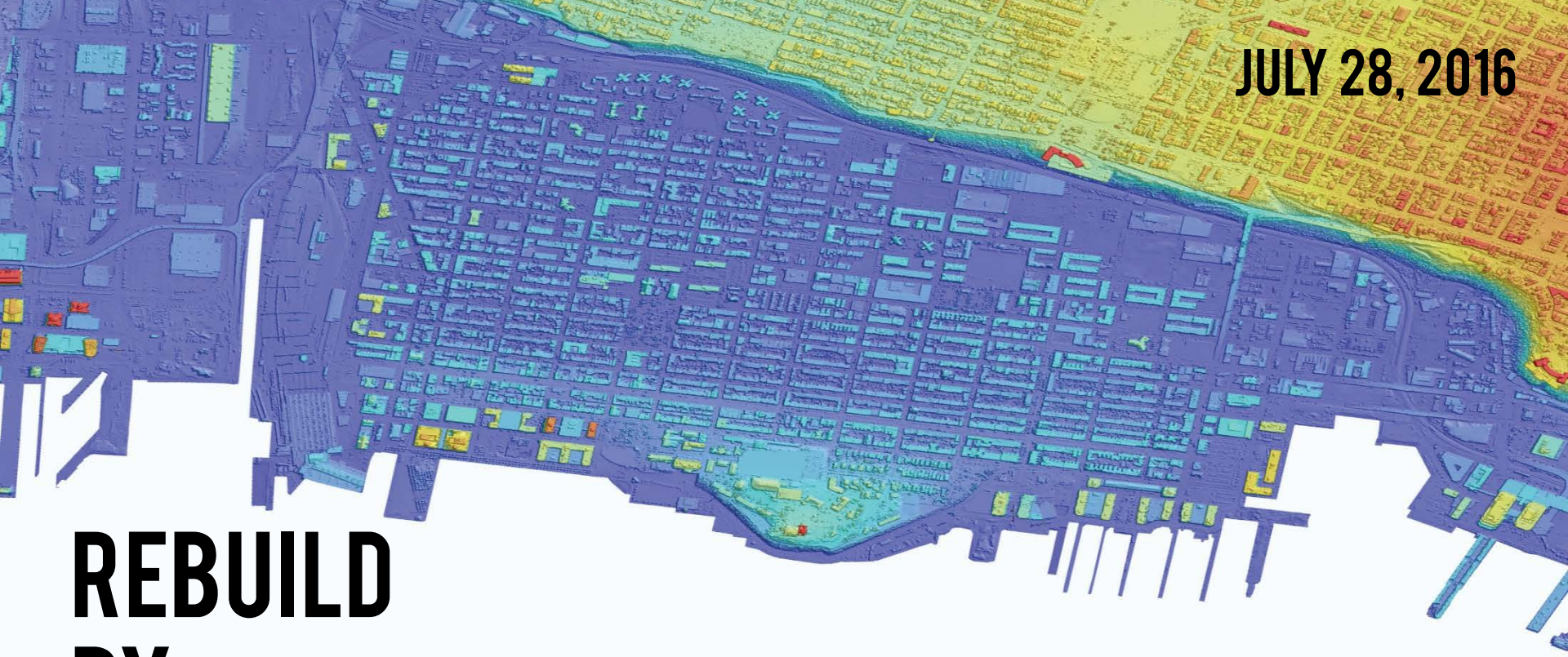

REBUILD BY DESIGN

RESIST · DELAY · STORE · DISCHARGE

HUDSON RIVER

Hoboken Weehawken Jersey City | New Jersey

ALTERNATIVES ANALYSIS

Meeting Agenda

Introduction	5 minutes
Project Status	5 minutes
Alternatives Analysis	5 minutes
Evaluation Criteria (Matrix)	40 minutes

- Flood Risk Reduction
- Socioeconomics / Built Environment
- Benefit Cost Analysis
- Construction / Maintenance and Operations
- Environmental Impacts

Takeaways / Next Steps	5 minutes
Q&A	20 minutes
Breakout Session	30 minutes

Rebuild by Design Vision

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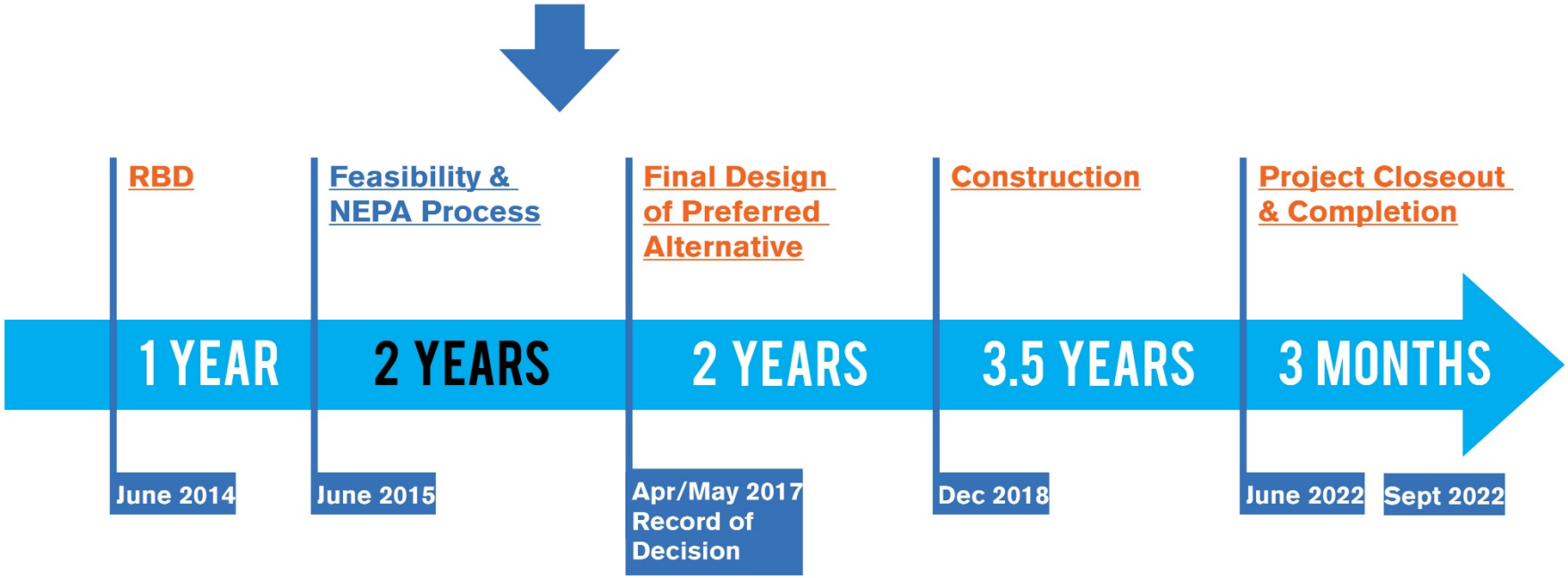
Project Status



Opportunities to Participate

How are we soliciting community input in this project phase?

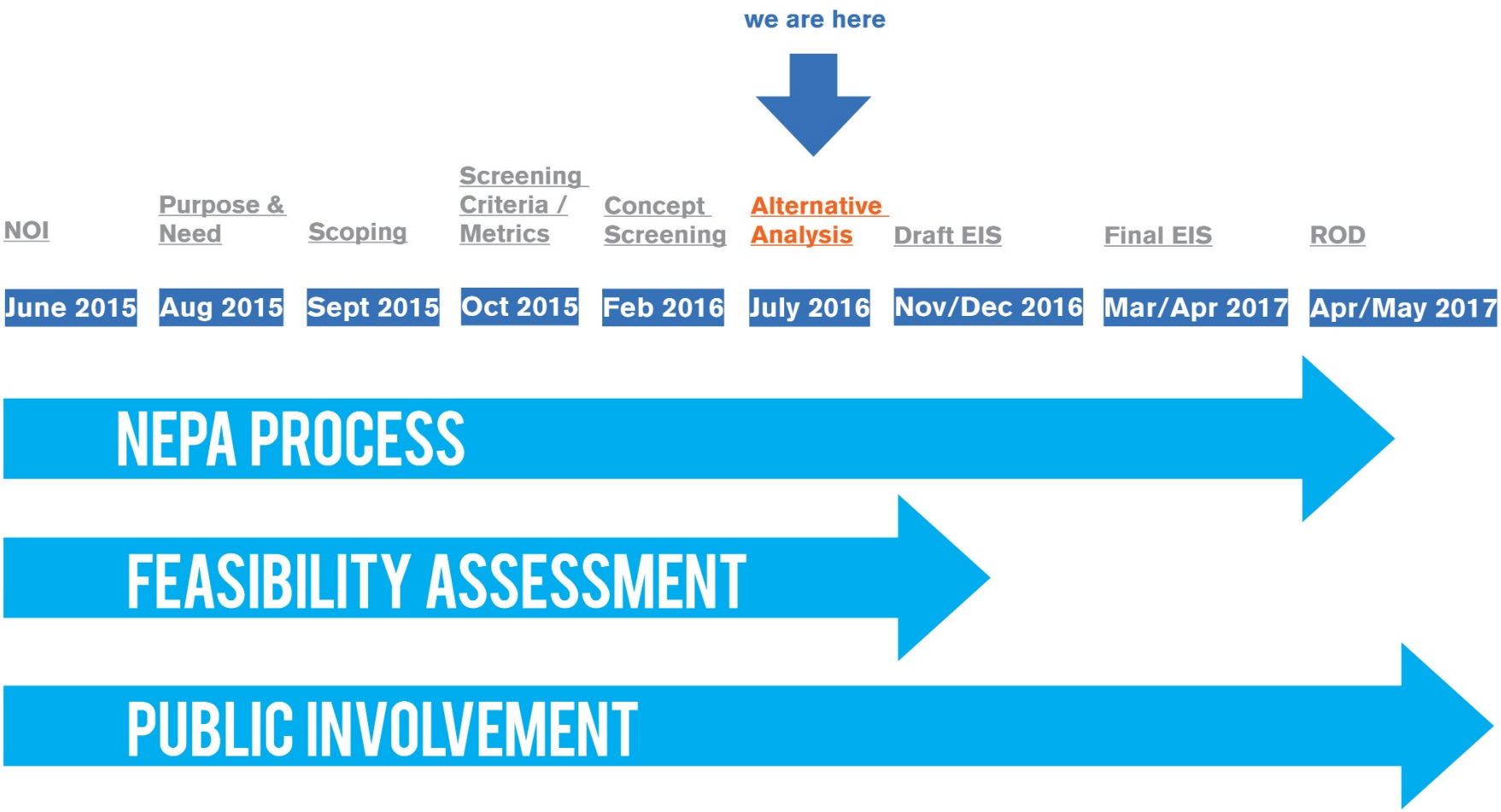
CAG Meetings

Public Meetings

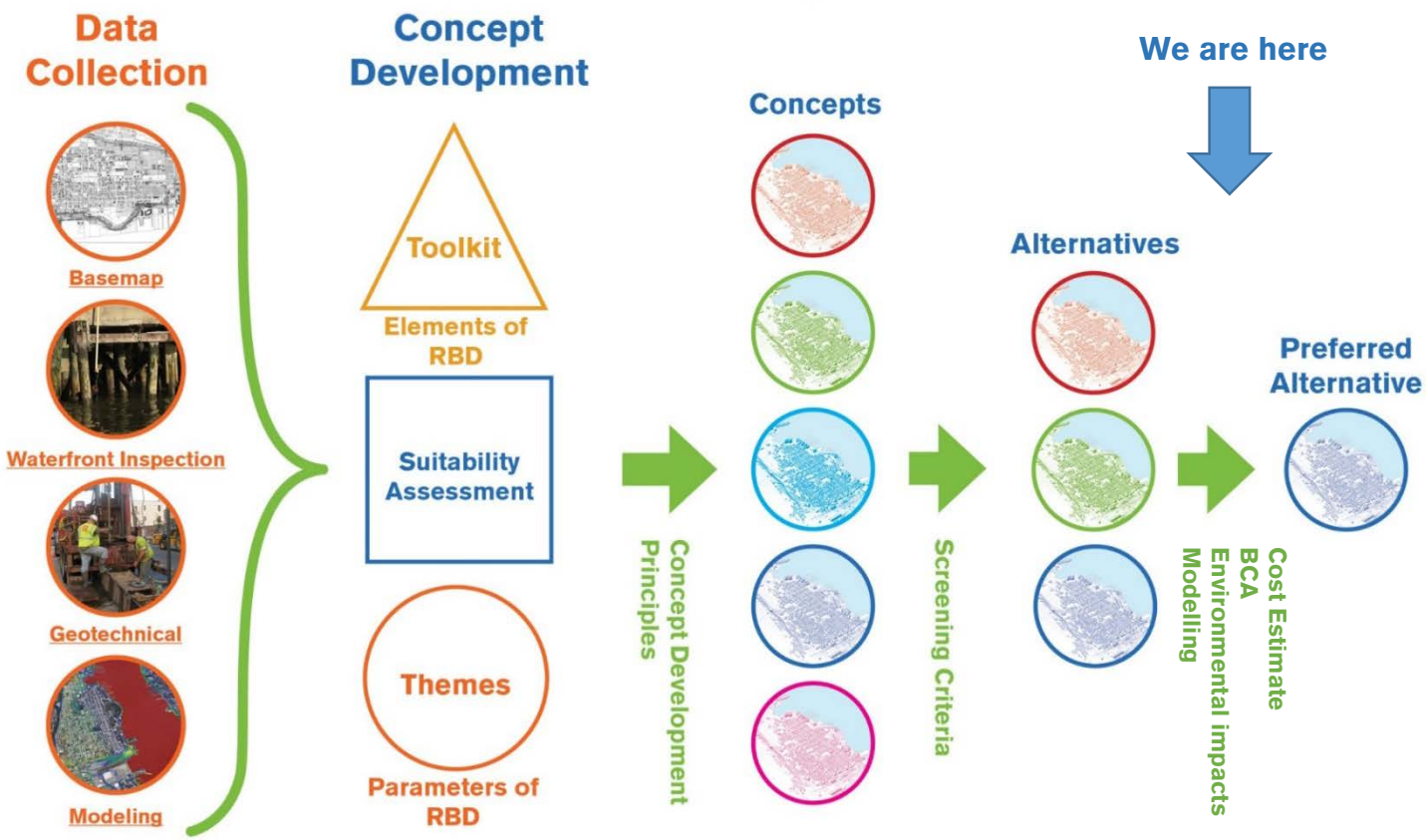
Workshops

PUBLIC INVOLVEMENT

The Process

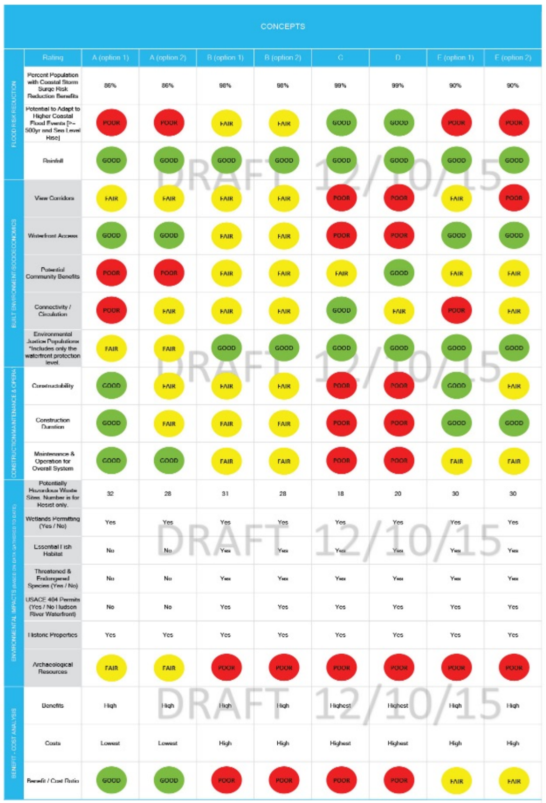

we are here
NOI
Purpose & Need
Scoping
Screening Criteria / Metrics
Concept Screening
Alternative Analysis
Draft EIS
Final EIS
ROD
June 2015
Aug 2015
Sept 2015
Oct 2015
Feb 2016
July 2016
Nov/Dec 2016
Mar/Apr 2017
Apr/May 2017
NEPA PROCESS
FEASIBILITY ASSESSMENT
PUBLIC INVOLVEMENT

Roadmap to Preferred Alternative



Alternatives Analysis

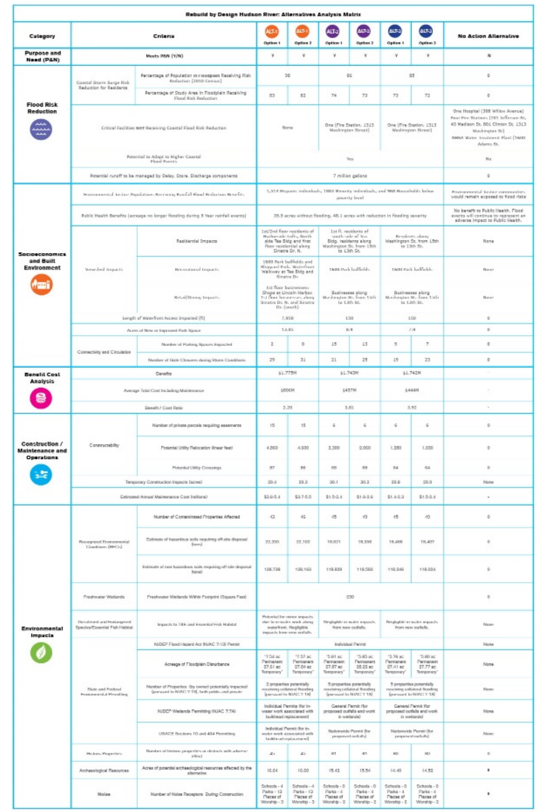
Concepts Screening (12/10)



CONCEPTS	Rating	A (option 1)	A (option 2)	B (option 1)	B (option 2)	C	D	E (option 1)	E (option 2)
FLOOD RISK REDUCTION	Percent Population with Coastal Storm Surge Risk Reduction Benefits	86%	86%	98%	98%	99%	99%	90%	90%
	Potential to Adapt to Higher Coastal Flood Events [>~500yr and Sea Level Rise]	POOR	POOR	FAIR	FAIR	GOOD	GOOD	POOR	POOR
	Rainfall	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
BUILT ENVIRONMENT/SOCIOECONOMICS	View Corridors	FAIR	FAIR	FAIR	FAIR	POOR	POOR	FAIR	POOR
	Waterfront Access	GOOD	GOOD	FAIR	FAIR	POOR	POOR	GOOD	GOOD
	Potential Community Benefits	POOR	POOR	FAIR	FAIR	FAIR	GOOD	FAIR	FAIR
	Connectivity / Circulation	POOR	FAIR	FAIR	FAIR	GOOD	FAIR	POOR	FAIR
	Environmental Justice Populations *Includes only the waterfront protection level.	FAIR	FAIR	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
CONSTRUCTION/MAINTENANCE & OPERA	Constructability	GOOD	FAIR	FAIR	FAIR	POOR	POOR	GOOD	FAIR
	Construction Duration	GOOD	FAIR	FAIR	FAIR	POOR	POOR	GOOD	GOOD
	Maintenance & Operation for Overall System	GOOD	GOOD	FAIR	FAIR	POOR	POOR	FAIR	FAIR
ENVIRONMENTAL IMPACTS (BASED ON DATA GATHERED TO DATE)	Potentially Hazardous Waste Sites. Number is for Resist only.	32	28	31	28	18	20	30	30
	Wetlands Permitting (Yes / No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Essential Fish Habitat	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	Threatened & Endangered Species (Yes / No)	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	USACE 404 Permits (Yes / No Hudson River Waterfront)	No	No	Yes	Yes	Yes	Yes	Yes	Yes
	Historic Properties	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Archaeological Resources	FAIR	FAIR	POOR	POOR	POOR	POOR	POOR	POOR
BENEFIT - COST ANALYSIS	Benefits	High	High	High	High	Highest	Highest	High	High
	Costs	Lowest	Lowest	High	High	Highest	Highest	High	High
	Benefit / Cost Ratio	GOOD	GOOD	POOR	POOR	POOR	POOR	FAIR	FAIR

DRAFT 12/10/15

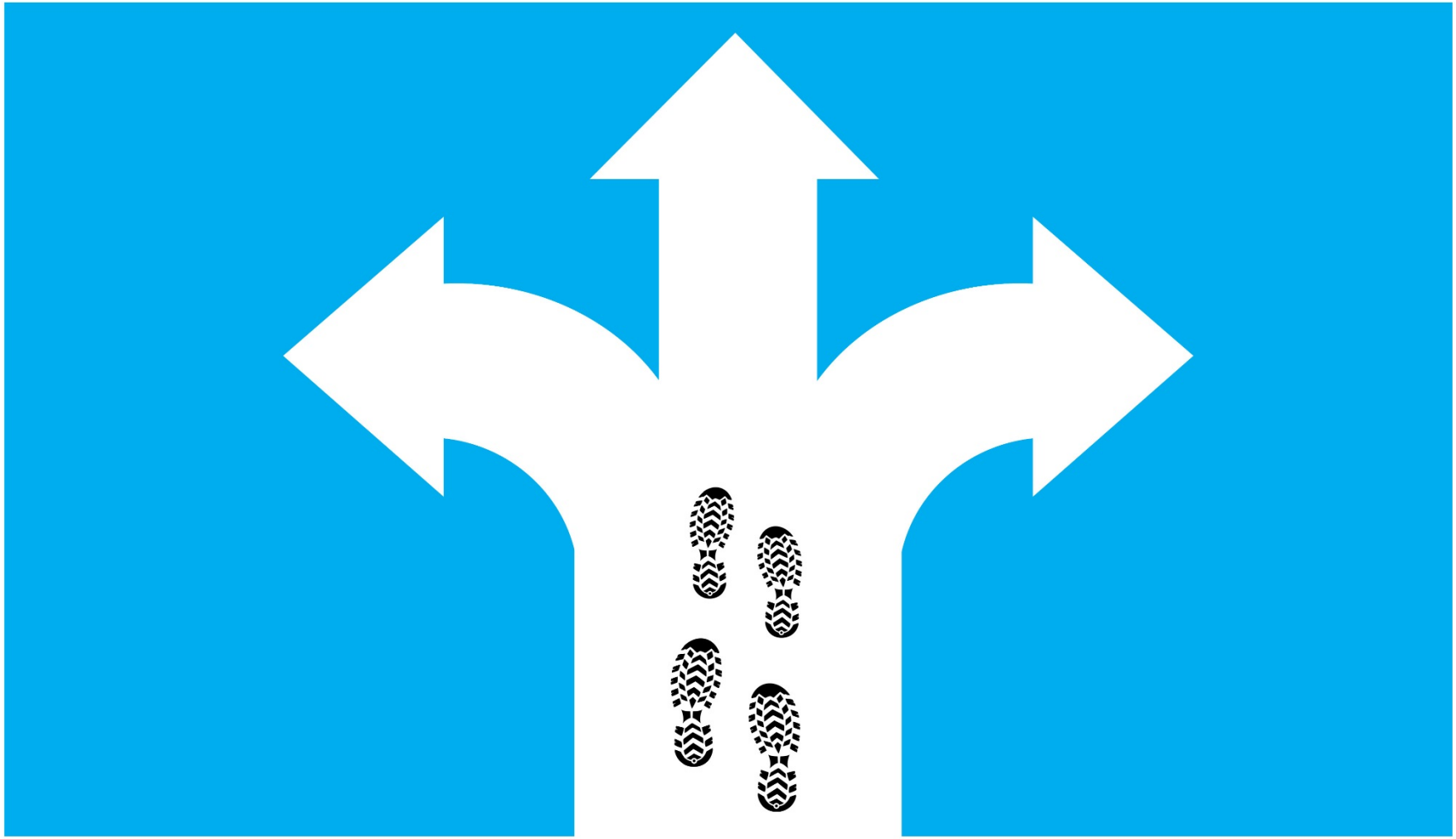
Alternatives Analysis (7/28)



