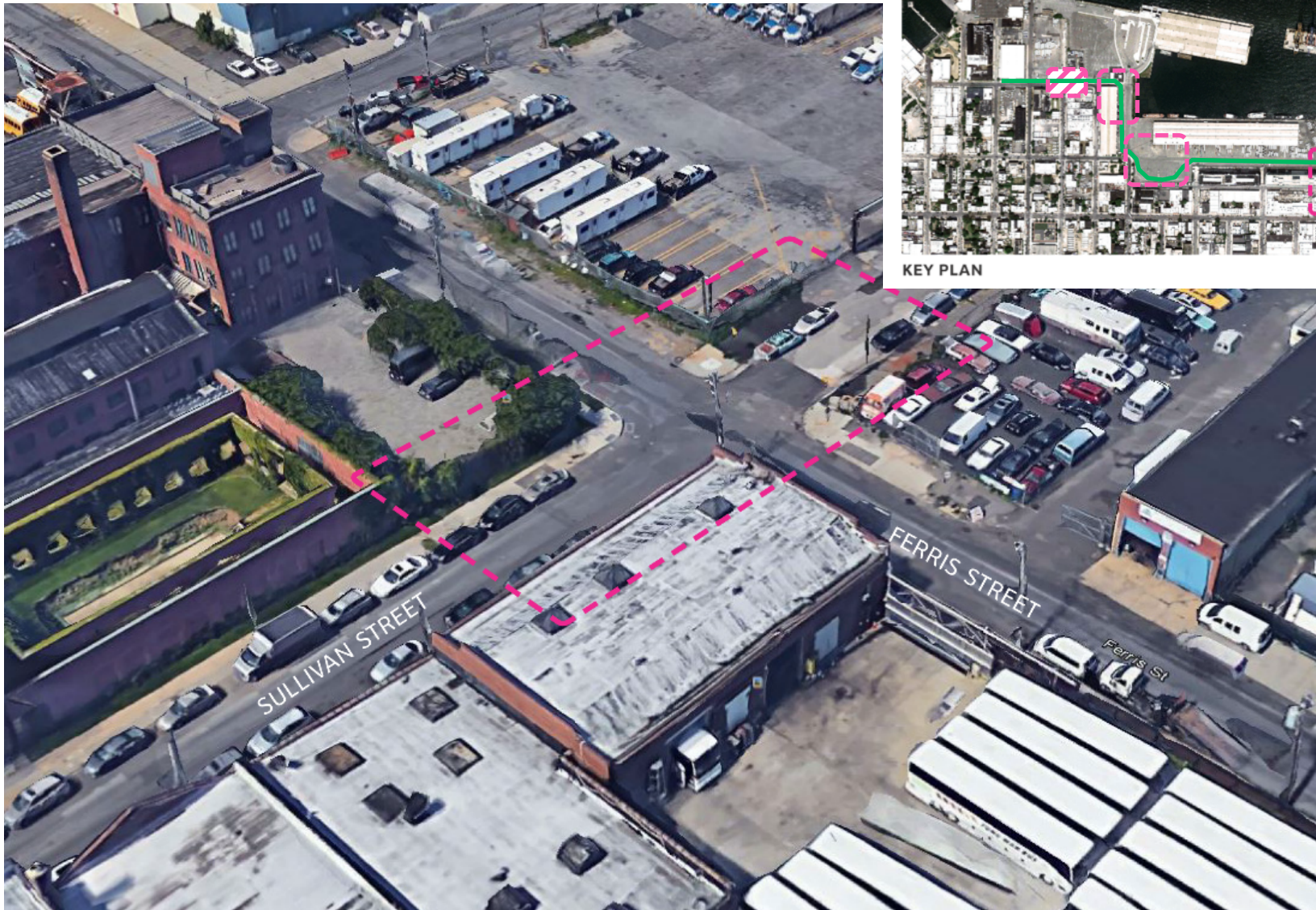


# Schematic Design at Ferry Terminal

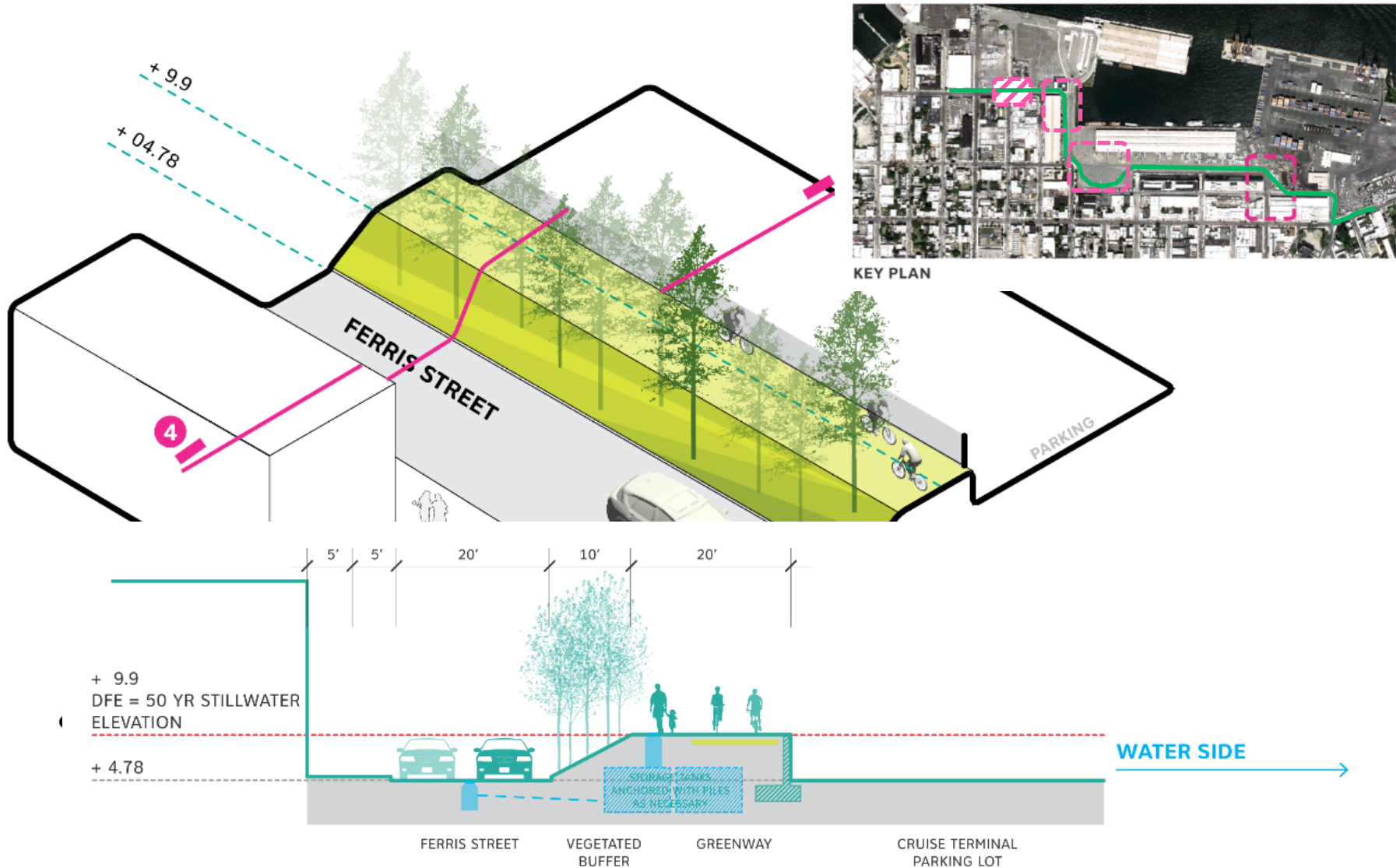




# Existing Conditions – Sullivan & Ferris St.

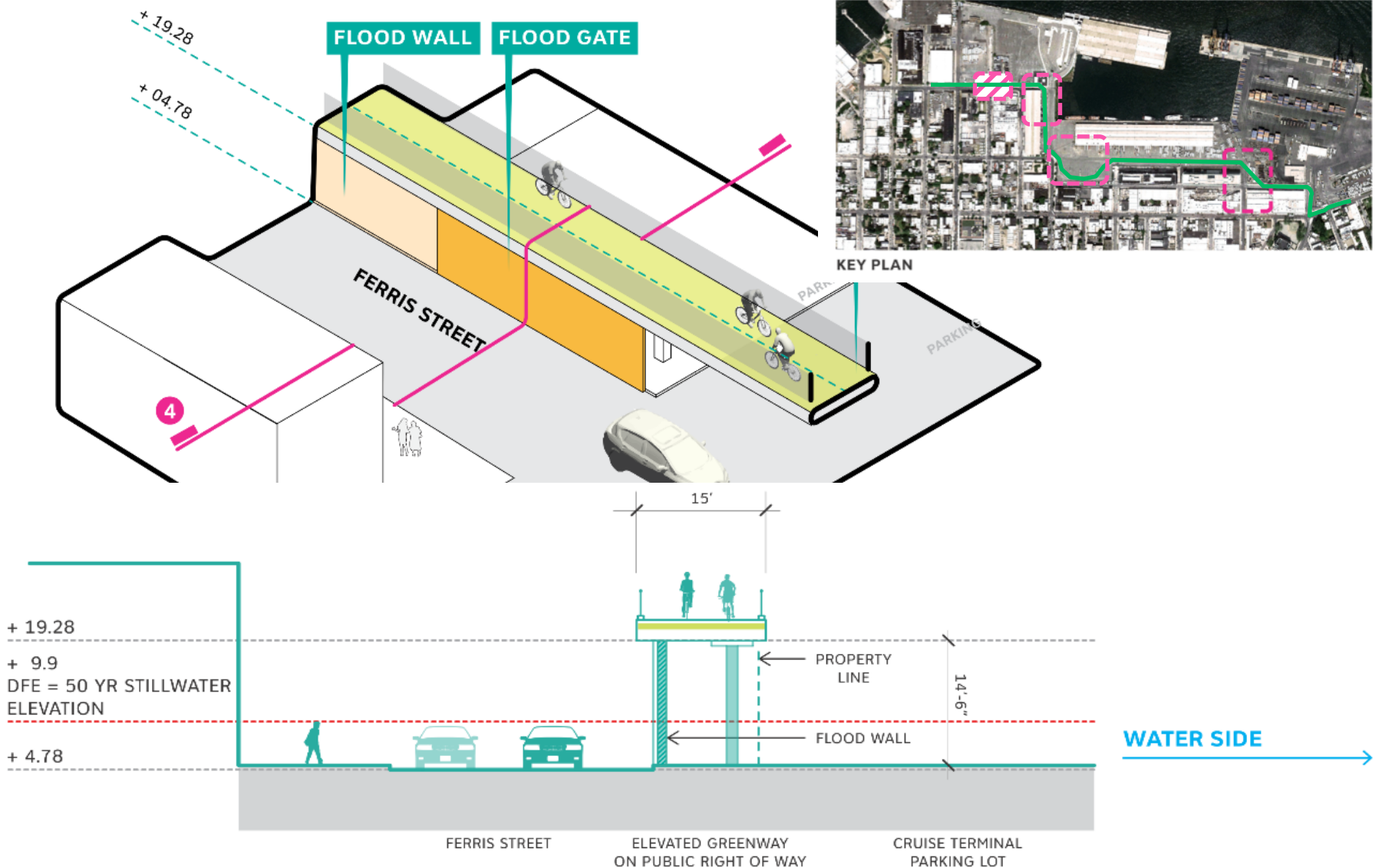


# Schematic Design – Option 1 at Ferris St.





# Schematic Design – Option 2 at Ferris St.



# Sunset Park Feasibility Study

## Existing Conditions

- Review and Analysis of Prior Studies and Reports
- Site Visits to Verify and Analyze Conditions
- Determine Site Constraints, Needs, and Opportunities