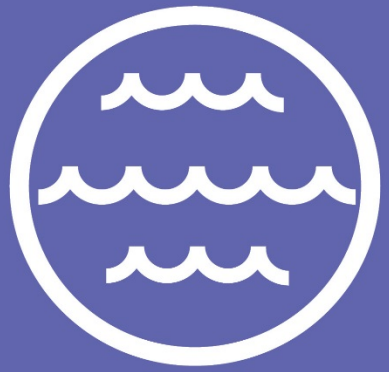
Rebuild by Design Hudson River: Alternatives Analysis Matrix

Category	Criteria		ALT-1 Option 1	ALT-1 Option 2	ALT-2 Option 1	ALT-2 Option 2	ALT-3 Option 1	ALT-3 Option 2	No Action Alternative
Purpose and Need (P&N)	Meets P&N (Y/N)		Y	Y	Y	Y	Y	Y	N
Flood Risk Reduction	Coastal Storm Surge Risk Reduction for Residents	Percentage of Population in Floodplain Receiving Risk Reduction (2010 Census)	90		86		85		0
		Percentage of Study Area in Floodplain Receiving Flood Risk Reduction	83	82	74	73	73	72	0
	Critical Facilities NOT Receiving Coastal Flood Risk Reduction		None		One (Fire Station, 1313 Washington Street)		One (Fire Station, 1313 Washington Street)		One Hospital (308 Willow Avenue) Four Fire Stations (201 Jefferson St, 43 Madison St, 801 Clinton St, 1313 Washington St) NHSA Water Treatment Plant (1600 Adams St)
	Potential to Adapt to Higher Coastal Flood Events		Yes						No
	Potential runoff to be managed by Delay, Store, Discharge components		7 million gallons						0
Socioeconomics and Built Environment	Environmental Justice Populations Receiving Rainfall Flood Reduction Benefits		[illegible] Hispanic individuals, [illegible] Minority individuals, and [illegible] Households below poverty level						Environmental Justice communities would remain exposed to flood risks
	Public Health Benefits (acreage no longer flooding during 5 Year rainfall events)		35.5 acres without flooding, 48.1 acres with reduction in flooding severity						No benefit to Public Health. Flood events will continue to represent an adverse impact to Public Health.
	[illegible]	Residential Impacts	[illegible]		[illegible]		[illegible]		None
Benefit Cost Analysis	[illegible]		[illegible]						
Construction / Maintenance and Operations	[illegible]		[illegible]						
Environmental Impacts	[illegible]		[illegible]						

National Environmental Policy Act - Alternative Analysis



Flood Risk Reduction



Flood Risk Reduction

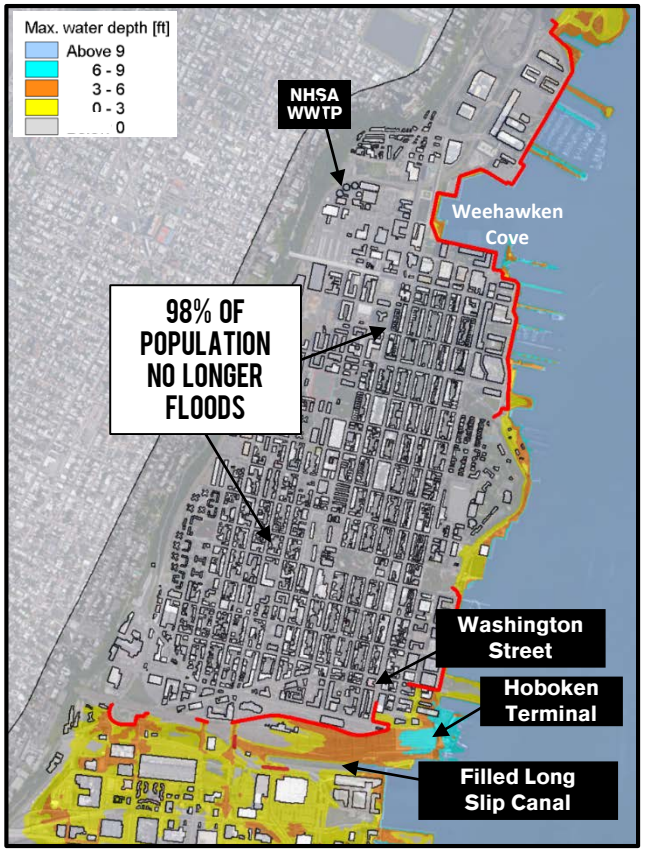
Considers the impacts of the project on flood patterns in the community

- Coastal Storm Surge Risk Reduction
- Rainfall Flood Risk Reduction
- Critical Facilities

NAA AND ALTERNATIVE 1 WITH 100-YEAR COASTAL STORM SURGE

NAA

ALT-1



shows resist feature alignment

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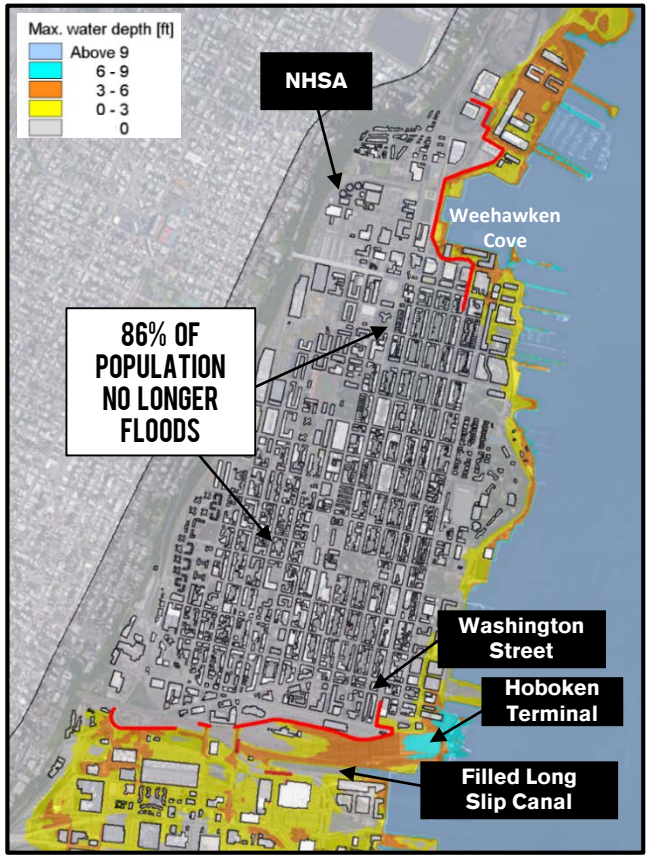
NAA AND ALTERNATIVE 2 WITH 100-YEAR COASTAL STORM SURGE

NAA

ALT-2



shows resist feature alignment

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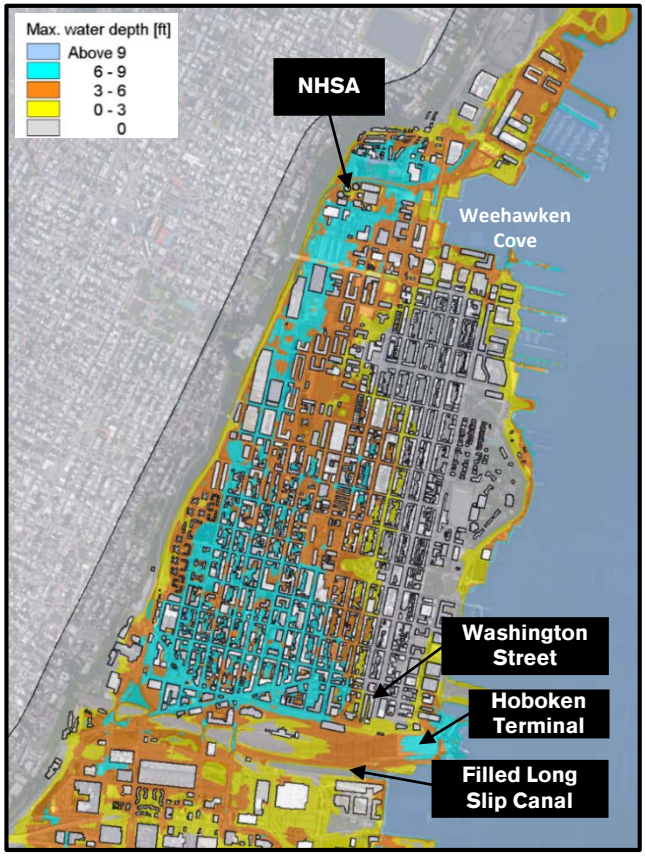
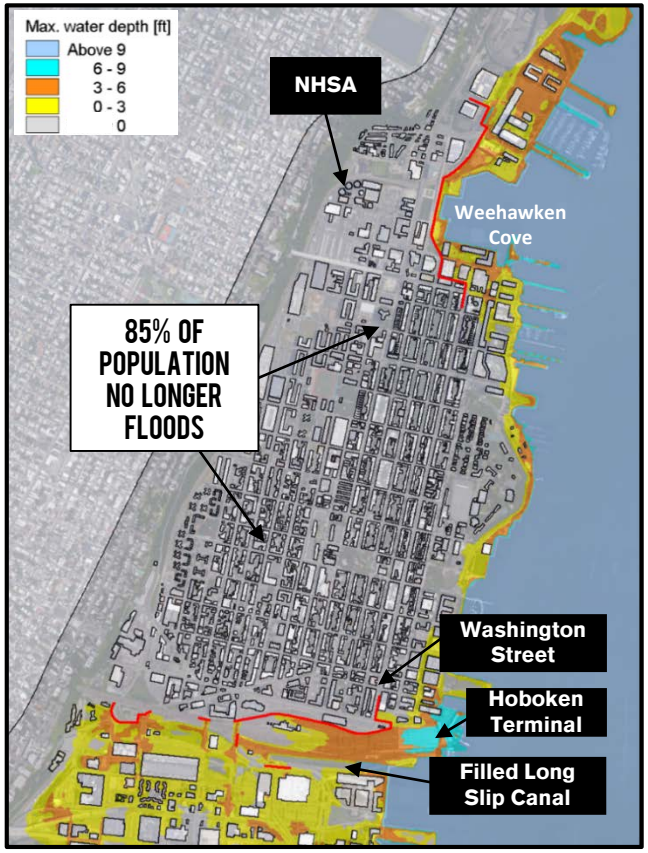
NAA AND ALTERNATIVE 3 WITH 100-YEAR COASTAL STORM SURGE

NAA



ALT-3



shows resist feature alignment

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Stormwater Modeling - Input and Output Parameters

Used FEMA accepted Danish Hydraulic Institute (DHI) MIKE Urban Model

Major Stormwater Model Inputs

Pipe, Manholes, Pumps

Topography

Rainfall

DSD Alternatives

MIKE Urban Stormwater Model Simulation Engine

MIKE Urban Stormwater Model Simulation Engine

- Flooded Areas
- Time Series Plots
- Animations
- Flow Volumes

Baseline Conditions (NAA) for Stormwater Modeling

Ongoing or completed projects

- **H1 Wet Weather Pump Station (Observer Highway)**
- **H 5 Wet Weather Pump Station (11th Street)**
- **City Hall Green Infrastructure Projects**
- **Southwest Resiliency Park (Block 12)**
- **Washington Street Rain Gardens**

Design Elements of Delay, Store, Discharge

Proposed underground detention facilities with green/open space on ground surface with discharge features such as pumps to manage rainfall runoff volume

BASF site

- **Manages rainfall runoff for approx. 55 acres**

NJ Transit site

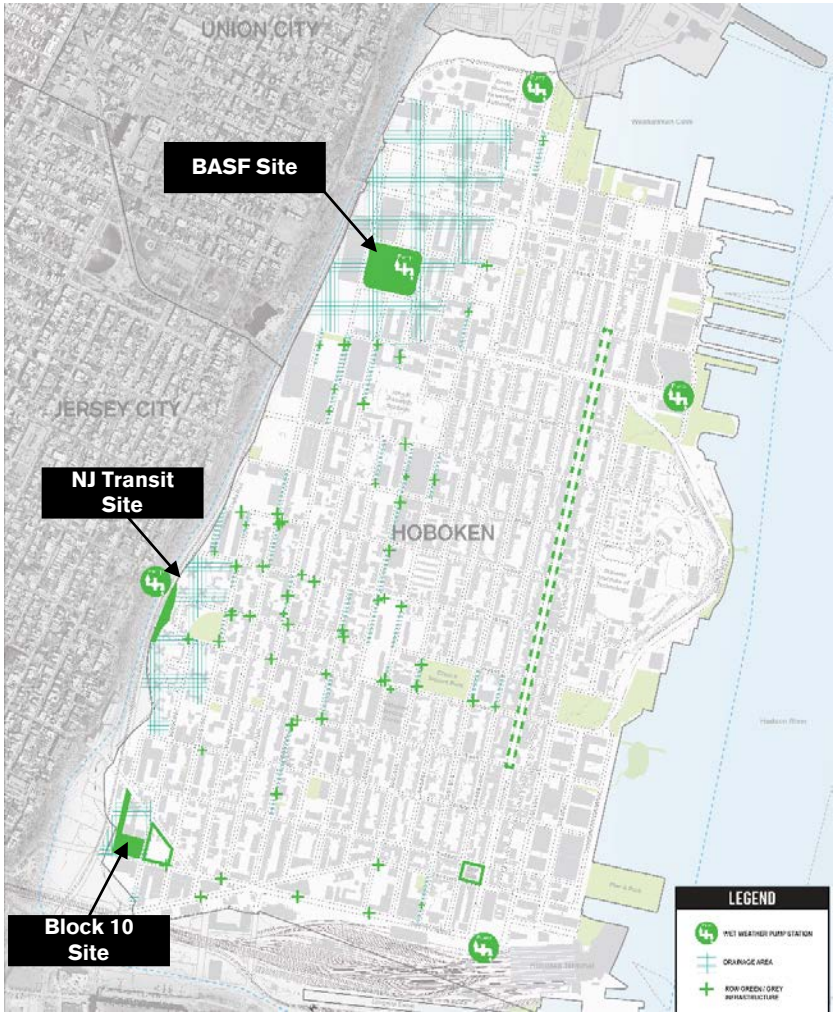
- **Manages rainfall runoff for approx. 15 acres**

Block 10 site

- **Manages rainfall runoff for approx. 8 acres**

ROW Green/Grey Infrastructure Practices

- **Total of 61 sites to manage street drainage for approx. 13 acres**



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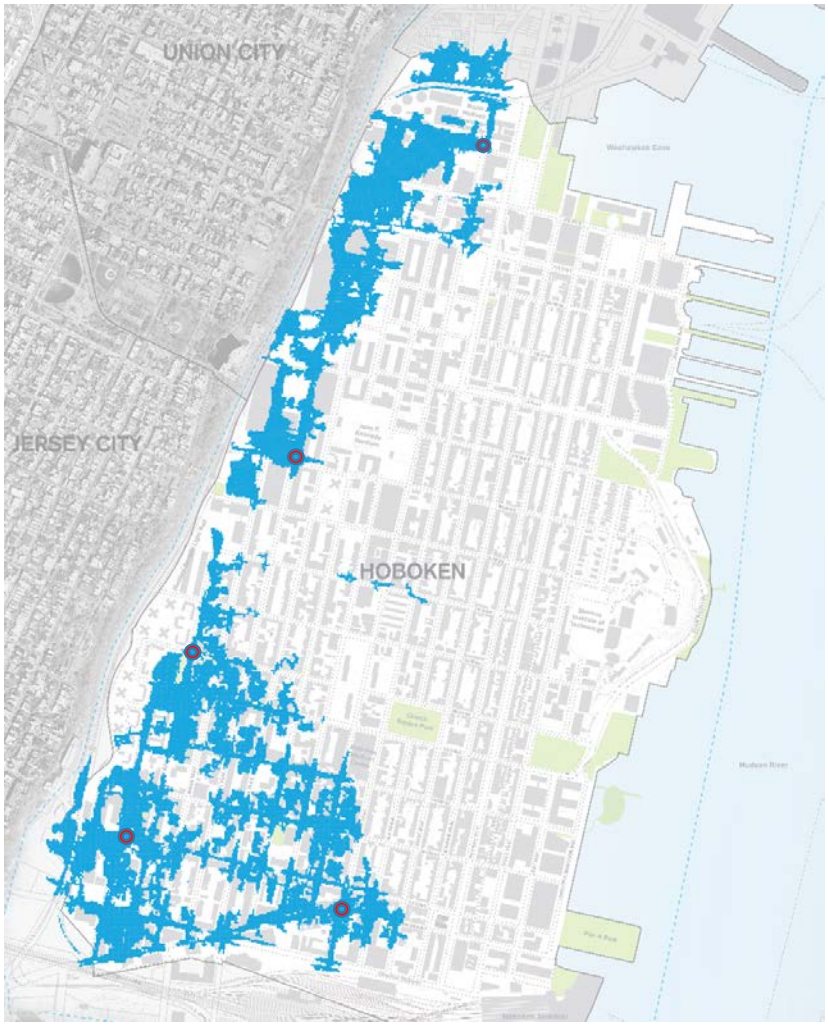
Hurricane Irene – Validation Model Simulation

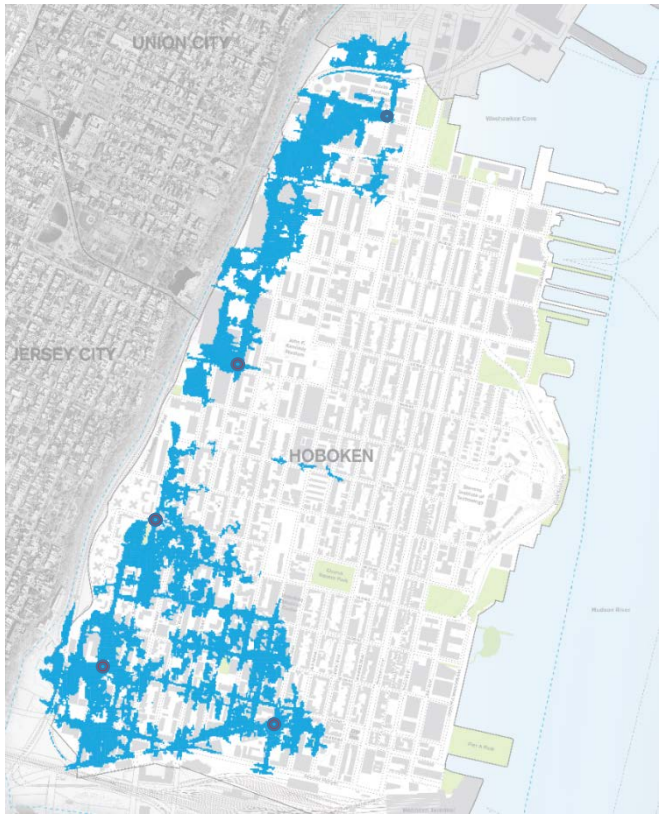


Blue shows flooded areas simulated by model

shows flooded spots observed by Emnet (company that monitored flooding during Irene)

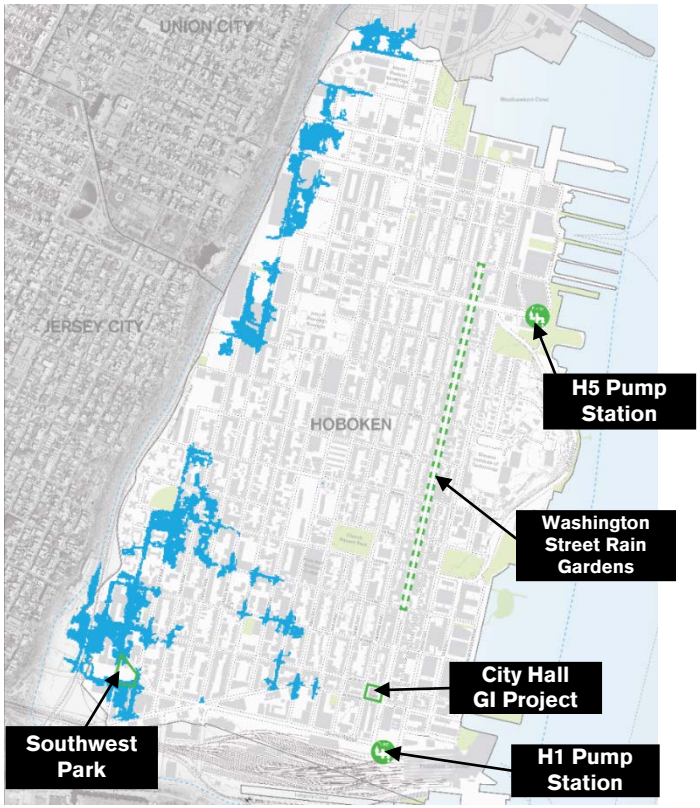
COMPARISON OF FLOODING AREAS – HURRICANE IRENE (2011 CONDITIONS) WITH BASELINE CONDITIONS (NAA)