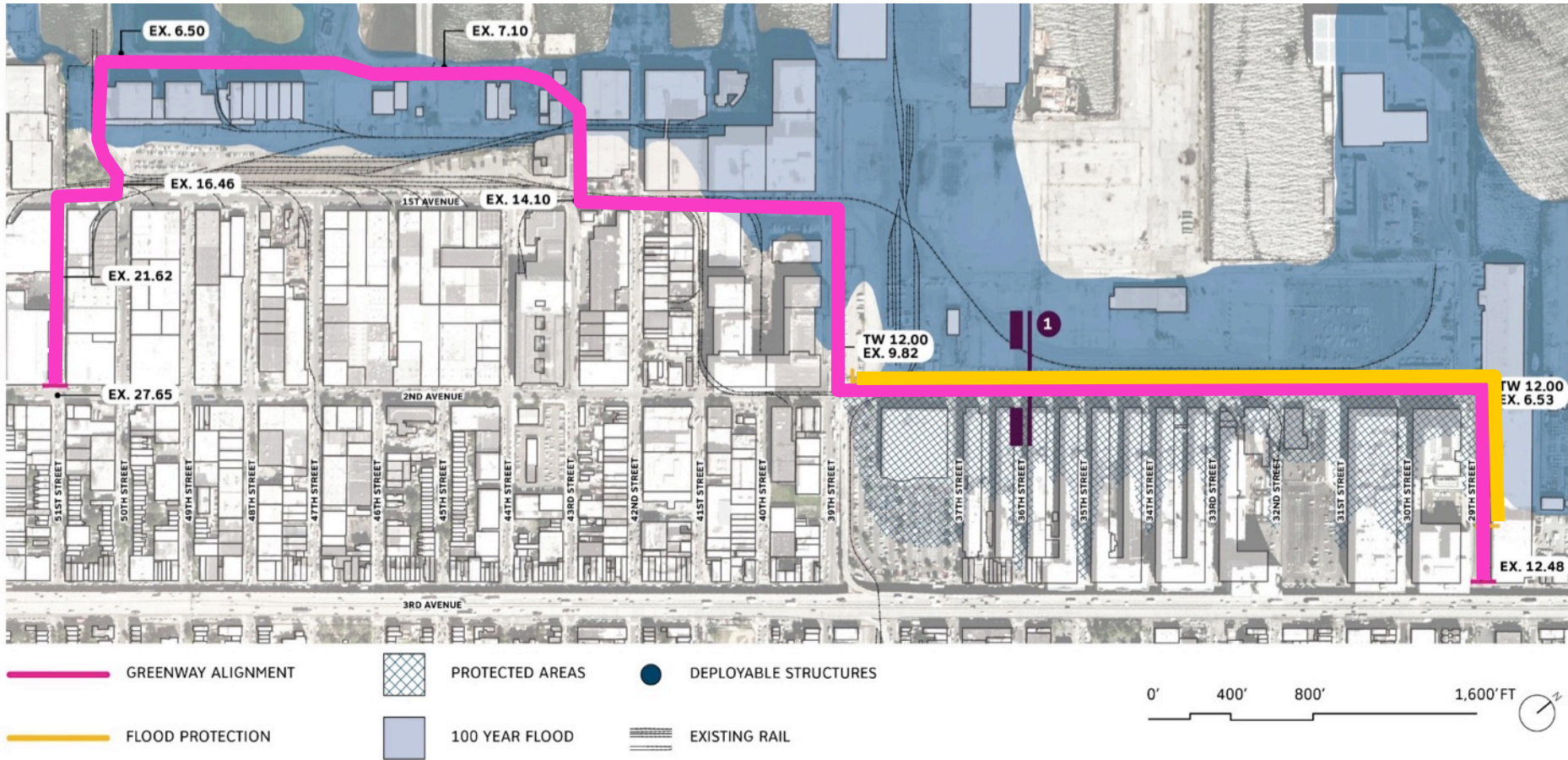


# Sunset Park Feasibility Study



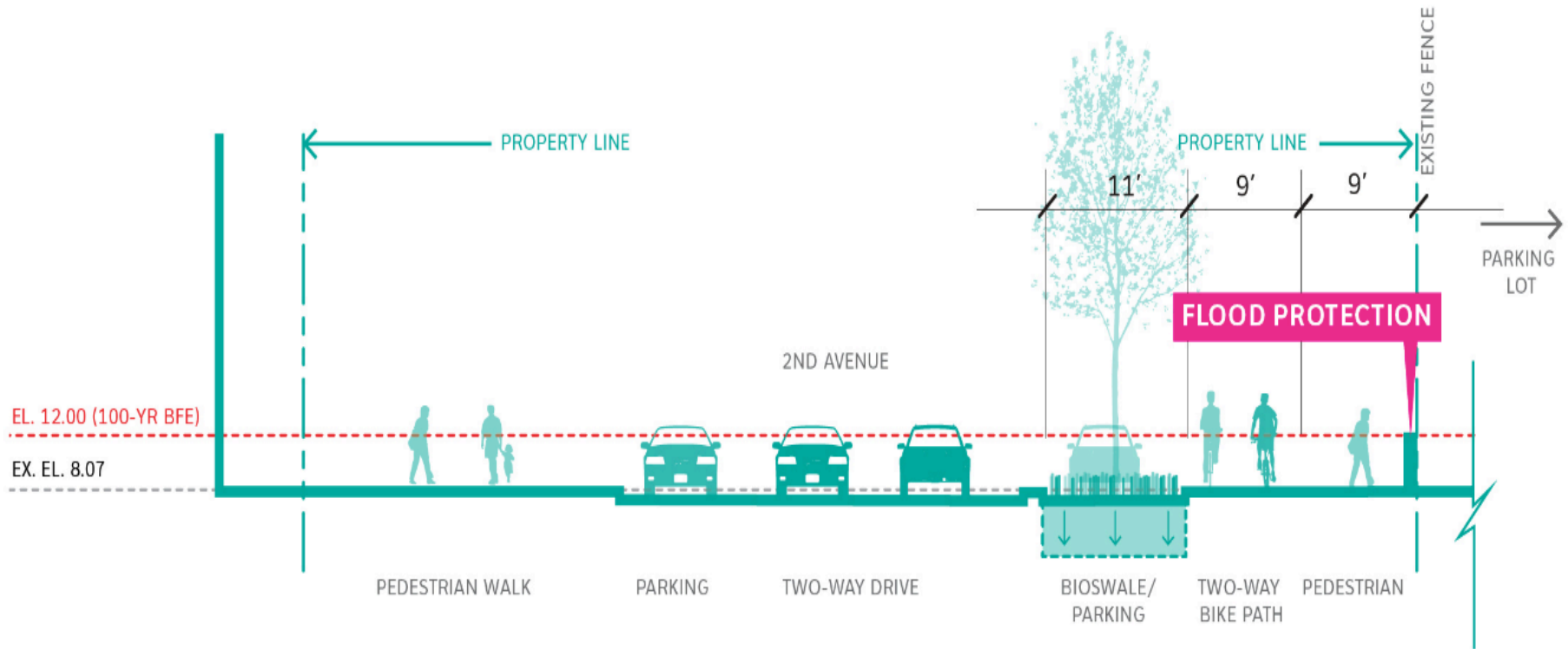


# Sunset Park – Alternative 1