Hurricane Irene 2011



Blue shows flooded areas simulated by model

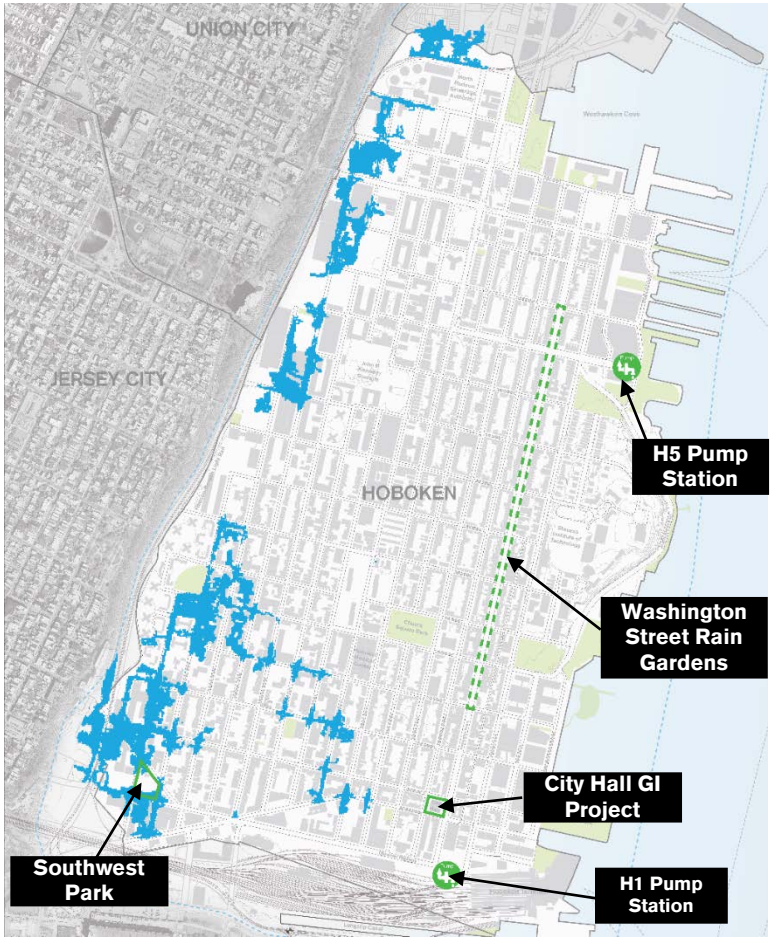
Baseline Conditions (NAA)



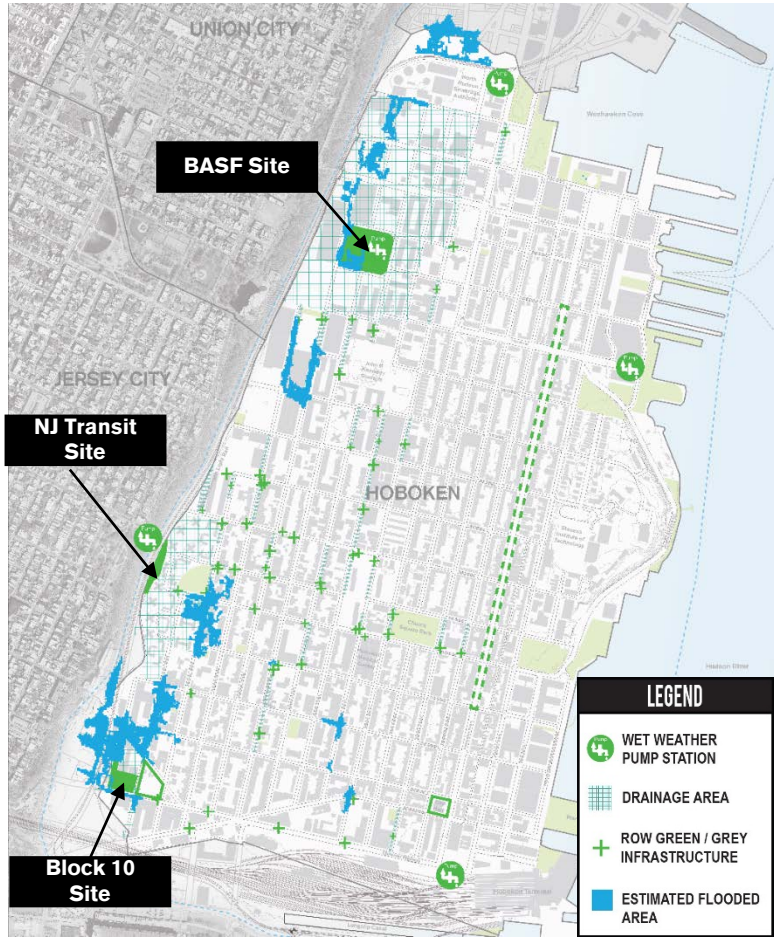
shows flooded spots observed by Emnet

COMPARISON OF FLOODING AREAS WITH HURRICANE IRENE – BASELINE CONDITIONS (NAA) AND PROPOSED DSD ALTERNATIVE

Baseline Conditions (NAA)



Proposed DSD Alternative



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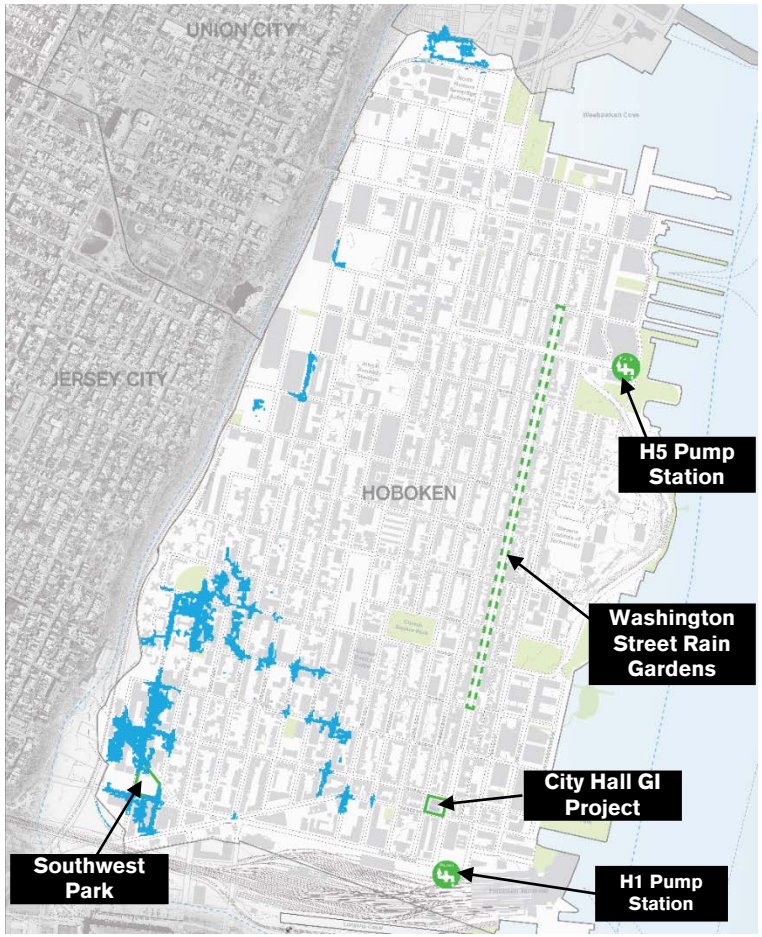
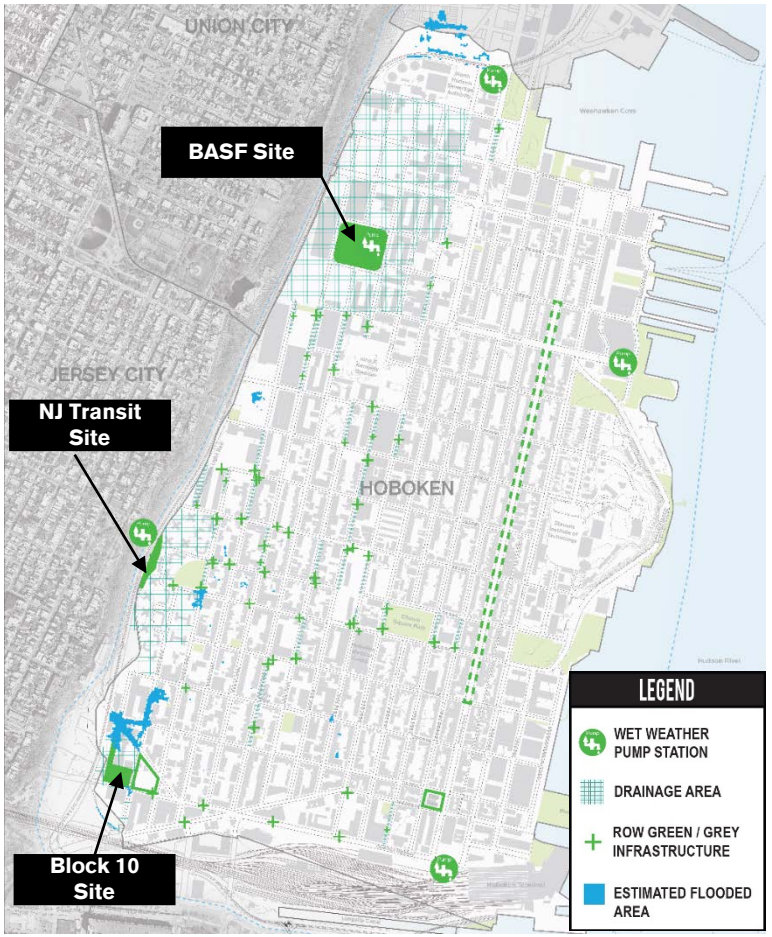
COMPARISON OF FLOODING AREAS WITH 5-YEAR / LOW TIDE - BASELINE CONDITIONS (NAA) AND PROPOSED DSD

Baseline Conditions (NAA)



Proposed DSD Alternative



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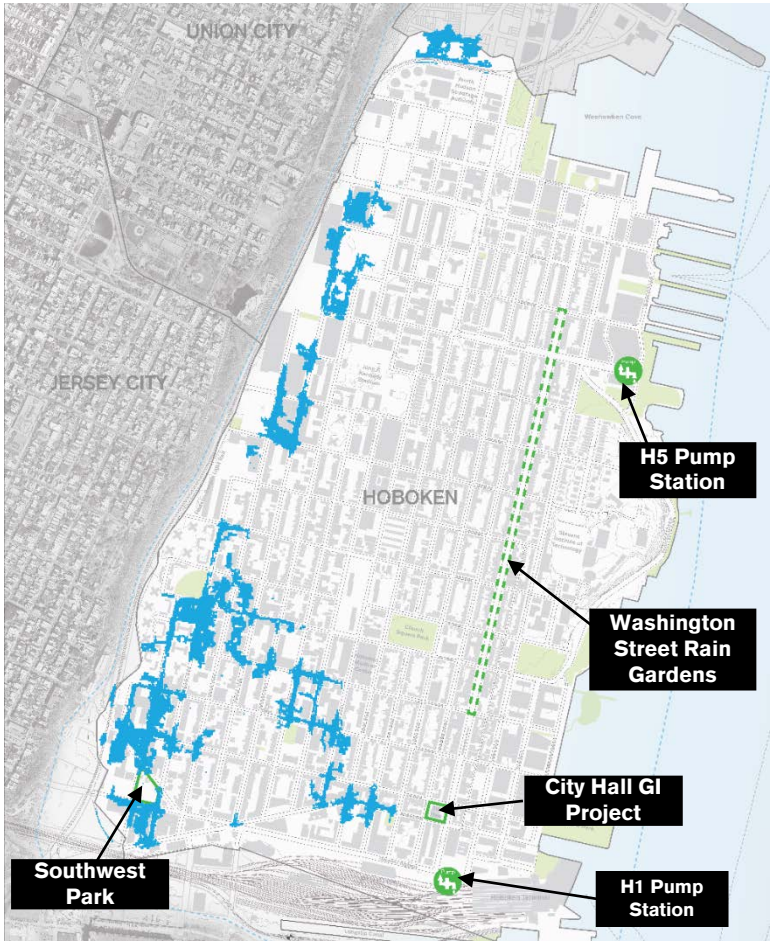
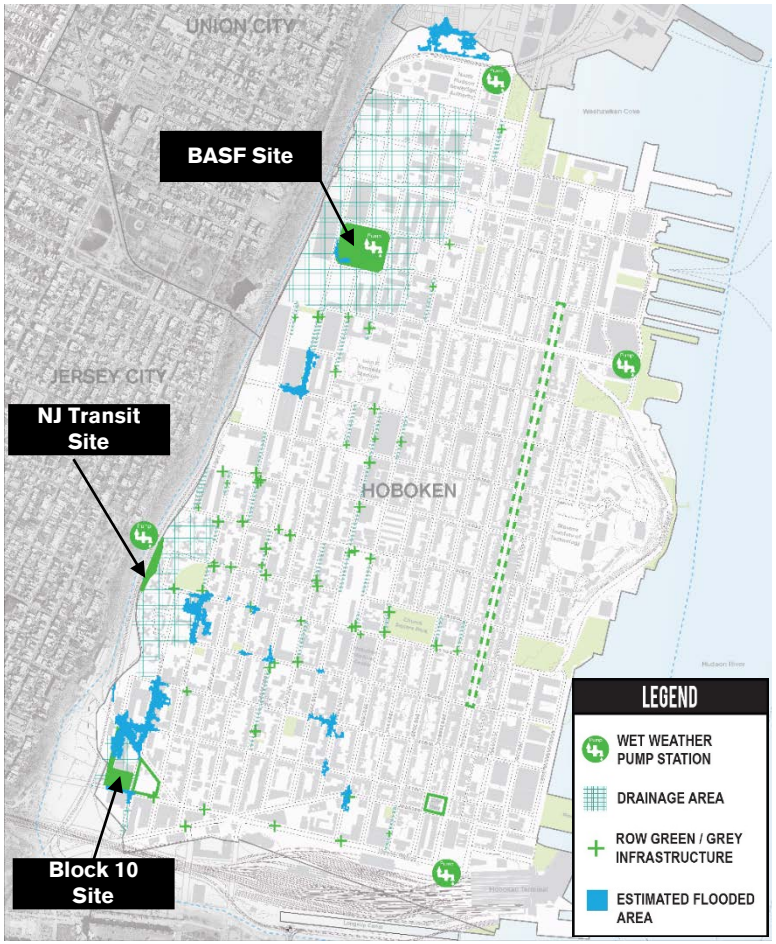
COMPARISON OF FLOODING AREAS WITH 5-YEAR / HIGH TIDE - BASELINE CONDITIONS (NAA) AND PROPOSED DSD

Baseline Conditions (NAA)



Proposed DSD Alternative



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ROW - Typical Sidewalk Condition

UNDERGROUND WATER STORAGE UNIT

TYPICAL CONDITION

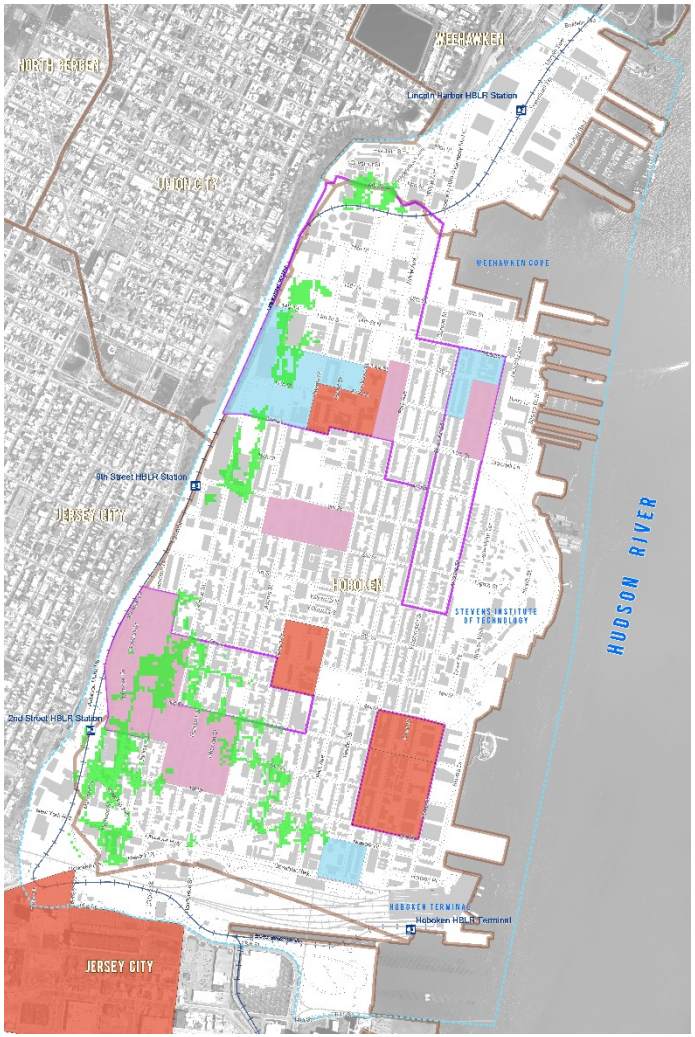
Socioeconomics and Built Environment

Socioeconomics and Built Environment

Looks at how project may impact the community – both to people as well as to the man-made environment (buildings and infrastructure)

- **Environmental Justice and Public Health**
- **Viewshed Impacts**
- **Waterfront Access**
- **New or Improved Park Space**

Rainfall and Environmental Justice



Legend

- Study Area
- Municipal Boundary
- Hudson-Bergen Light Rail (HBLR)
- Area of Reduced Flooding (Based on 5-Year Storm Model)
- Minority Block Groups
- Hispanic Block Groups
- Over 75 Block Groups
- Households in Poverty Census Tracts

ALT-1 ALT-2 ALT-3	**48.1 acres flood during NAA (5-year rainfall):** **- All receive rainfall flood reduction** **- 35.5 acres no longer flood at all**

DELAY
STORE
DISCHARGE

OVERALL STRATEGY

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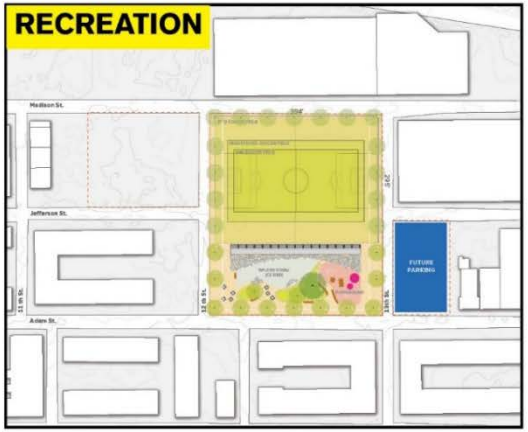
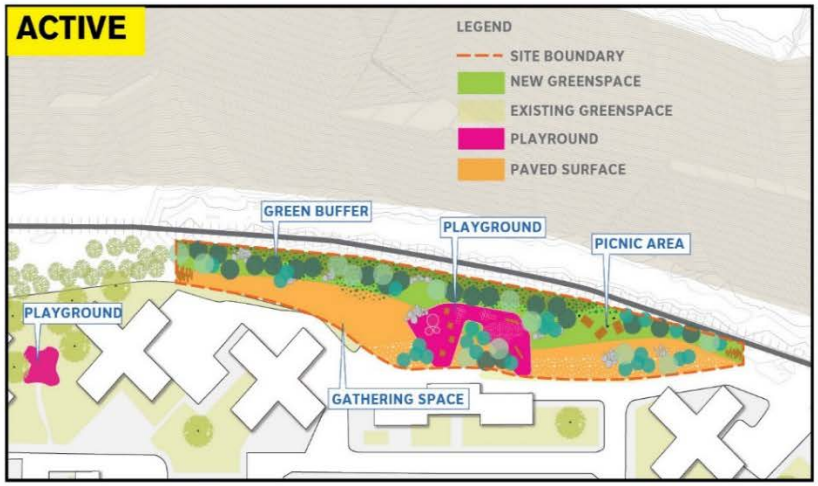
BASF Site

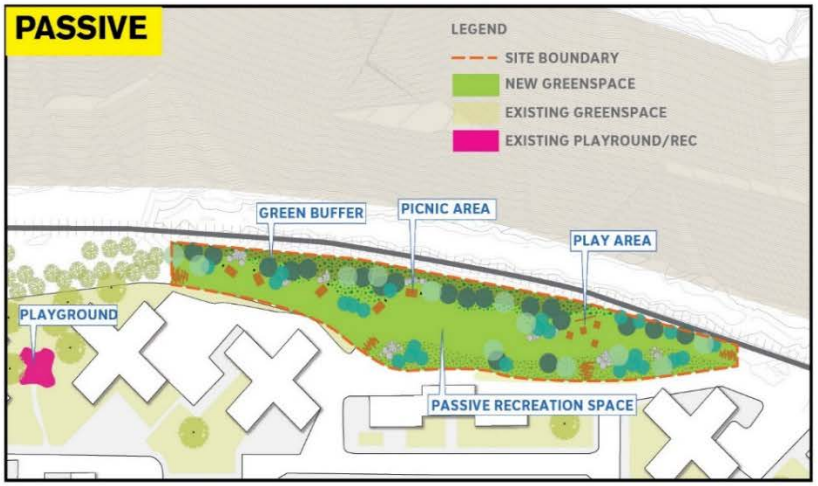

DESTINATION
Madison St.
Jefferson St.
Adam St.
FUTURE PARKING


RECREATION
Madison St.
Jefferson St.
Adam St.
FUTURE PARKING

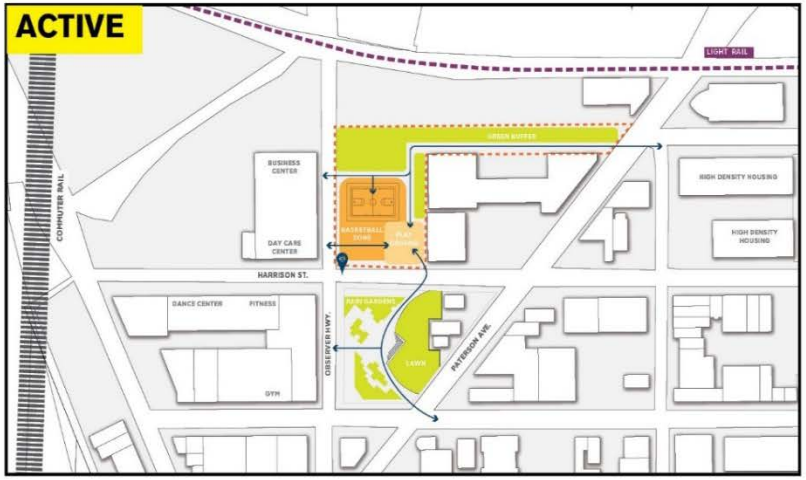

ECO
Madison St.
Jefferson St.
Adam St.
FUTURE PARKING

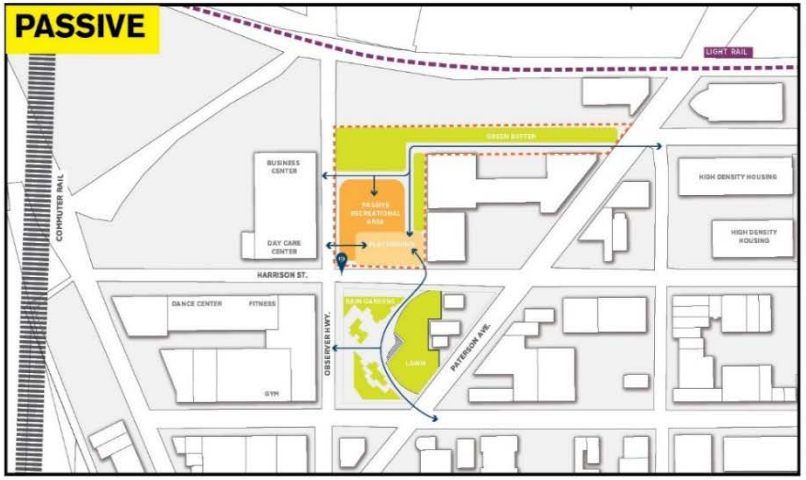
NJ TRANSIT Site





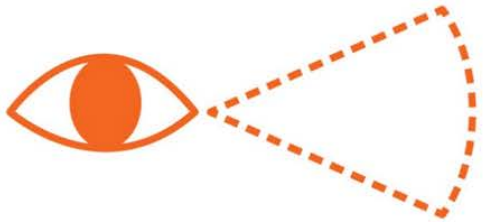
Block 10


ACTIVE
LIGHT RAIL
COMMUTER RAIL
BUSINESS CENTER
DAY CARE CENTER
HARRISON ST.
HIGH DENSITY HOUSING
HIGH DENSITY HOUSING
DANCE CENTER
FITNESS
GYM
OBSERVER HWY.
LAWN
PATERSON AVE.


PASSIVE
LIGHT RAIL
COMMUTER RAIL
BUSINESS CENTER
DAY CARE CENTER
HARRISON ST.
HIGH DENSITY HOUSING
HIGH DENSITY HOUSING
DANCE CENTER
FITNESS
GYM
OBSERVER HWY.
LAWN
PATERSON AVE.

ROW - Typical Bump Out Condition - Implementation

Alternatives Analysis Screening Criteria



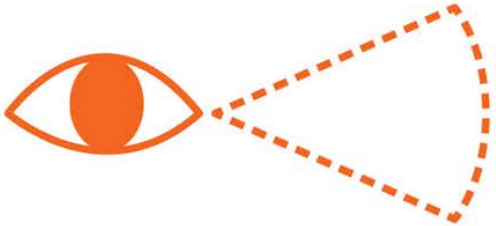
View Corridors

Waterfront Access

Park Space

Connectivity/Circulation

Alternatives Analysis - View Corridors



Locations where existing view corridors are impacted by urban design

Impact to Residential View Corridor

Impact to Retail/Dining View Corridor

Alternatives Analysis - Waterfront Access

Length (in feet) of waterfront access that is impacted by urban design

Length of Waterfront Access Impacted

Length of Waterfront Access Impacted

Alternatives Analysis - Park Space

Area (in acres) of new or improved park space

New Park Space - Cove Park

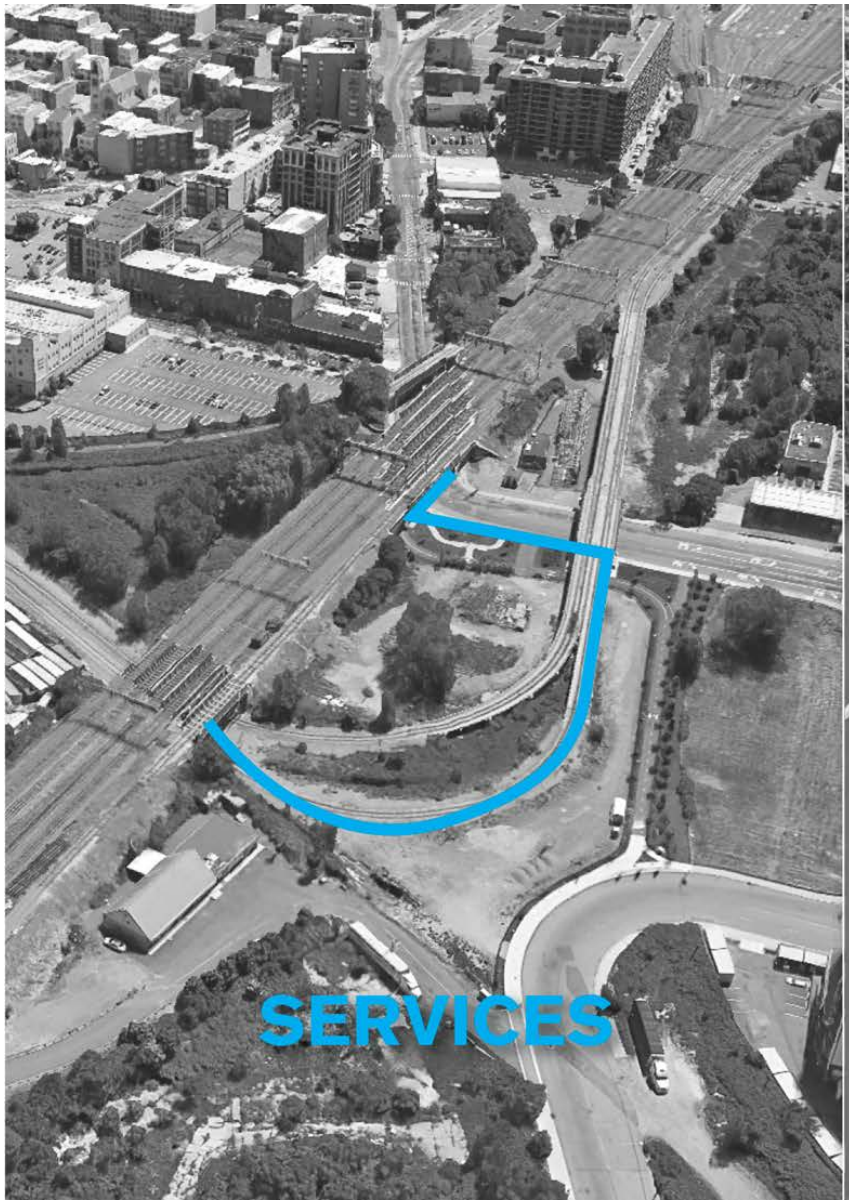
Improved Park Space - Bloomfield St

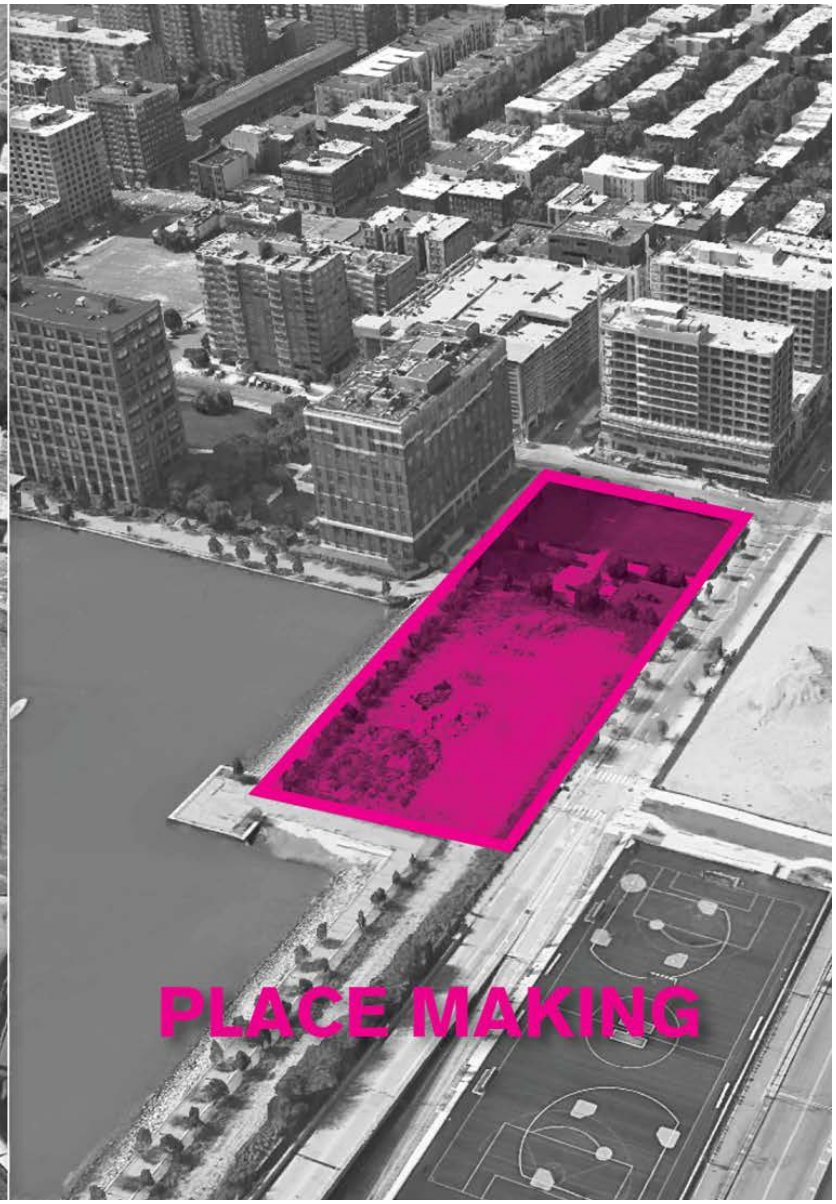
Alternatives Analysis - Connectivity/Circulation

Number of existing parking spaces impacted + Number of gate closures during storm

Sidewalk Landscape = Parking impact

West Alleyway Gate Location


SERVICES


PLACE MAKING

Toolkit - Performative Barrier

Technical Performance + Urban Performance

How does it perform as **flood protection**?

What **urban amenities** does it need to provide?

- Height Performance
- Construction Method
- Scouring Performance
- Context Integration
- Functionality
- Look & Feel

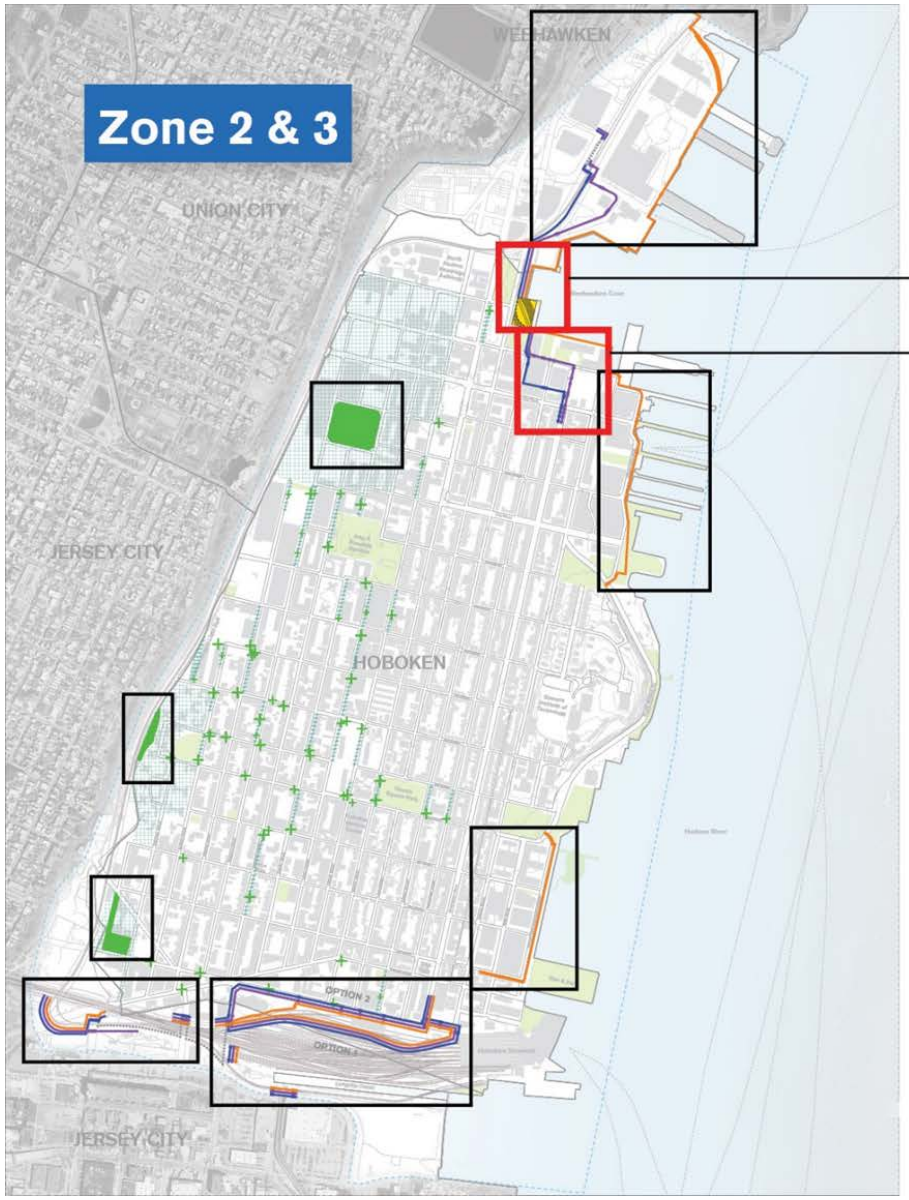
Urban Design Locations

Cove Park

Washington Street

Maxwell Place Park

South Waterfront Promenade



Zone 2 — Weehawken Cove

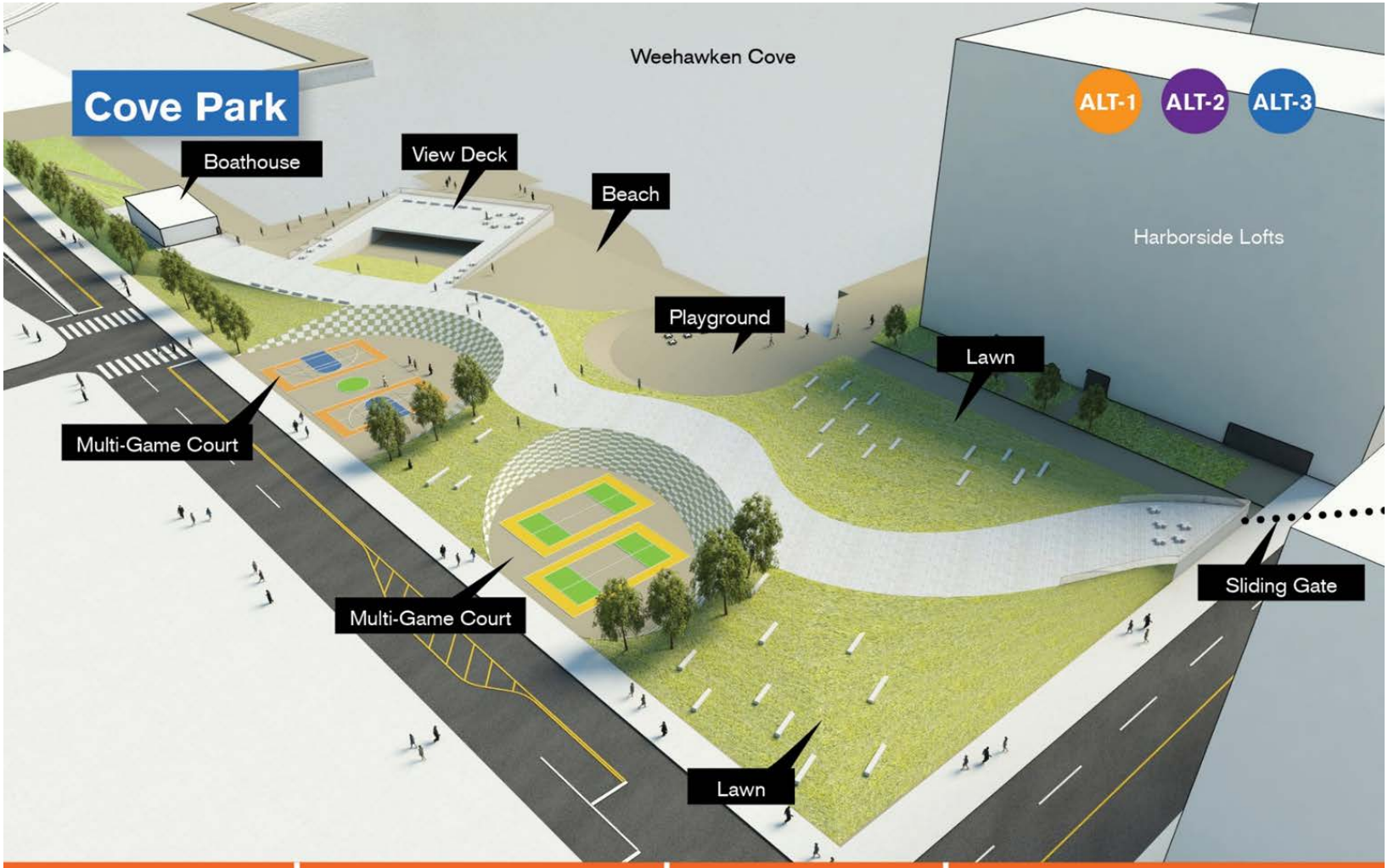
Alternative 1, 2, 3 @ Boathouse to Park Space

Zone 3 — Residential

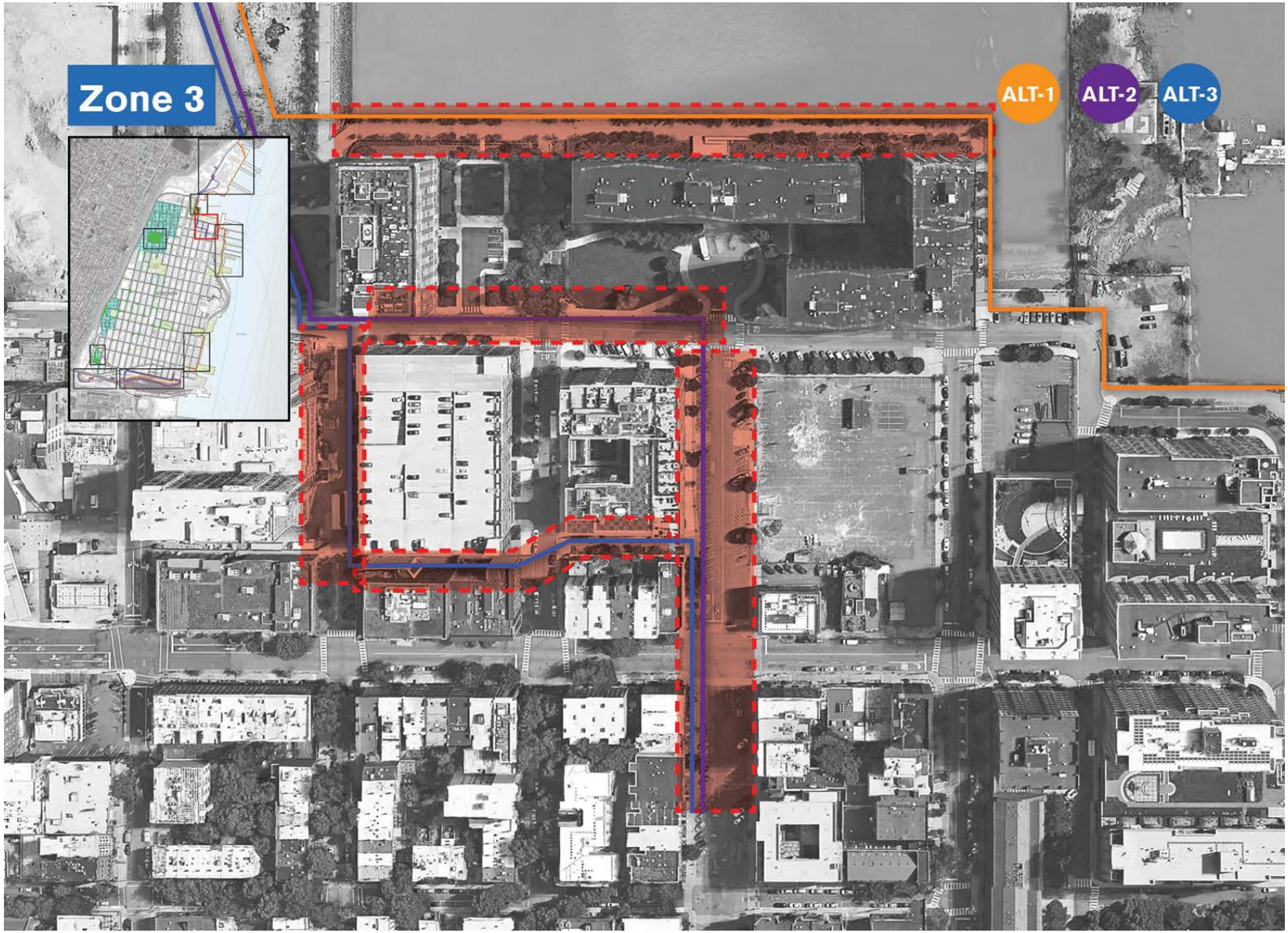
Alternative 1 @ Waterfront along Tea Building
Alternative 2 @ 15th St to Washington St.
Alternative 3 @ Alleyway to Washington St.