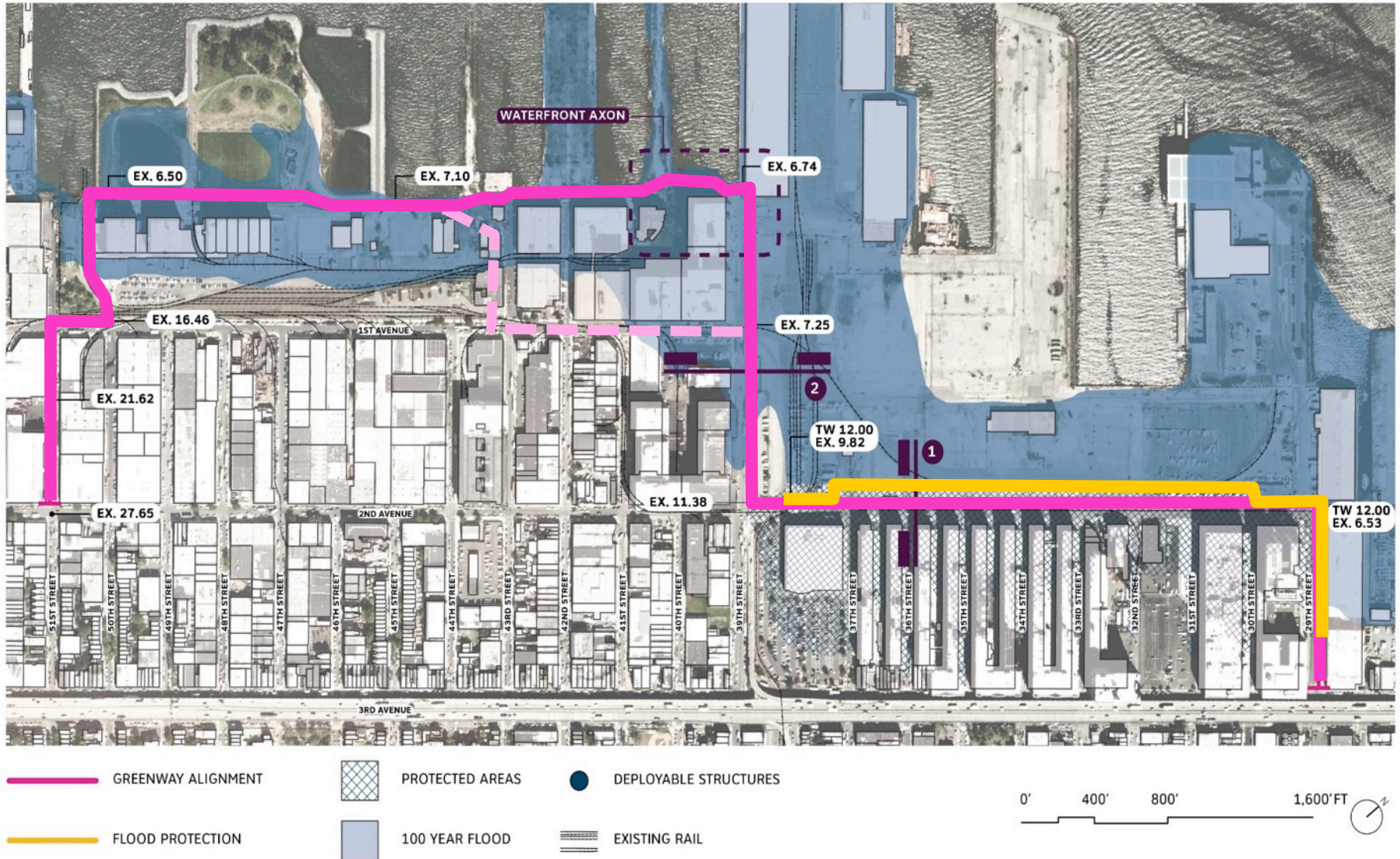


# Sunset Park - Alternative 1



Cross Section along 2<sup>nd</sup> Avenue

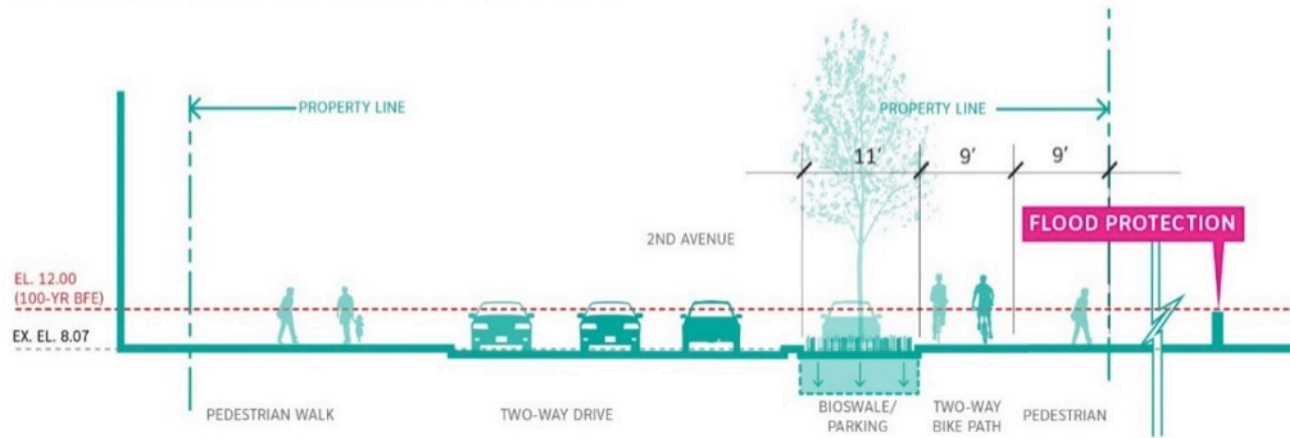