Cove Park
ALT-1
ALT-2
ALT-3
Water Facing
Urban Facing
Multi-Directional


Cove Park
New Park Space
ALT-1
ALT-2
ALT-3



View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Residential impacts	No Waterfront access impact	New Park Space	0 Parking Impacted, 1 Gate


Zone 3
ALT-1
ALT-2
ALT-3

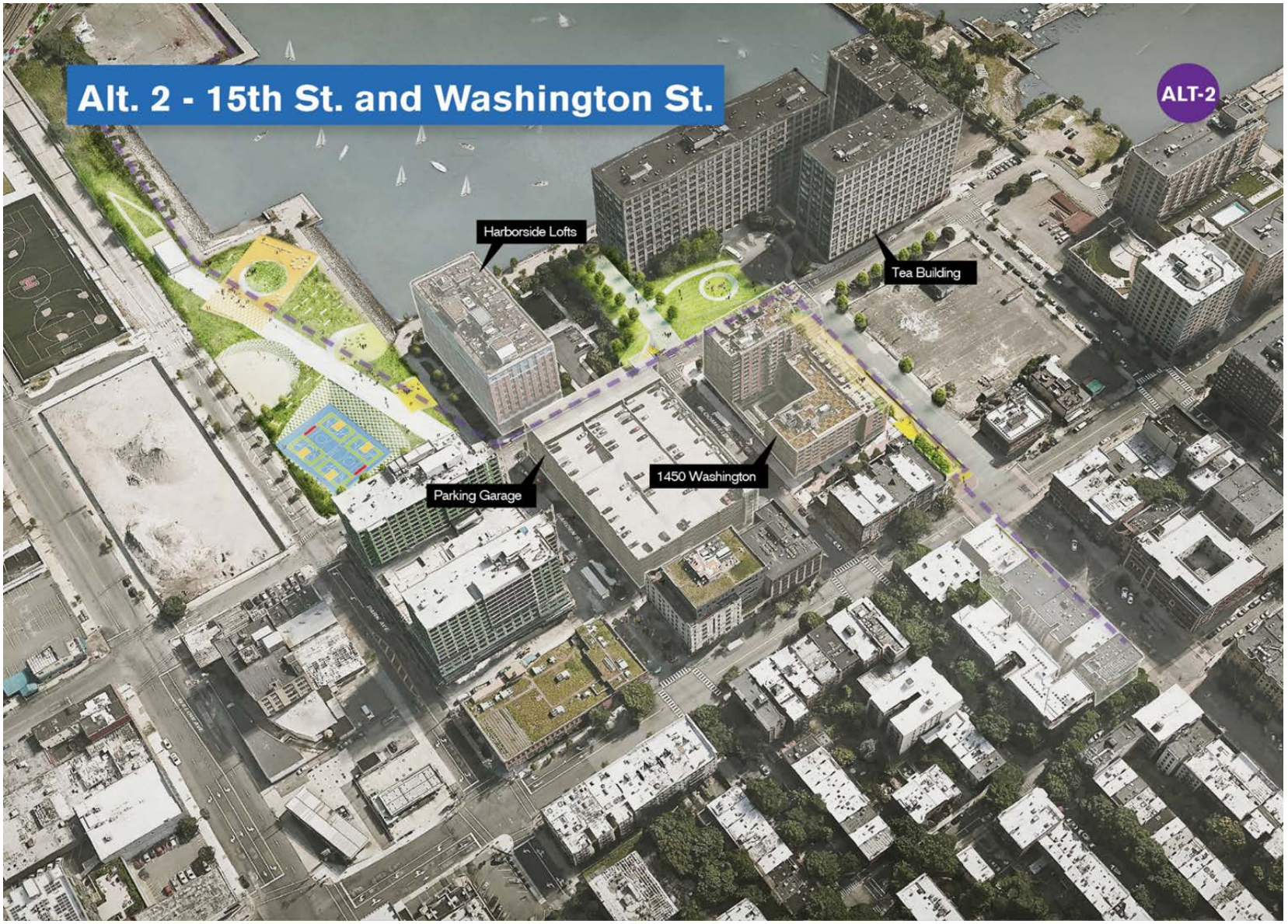

Alt. 1 - Weehawken Cove Promenade
ALT-1
Harborside Lofts
Tea Building


Viewing Platforms + Landscape
ALT-1

Weehawken Cove Promenade

ALT-1

View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Residential impacts	Waterfront access impacted	Improved Park Space	0 Parking Impacted, 1 Gate


Alt. 2 - 15th St. and Washington St.
ALT-2
Harborside Lofts
Tea Building
1450 Washington
Parking Garage

Dewberry

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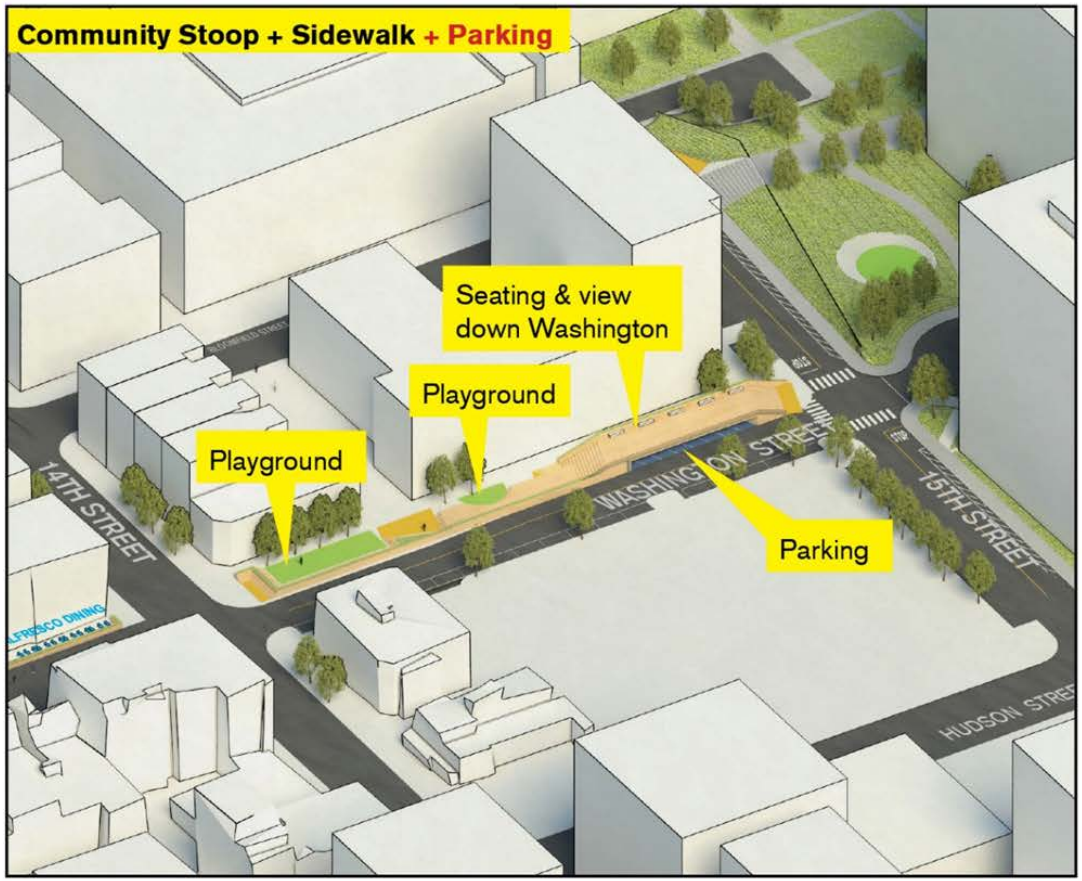
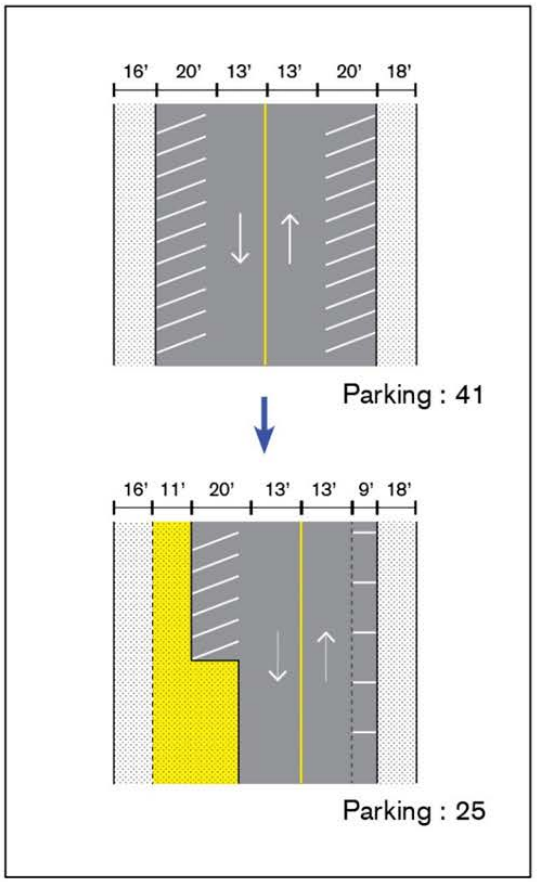
Washington Street
View Corridor
ALT-2

Alt. 2 - Washington Street

ALT-2





Dewberry

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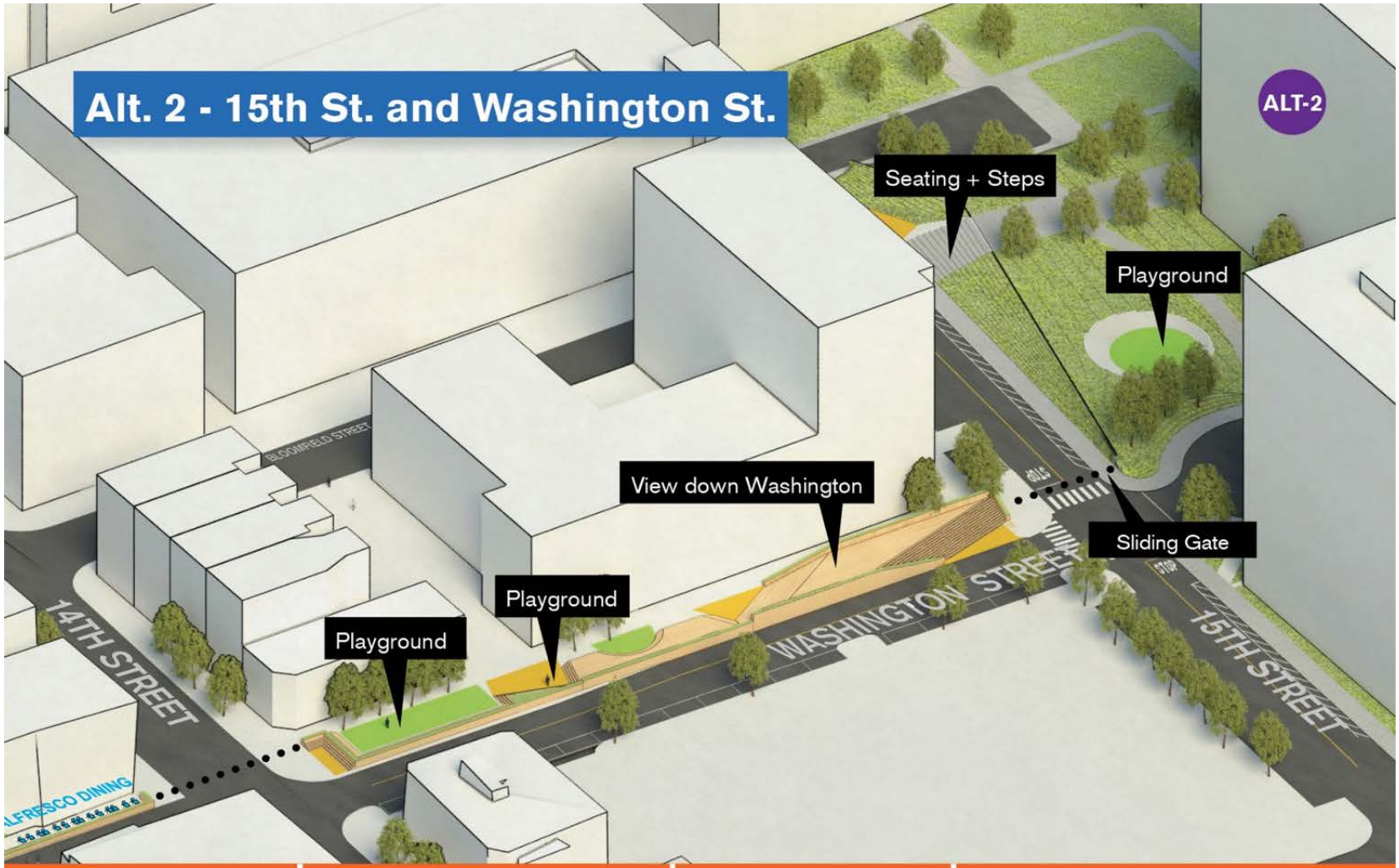
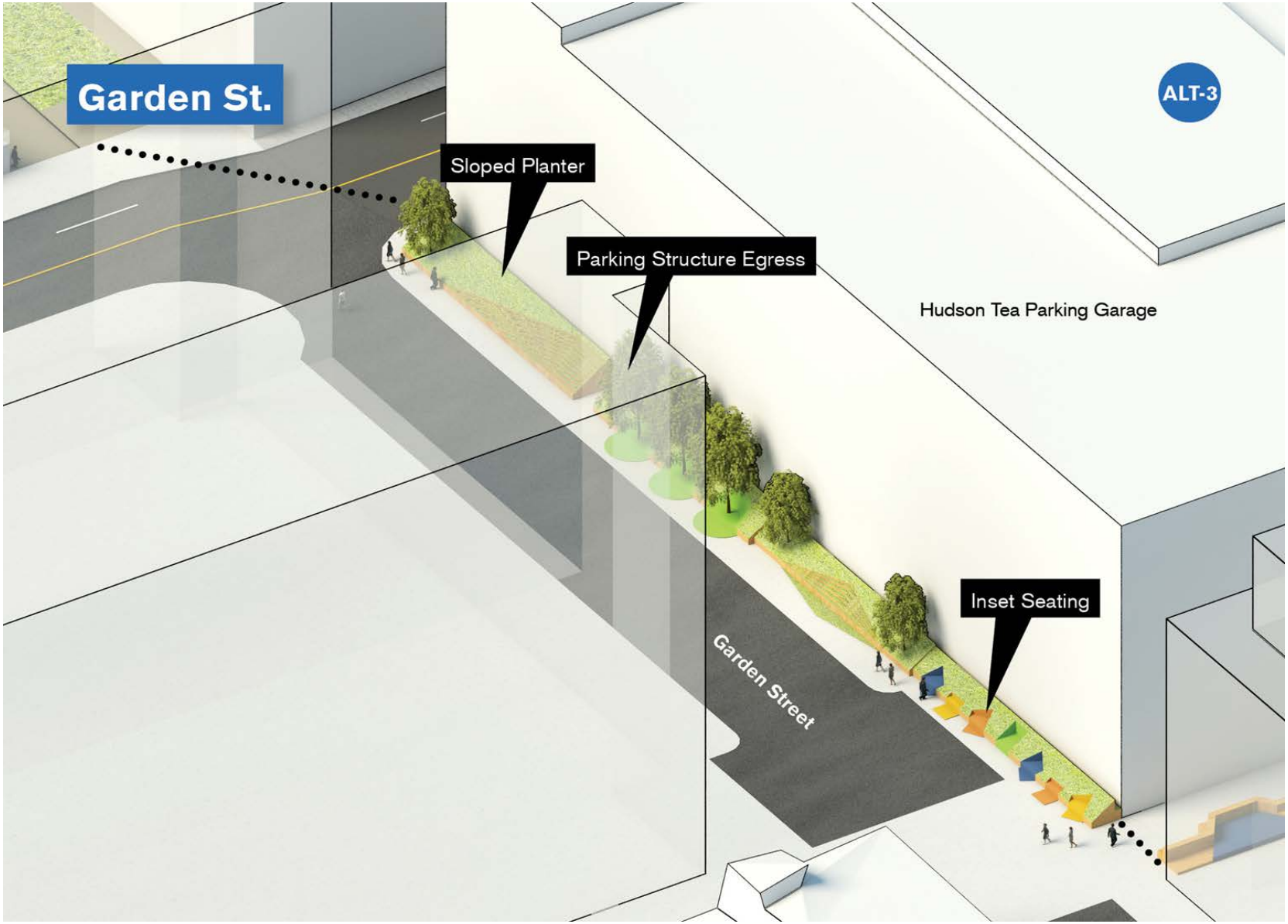


View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Residential impacts Retail/Dining impacts	Waterfront access impacted	Improved Park Space	15-20 Parking Impacted, 2 Gates


Alt. 3 - Garden St. and Alleyway
ALT-3
Harborside Lofts
Tea Building
Parking Garage
1450 Washington
Garden Street
Alleyway
Washington Street



Dewberry

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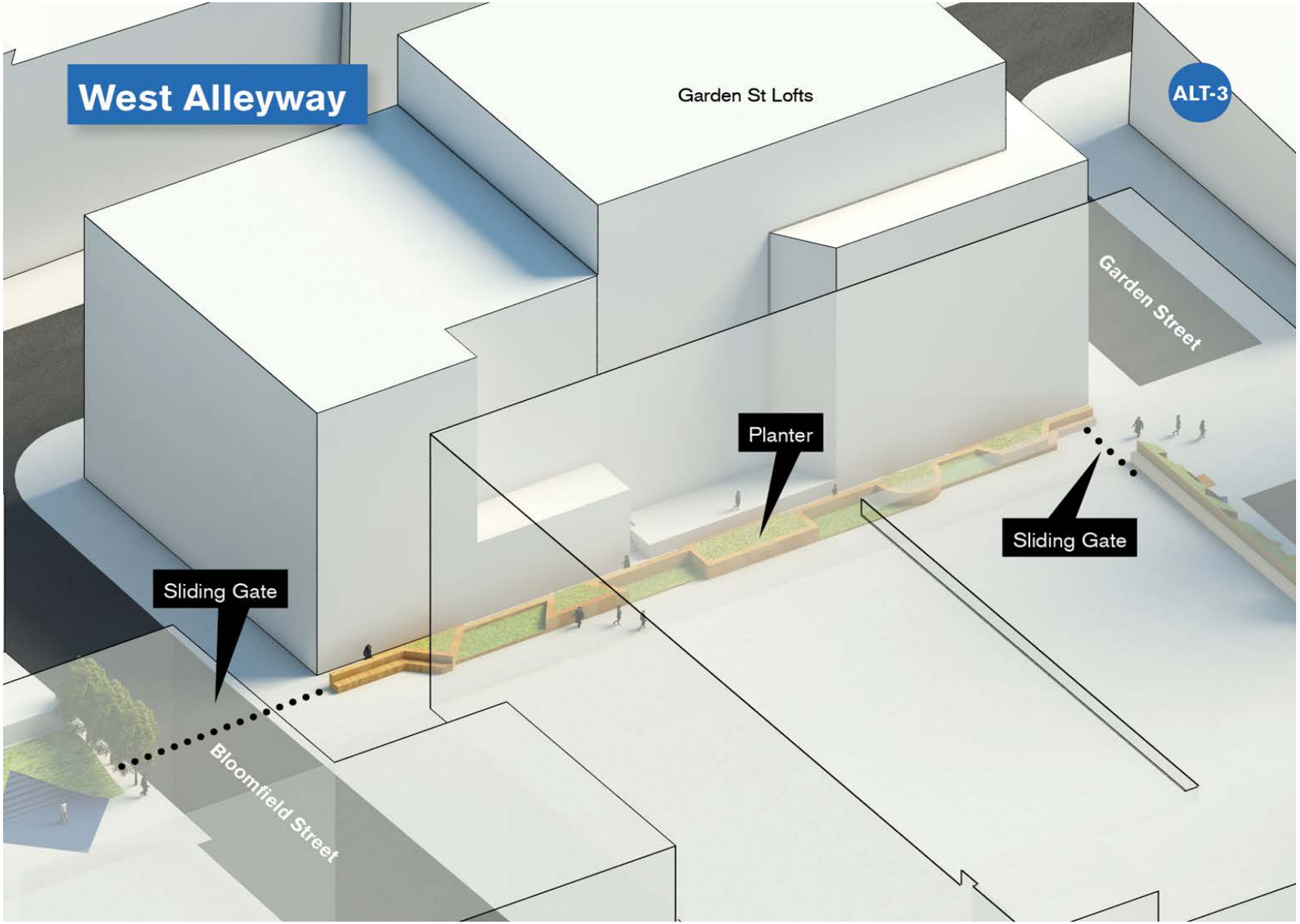
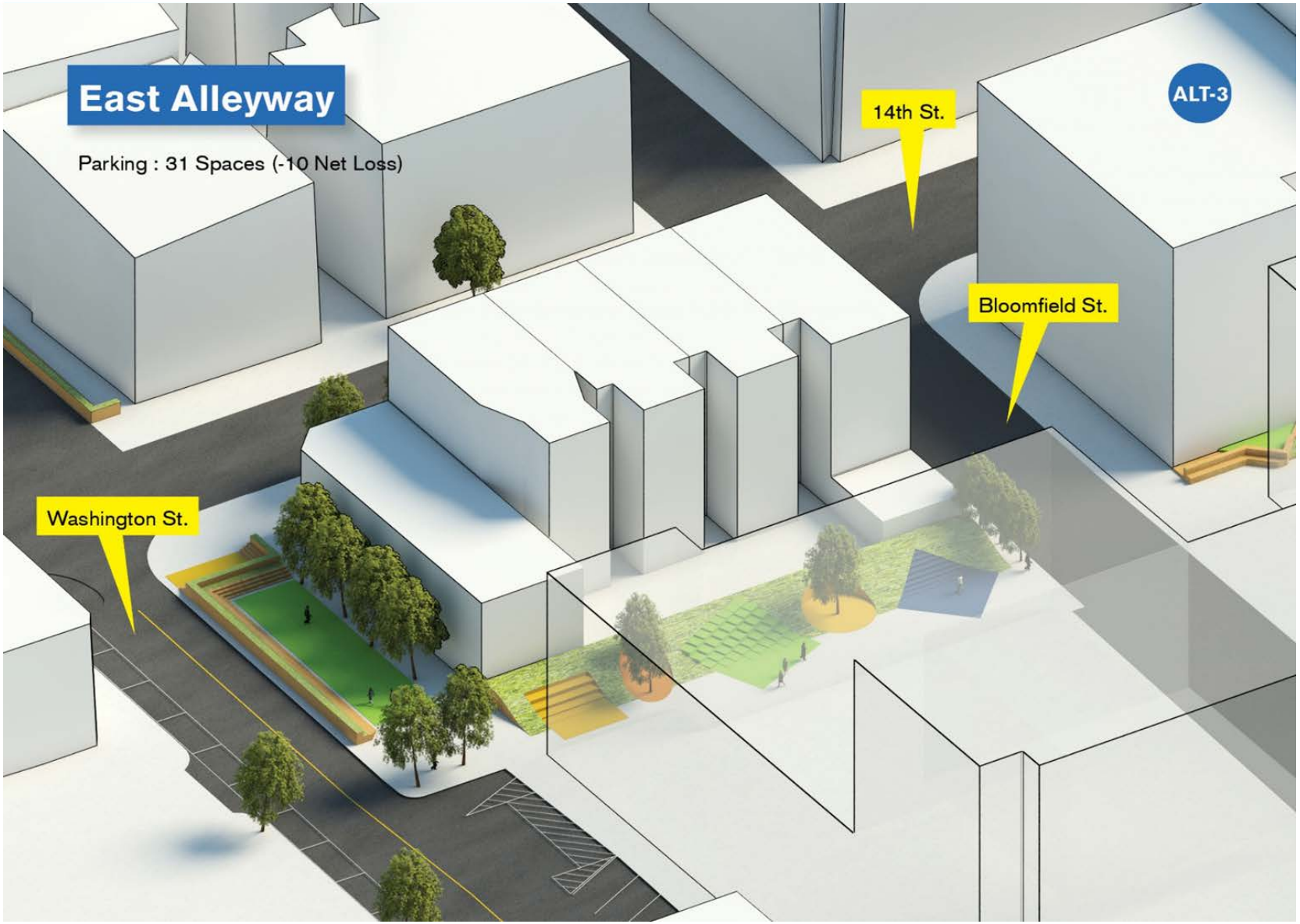
Garden St.
ALT-3
PARKING
4'-3"±
EXISTING PARKING
7'-0"