# Sunset Park – Alternative 2



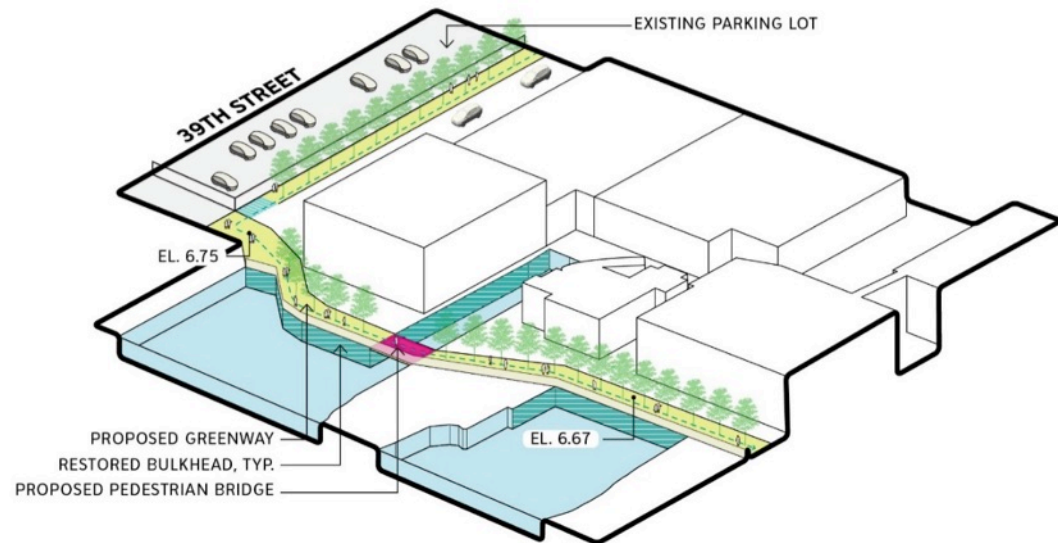
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# Sunset Park – Alternative 2