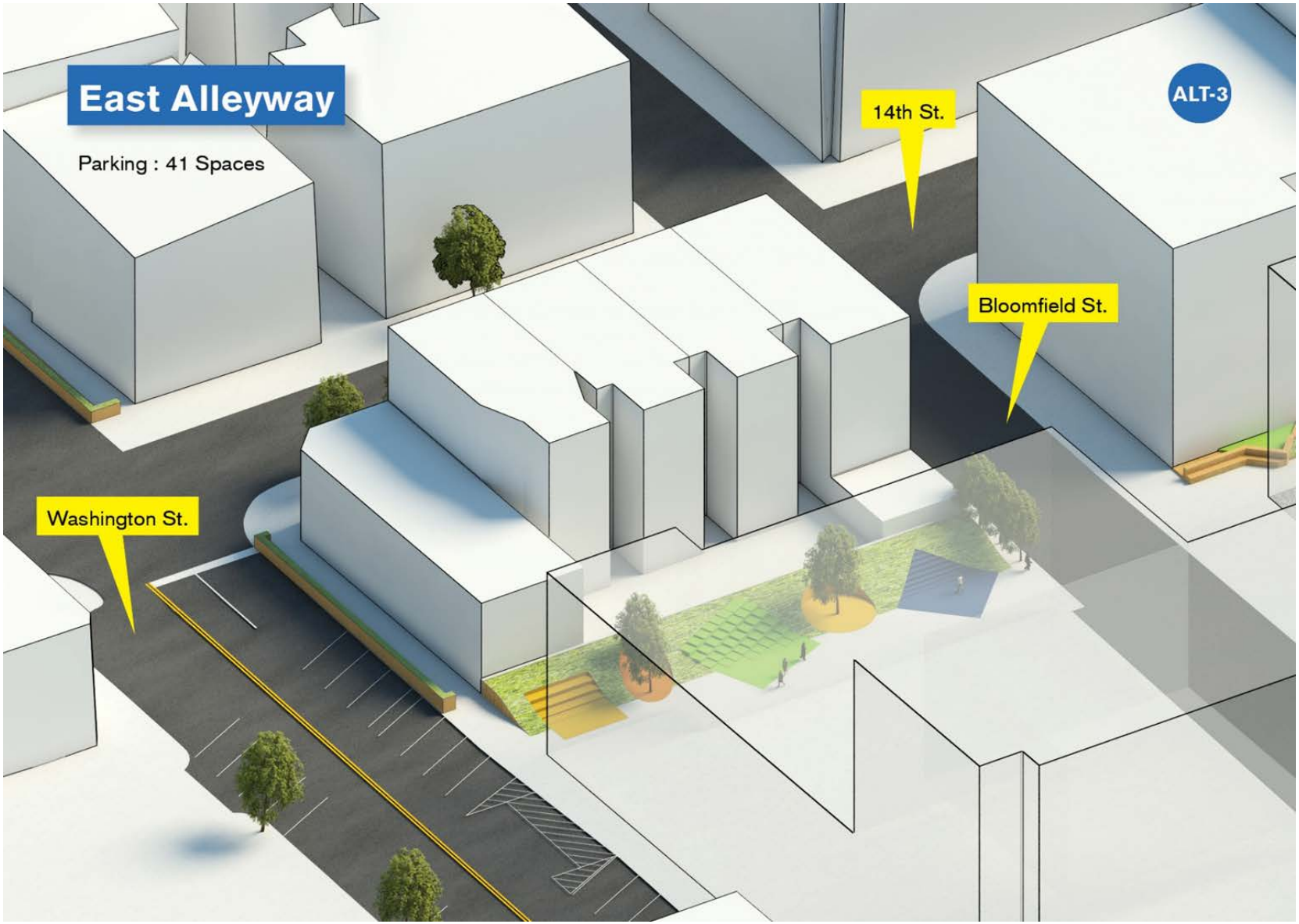

West Alleyway
Garden St Lofts
ALT-3
Garden Street
Planter
Sliding Gate
Sliding Gate
Bloomfield Street


West Alleyway
Sliding Gate Location
ALT-3



Dewberry

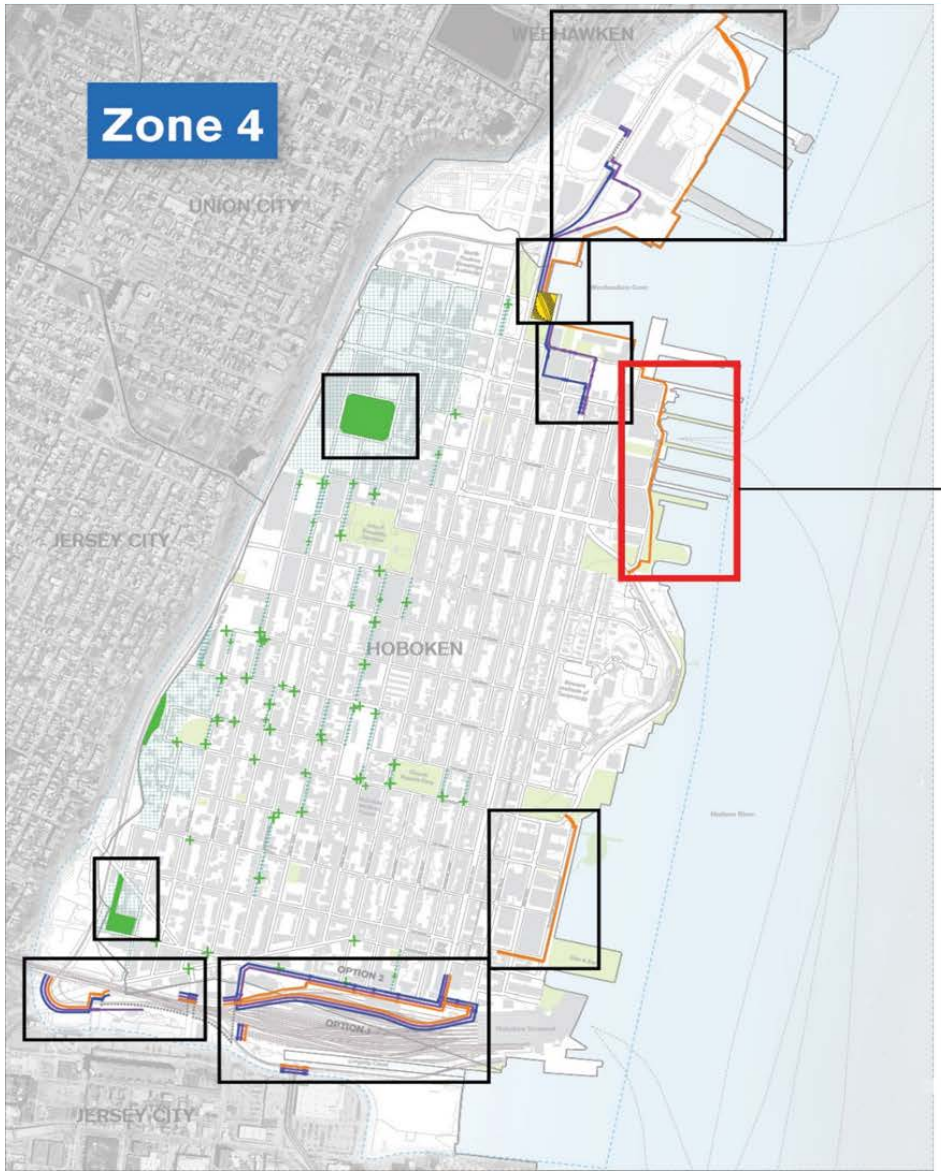
State of New Jersey Department of Environmental Protection


East Alleyway
Parking : 41 Spaces
14th St.
ALT-3
Bloomfield St.
Washington St.


East Alleyway
ALT-3
Parking Impacted

Alt. 3 - Garden St. and Alleyway

View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Residential impacts Retail/Dining impacts	No Waterfront access impact	New Park Space	0-10 Parking Impacted, 4 Gates



Zone 4 — North Waterfront

Alternative 1 Only

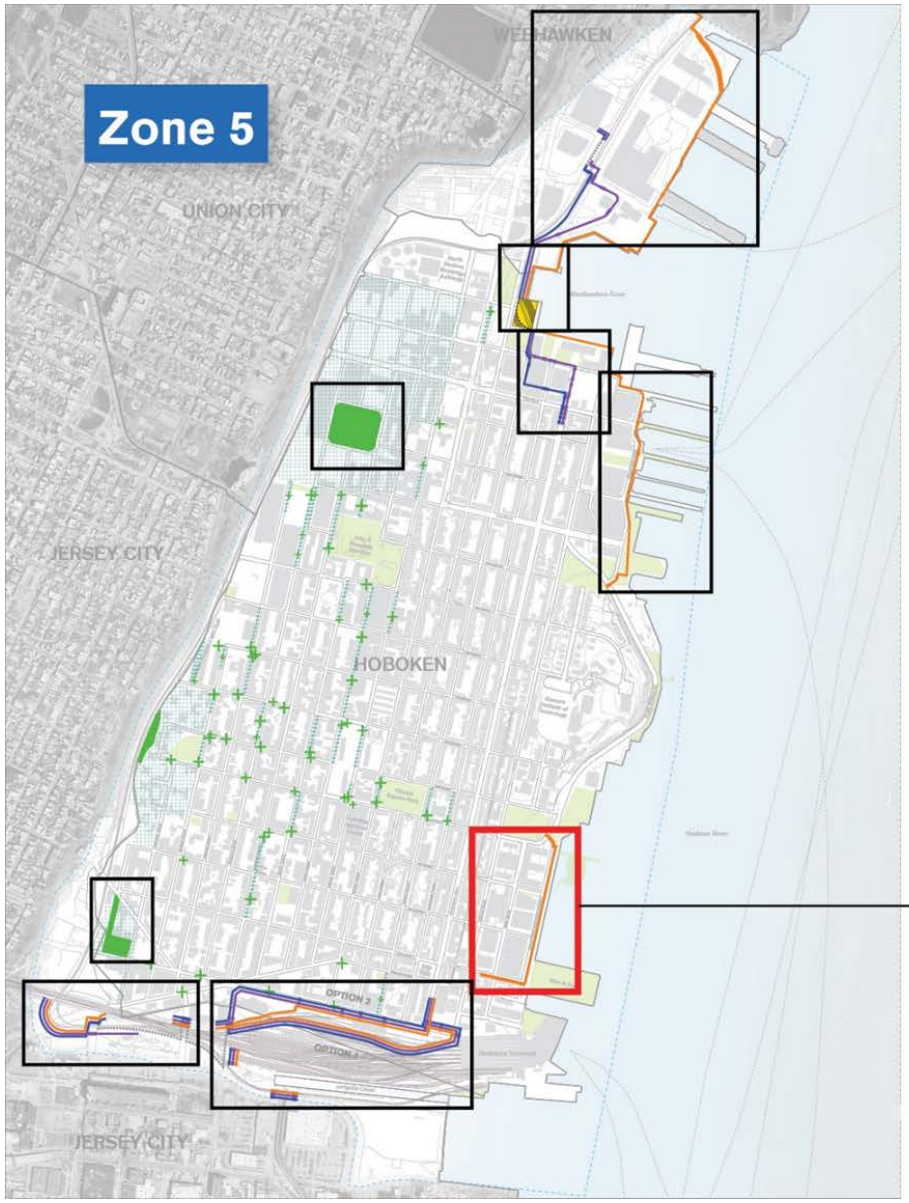

Zone 4 - Alt. 1
ALT-1
Independence Court Waterfront
Maxwell Place Park


Independence Court Waterfront
ALT-1
Existing View Impacted


Maxwell Place Park
Waterfront Access Impacted
ALT-1

Independence Court Waterfront

View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Residential impacts Recreational impacts	Waterfront access impacted	Improved Park Space	< 10 Parking Impacted, 5 Gates

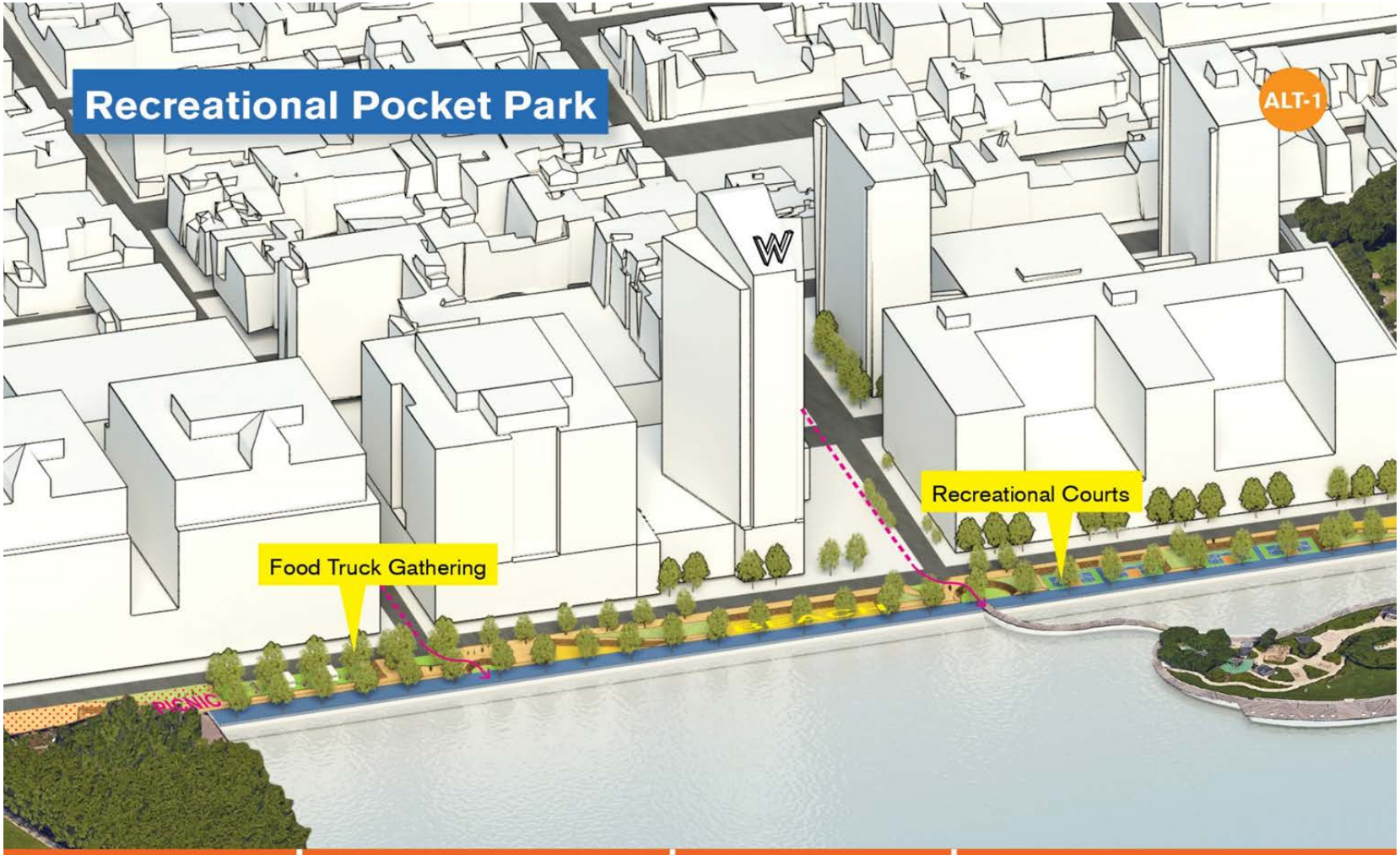


Zone 5 — South Waterfront

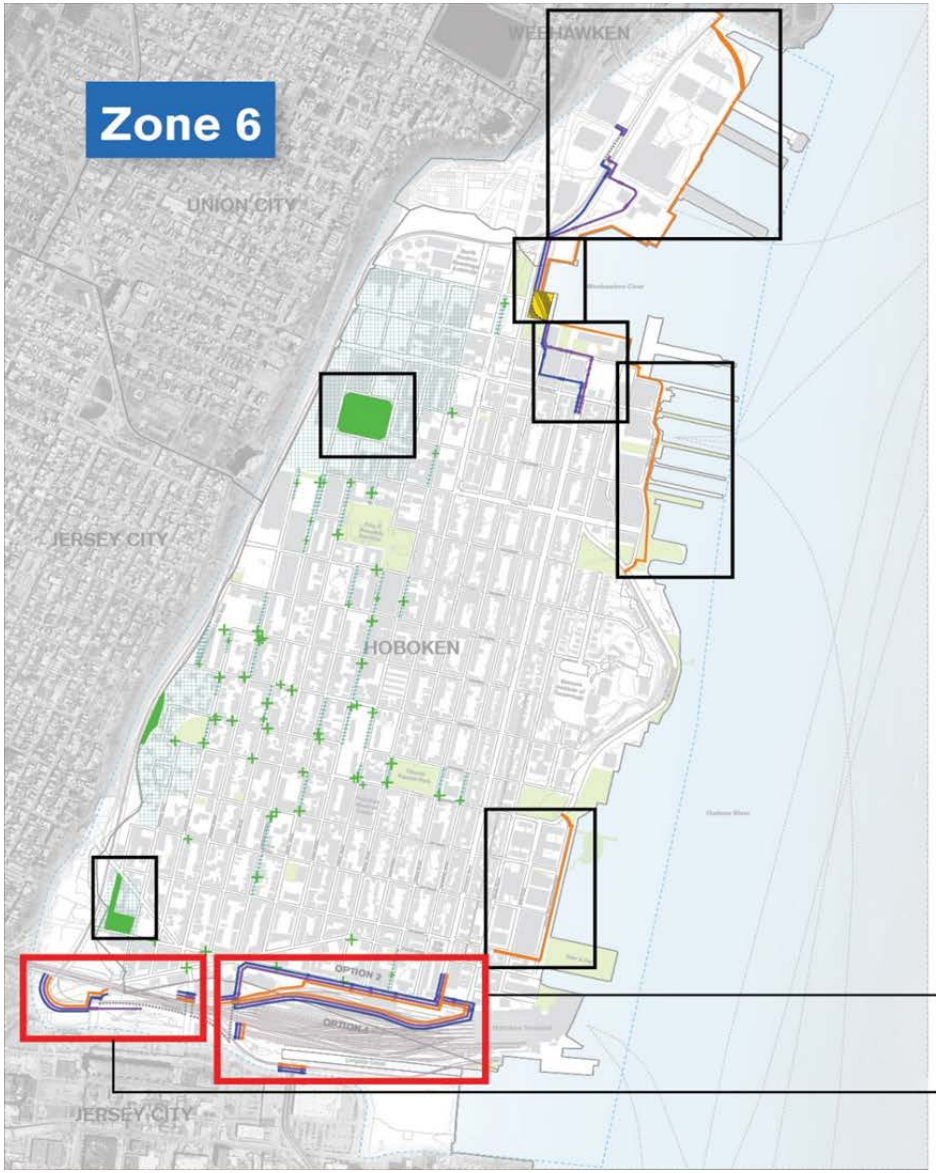
Alternative 1 Only


Zone 5 - Alt. 1
ALT-1


Recreational Pocket Park
Waterfront Access Impacted
ALT-1



View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Residential impacts Retail/Dining impacts	Waterfront access impacted	Improved Park Space	0 Parking Impacted, 2 Gates

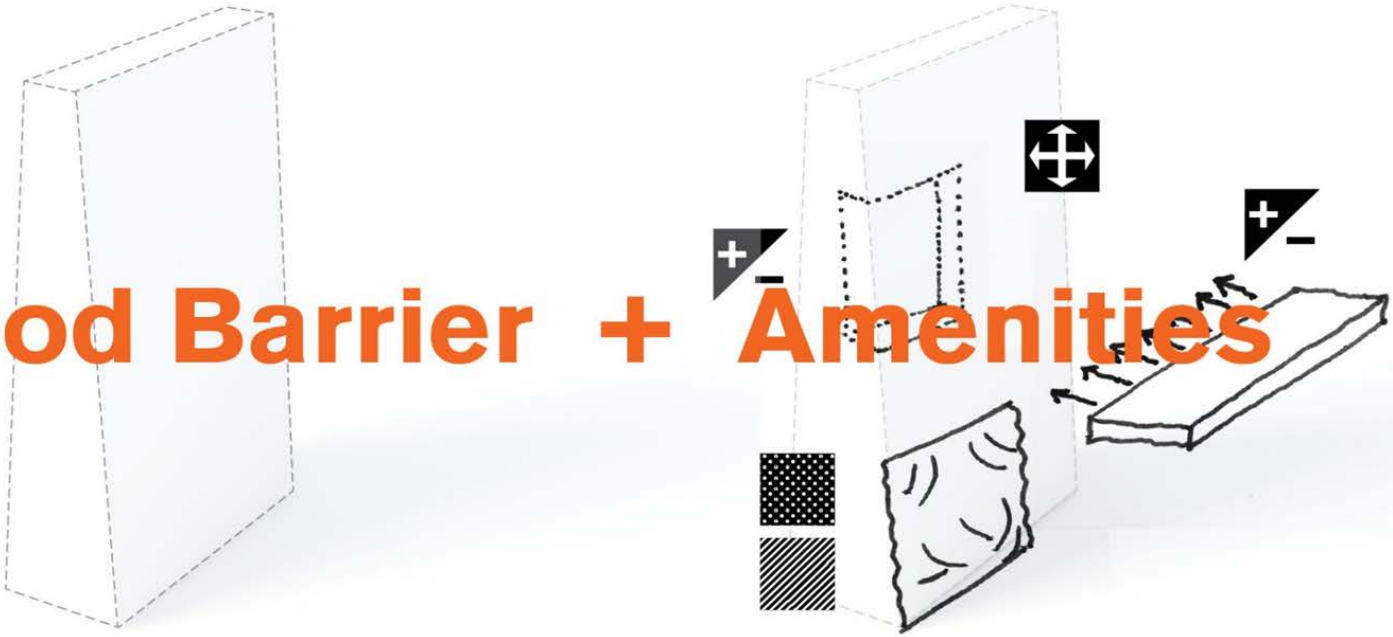


Zone 6 — Observer Highway
Alternative 1, 2, 3 @ Street or along rails

Zone 7 — Jersey Avenue Underpass
Alternative 1, 2, 3 @ Underpass

Toolkit

Flood Barrier + Amenities



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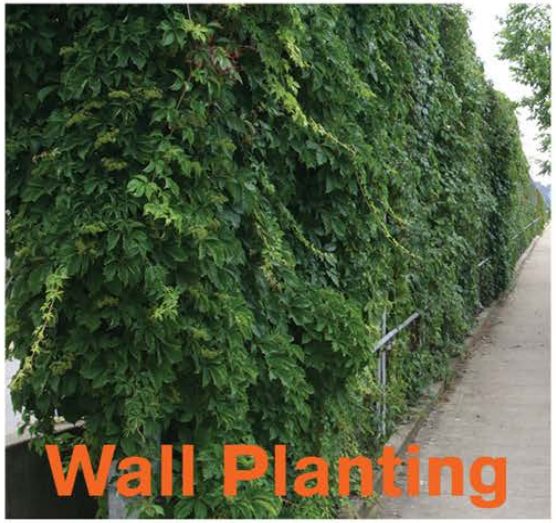
Toolkit

Wayfinding

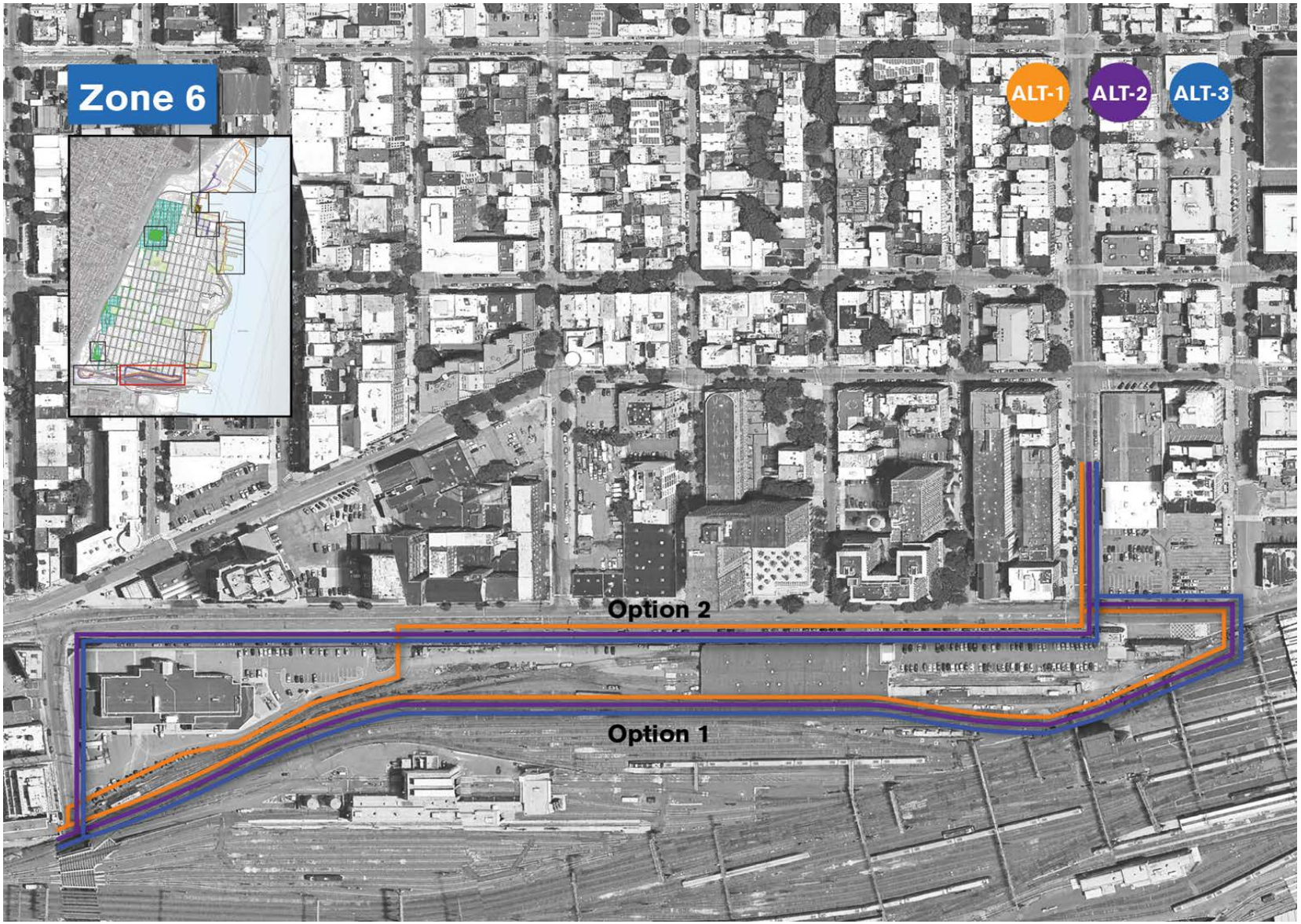

Seating


Bike Parking


Mural

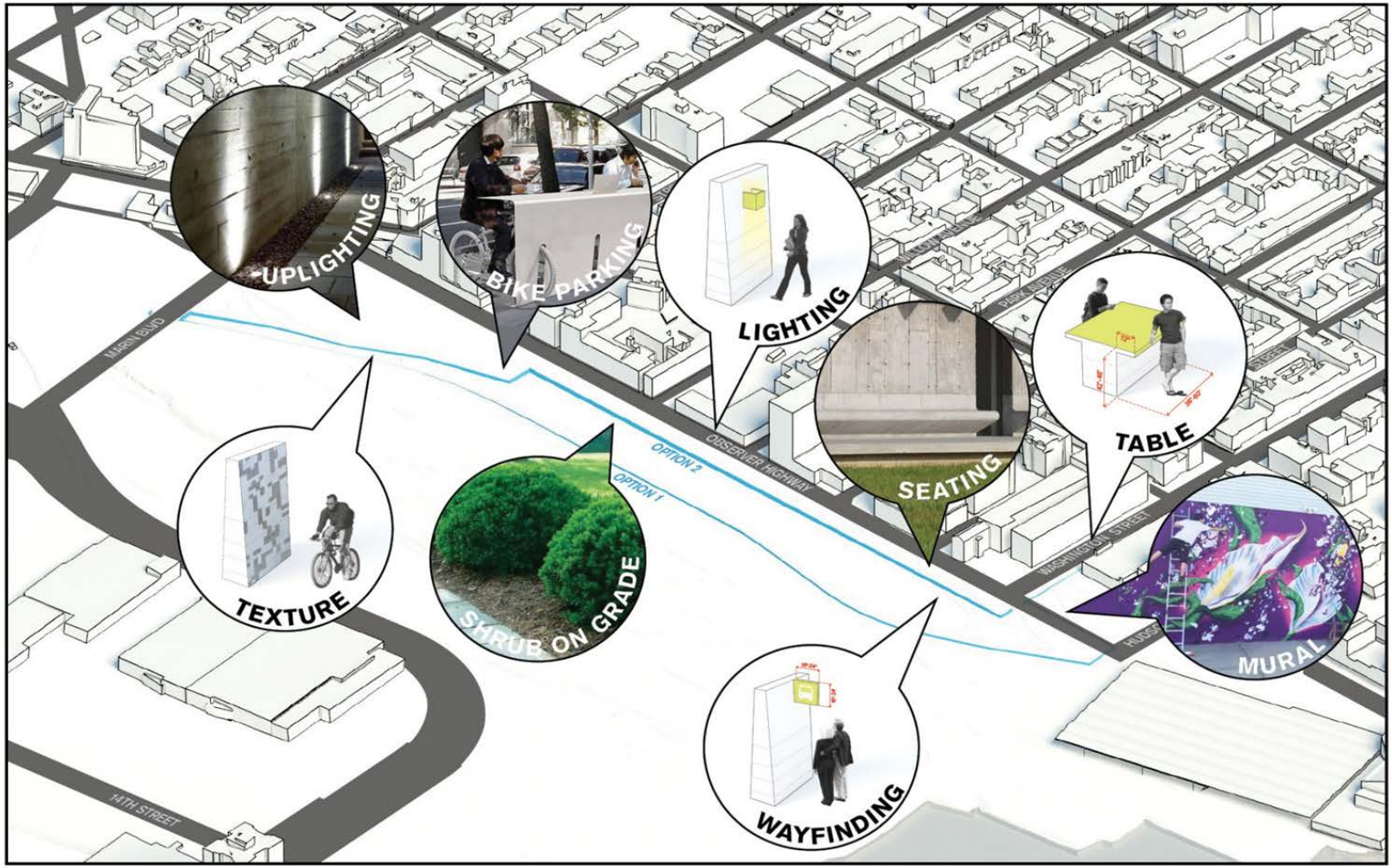

Wall Planting


Shrub Planter


Zone 6
ALT-1
ALT-2
ALT-3
Option 2
Option 1

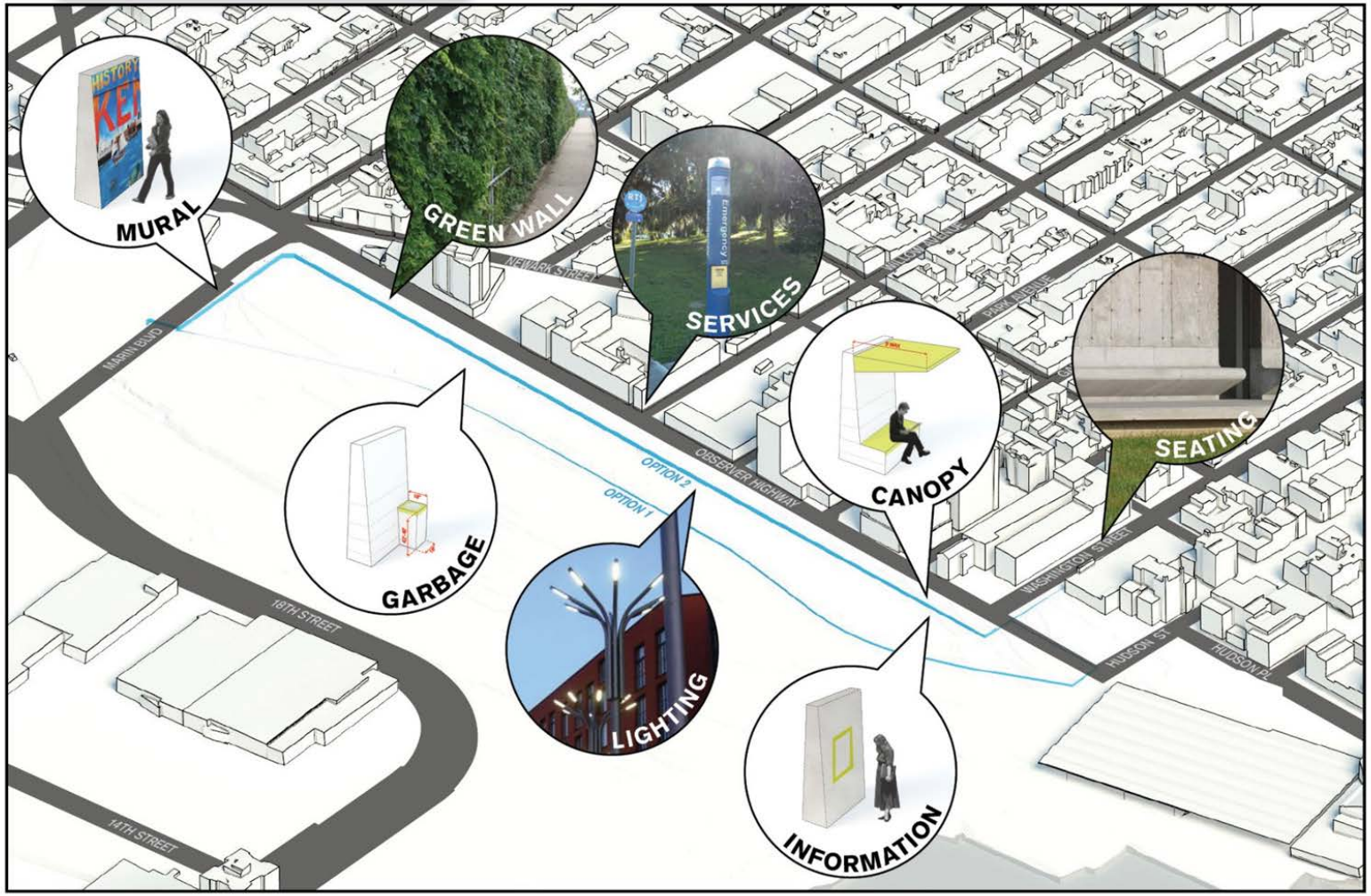
Alt. 1 Overview

ALT-1

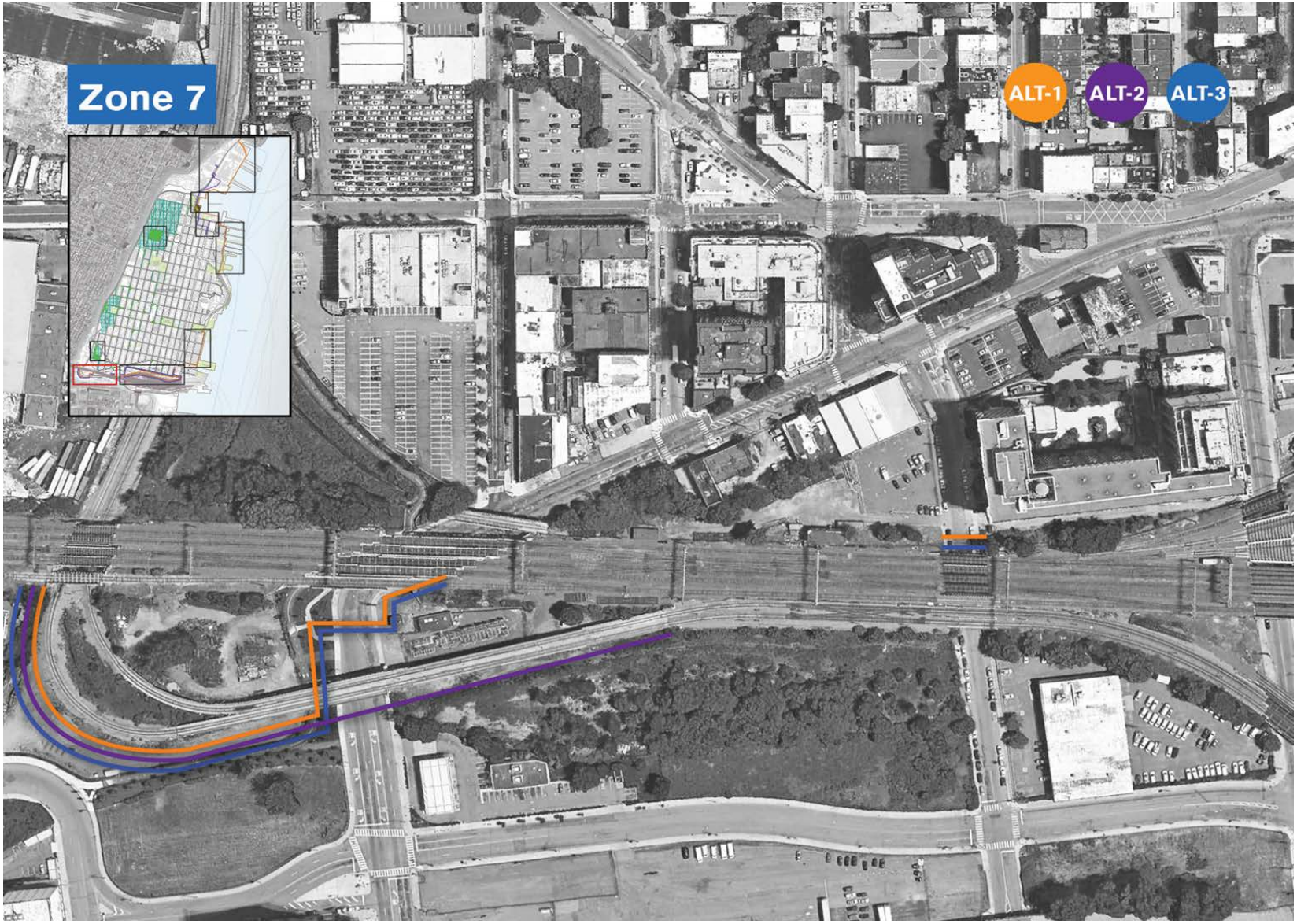


Alt. 2 & 3 Overview

ALT-2 ALT-3

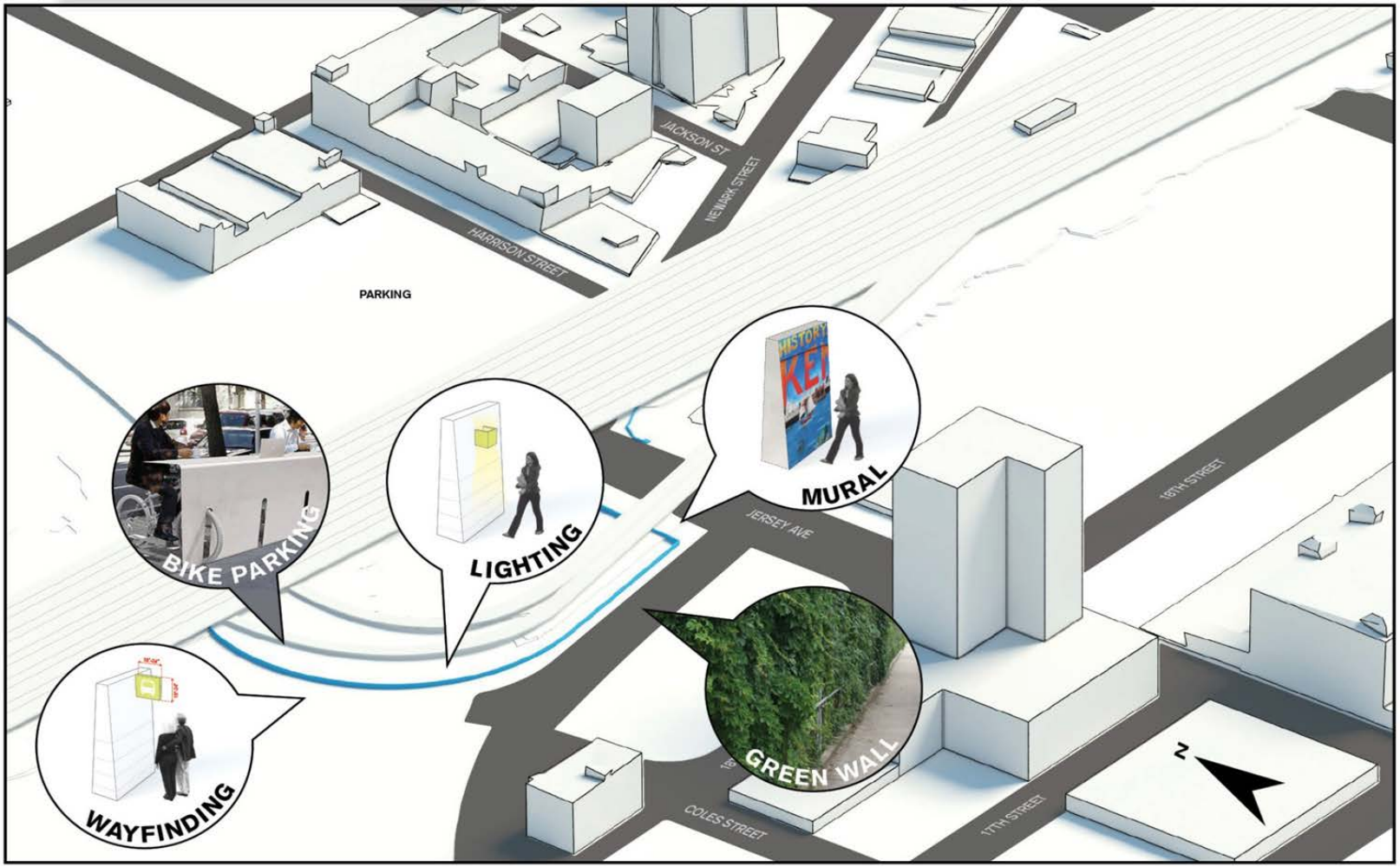


View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Residential impacts Retail/Dining impacts	No Waterfront access impact	N/A	0 Parking Impacted, 2-5 Gates