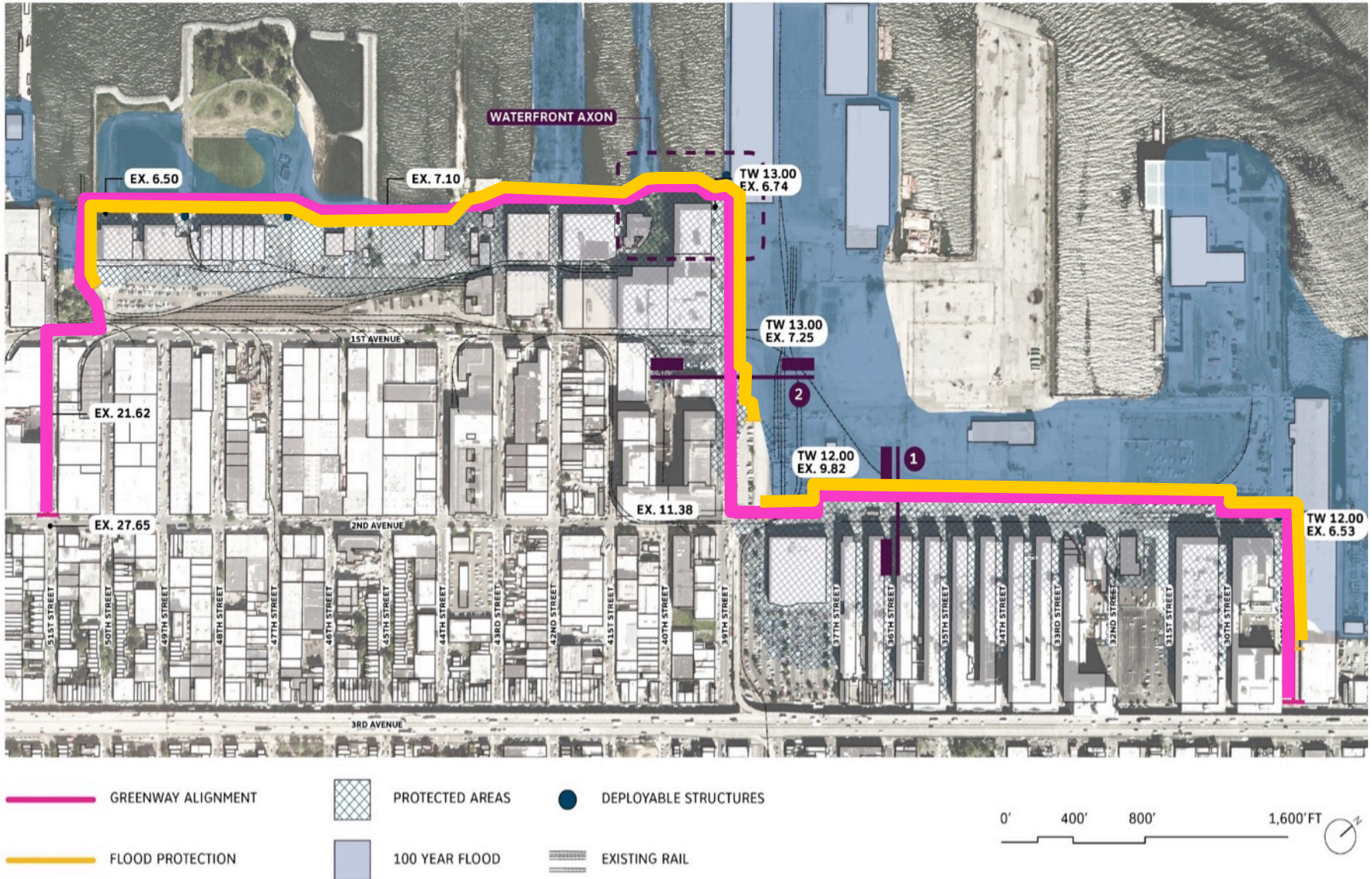


Cross Section along 2<sup>nd</sup> Avenue



Axon of the waterfront area

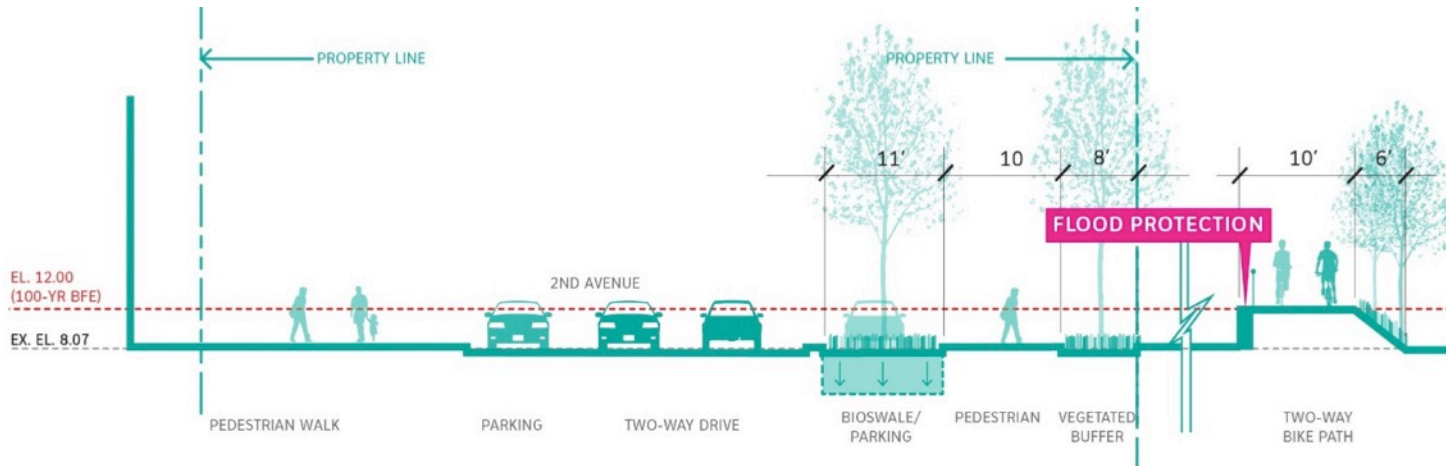
# Sunset Park – Alternative 3



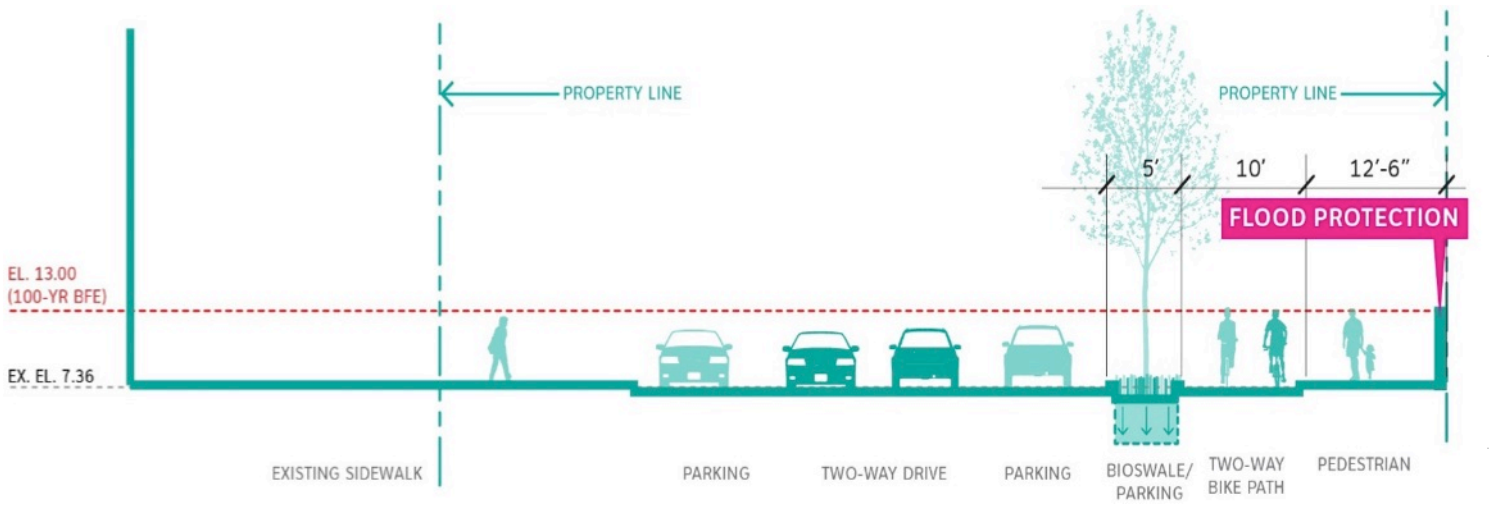
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# Sunset Park – Alternative 3



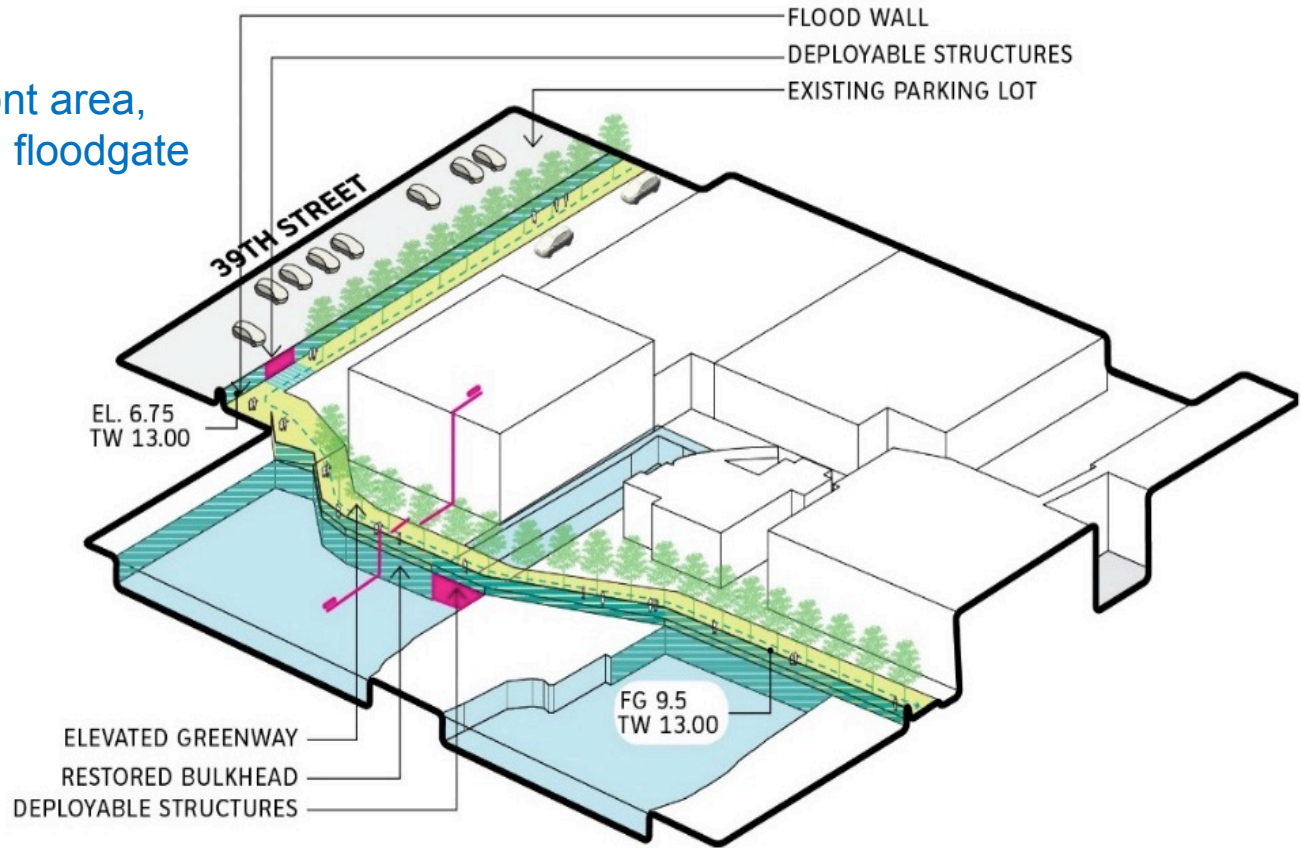
Cross Section along 2<sup>nd</sup> Avenue



Cross Section along 39<sup>th</sup> Street

# Sunset Park Alternative 3

Axon of the waterfront area,  
option of bridge with floodgate





# Sunset Park Feasibility Study Report

## Alternative Comparison

Features	Alternative 1	Alternative 2	Alternative 3
Approx. length of Greenway alignment	9,178 LF	9,265 LF	9,343 LF
Approx. length of flood protection alignment	3,053 LF	3,139 LF	7,601 LF
Potential no. of deployables in alignment	12	3	11
Coastal flood risk reduction benefits	Moderate among all three alternatives	Moderate among all three alternatives	Maximum among all three alternatives
Stormwater flood risk reduction benefits	Similar for all three alternatives	Similar for all three alternatives	Similar for all three alternatives
Cost estimate range of alignment	\$40.9 Million	\$88.7 Million	\$128.0 – 130.5 Million
Impacts to built environment	Lowest impact among all three alternatives	Moderate impact among all three alternatives	Highest impact among all three alternatives
Level of protection to existing building and utilities	Moderate among all three alternatives	Moderate among all three alternatives	Maximum among all three alternatives
Level of emergency access	Moderate among all three alternatives	Moderate among all three alternatives	Maximum among all three alternatives
Access to Waterfront	From 43 <sup>rd</sup> St. to 50 <sup>th</sup> St.	From 39 <sup>th</sup> St. to 50 <sup>th</sup> St.	From 39 <sup>th</sup> St. to 50 <sup>th</sup> St.

# Next Steps

- Coordinate with city agencies and public outreach efforts with community groups and property owners and developers to obtain input regarding flood barrier structures and Greenway alignments
- Select the preferred alternative based on feedback from key stakeholders, community input, as well as factors and constraints listed in this feasibility study.
- Coordinate the scope of this project with other ongoing development projects and resilience measures in and around the study area



# Questions?