Zone 7
ALT-1
ALT-2
ALT-3

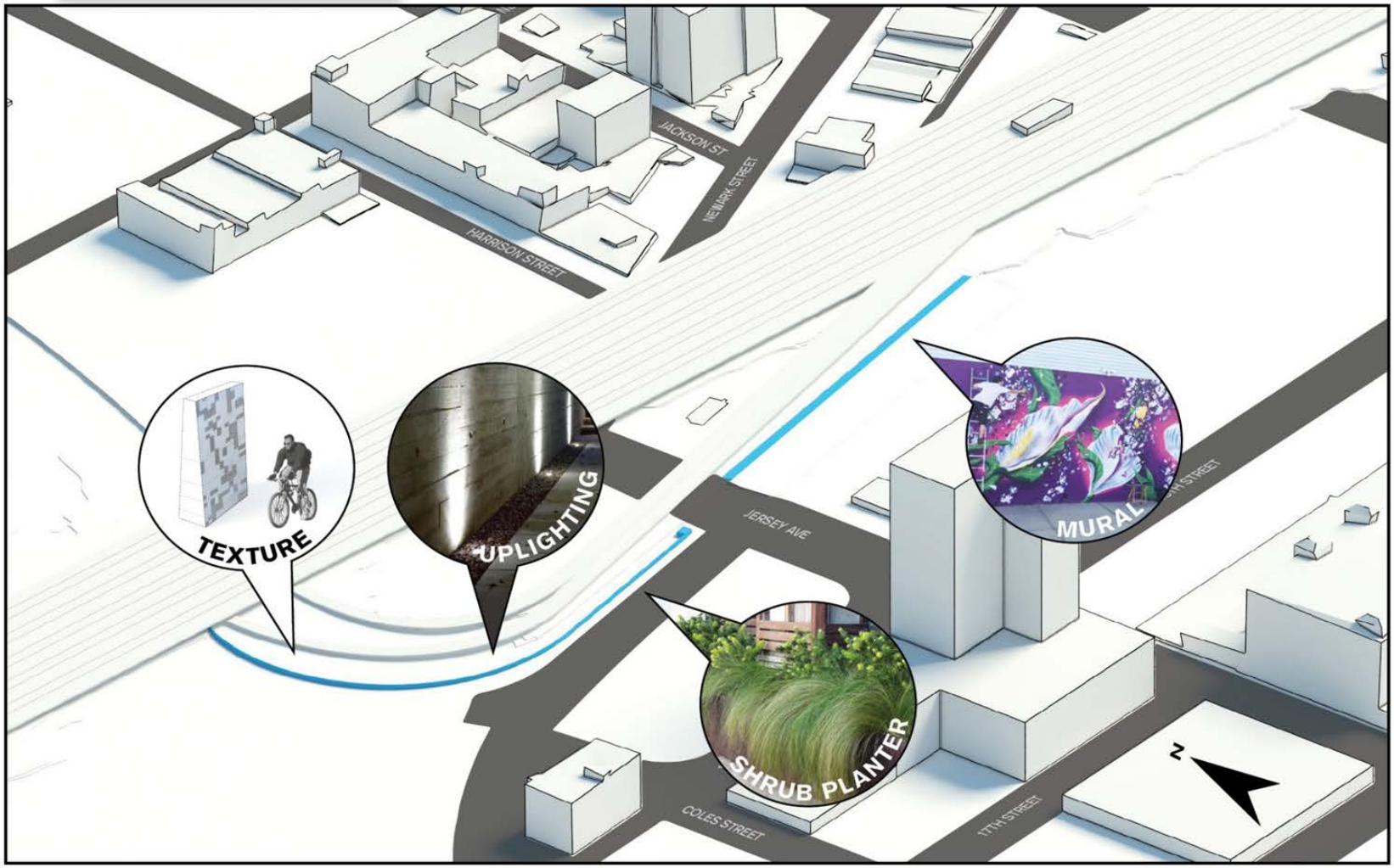
Alt. 1 & 3 Overview

ALT-1 ALT-3

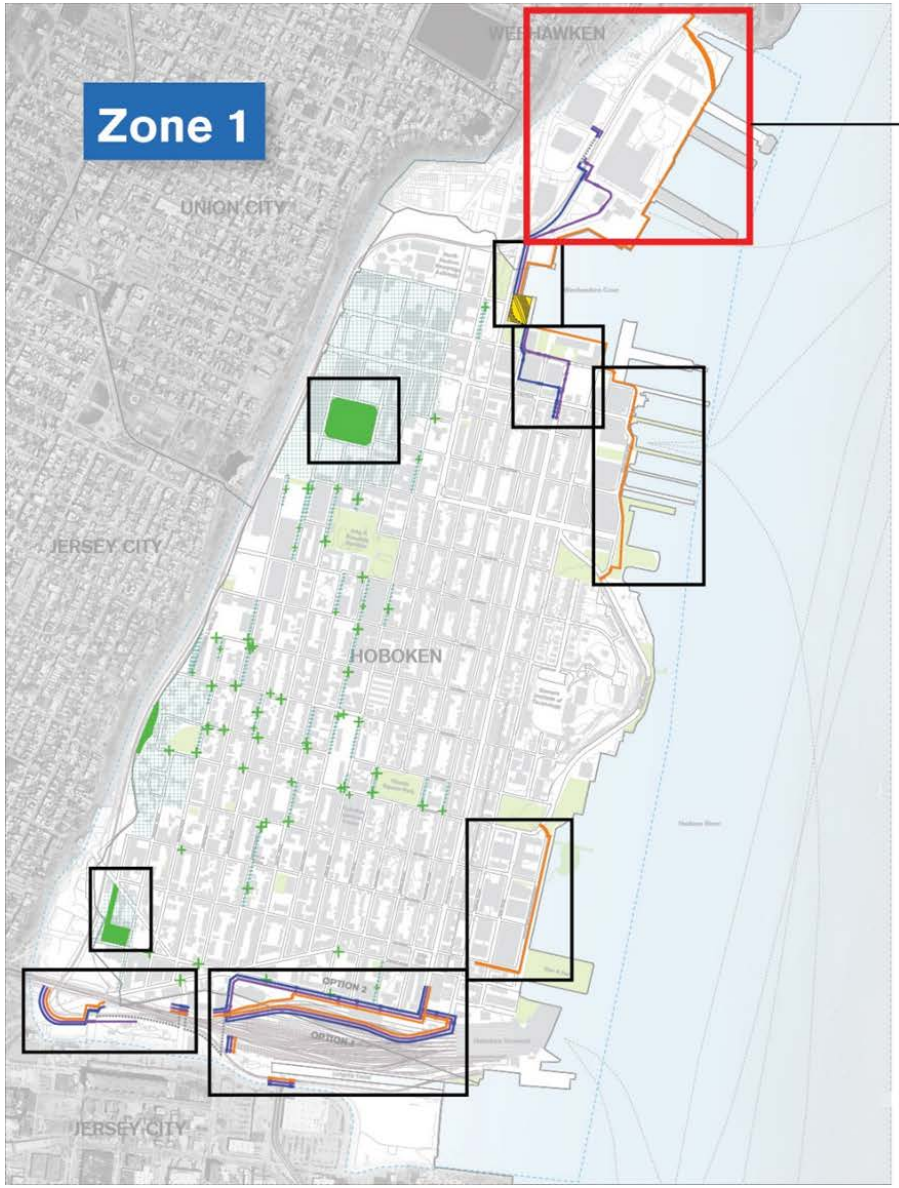


Alt. 2 Overview

ALT-2



View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Residential impacts	No Waterfront access impact	N/A	0 Parking Impacted, 1-3 Gates

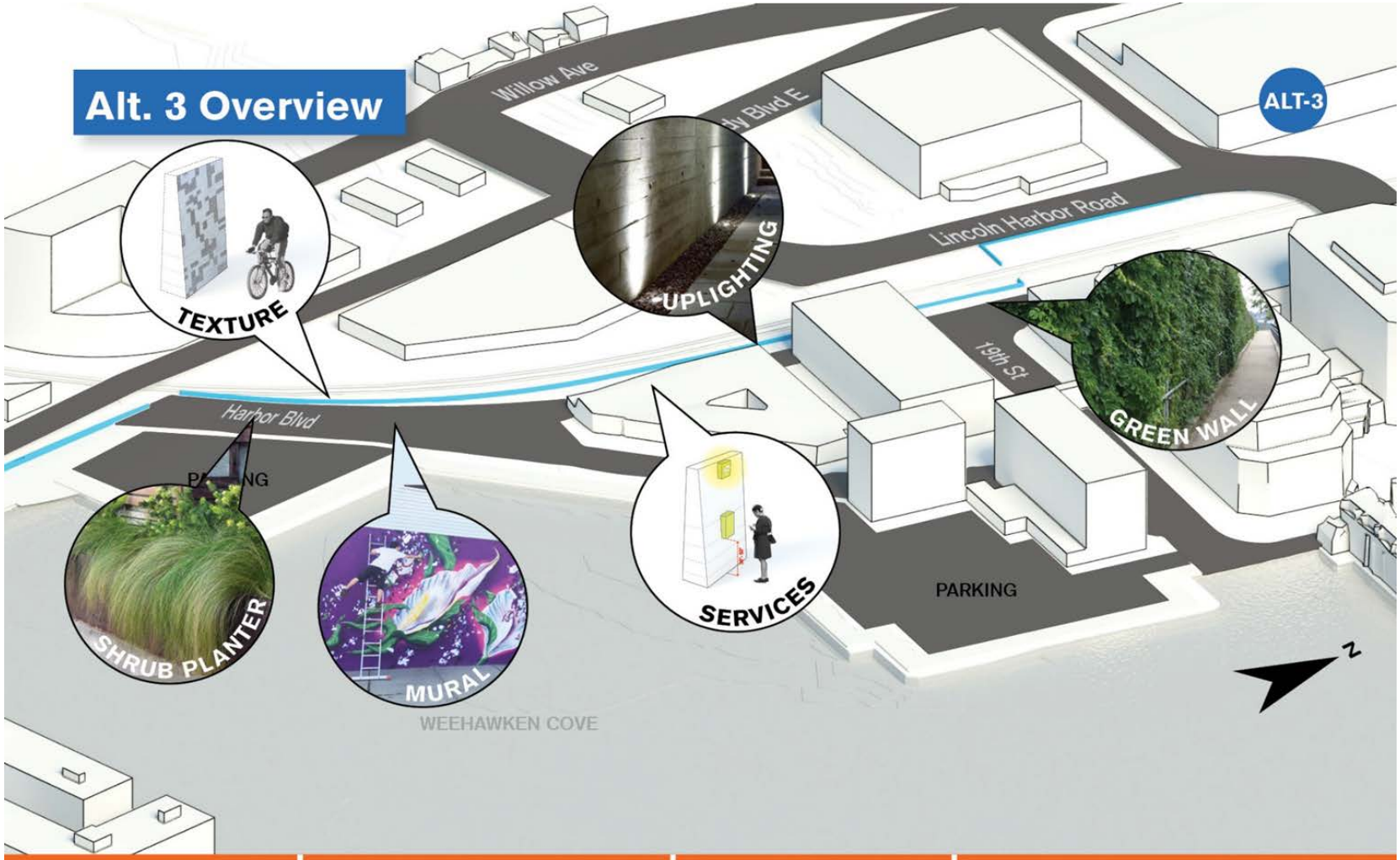


Zone 1 — Weehawken Tie In

Alternative 1 @ Waterfront to Lincoln Tunnel
Alternative 2, 3 @ Inland to 19th Street


Zone 1
ALT-1
ALT-2
ALT-3

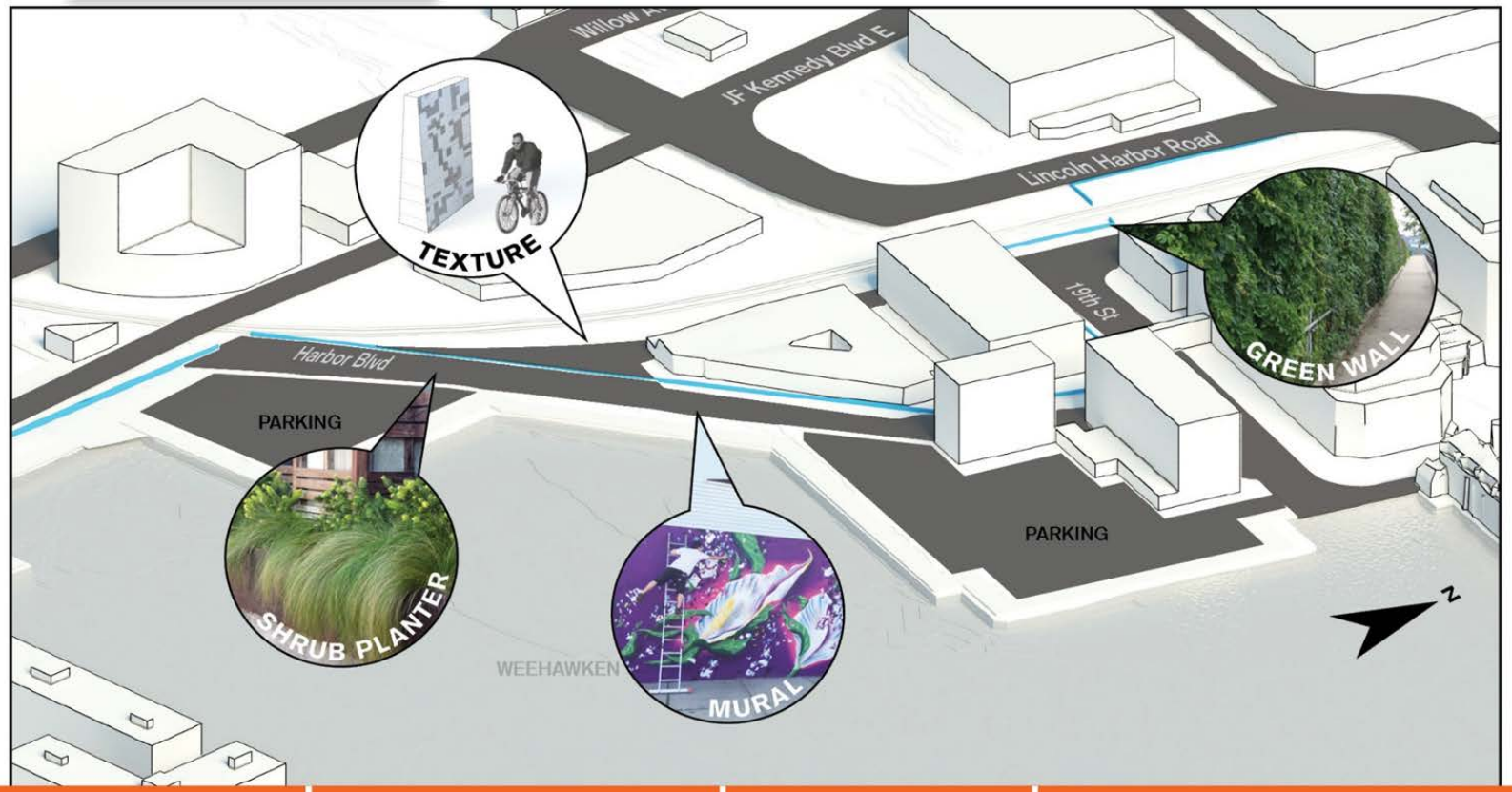
Alt. 3 Overview



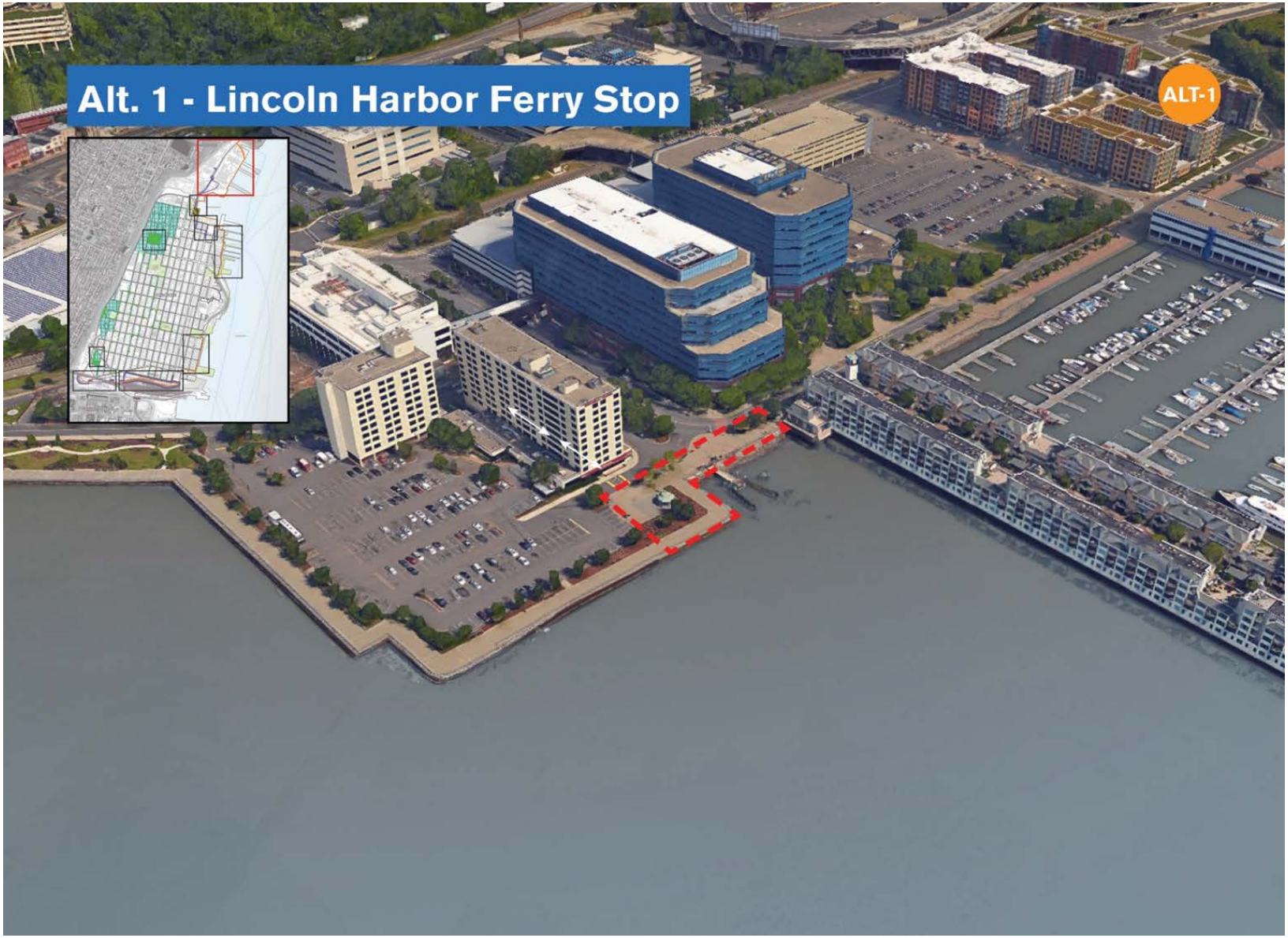
View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Recreational impacts	No Waterfront access impact	N/A	0 Parking Impacted, 3 Gates

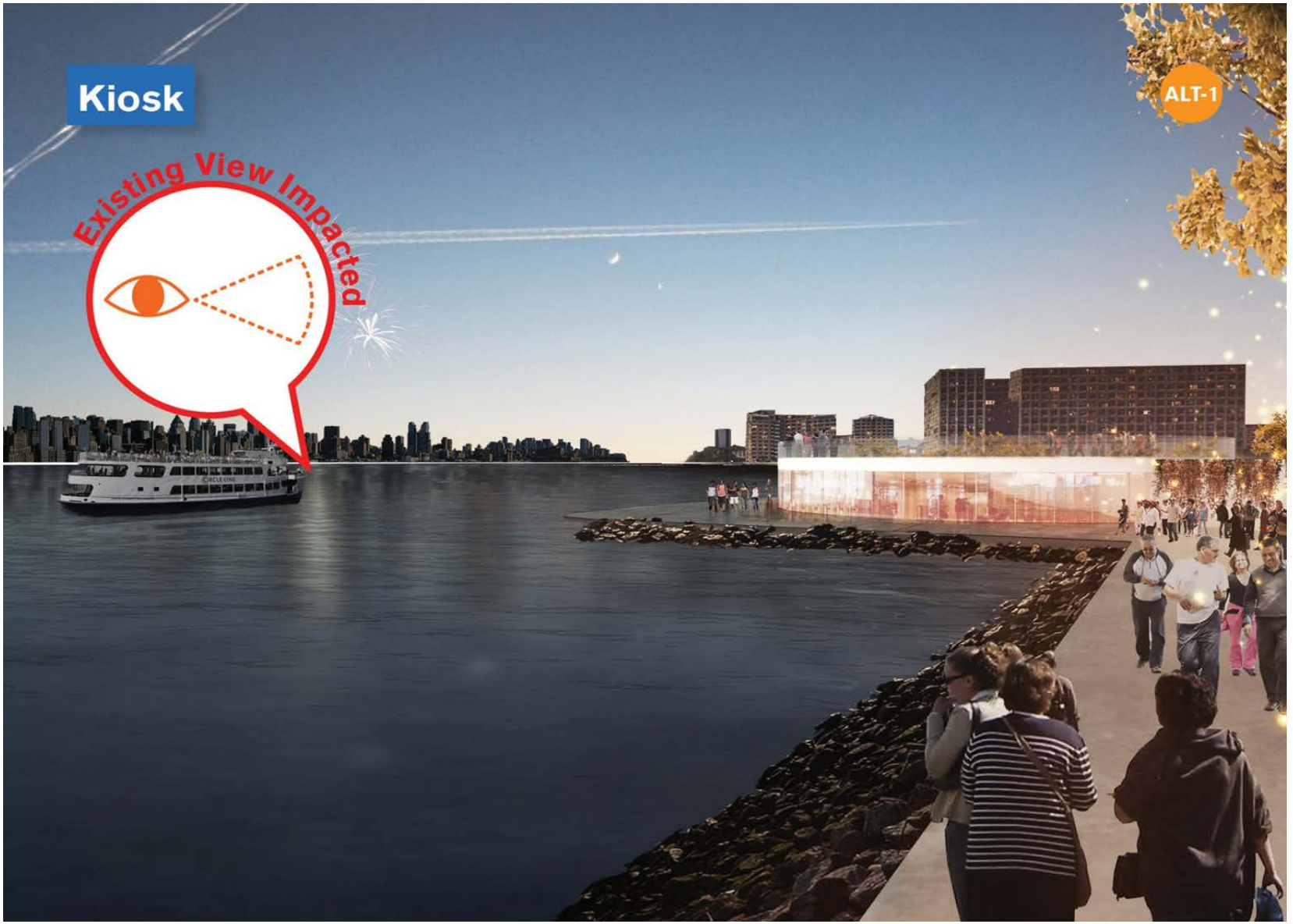
Alt. 2 Overview

ALT-2



View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Retail/Dining impacts	Waterfront access impacted	N/A	0 Parking Impacted, 3 Gates


Alt. 1 - Lincoln Harbor Ferry Stop
ALT-1

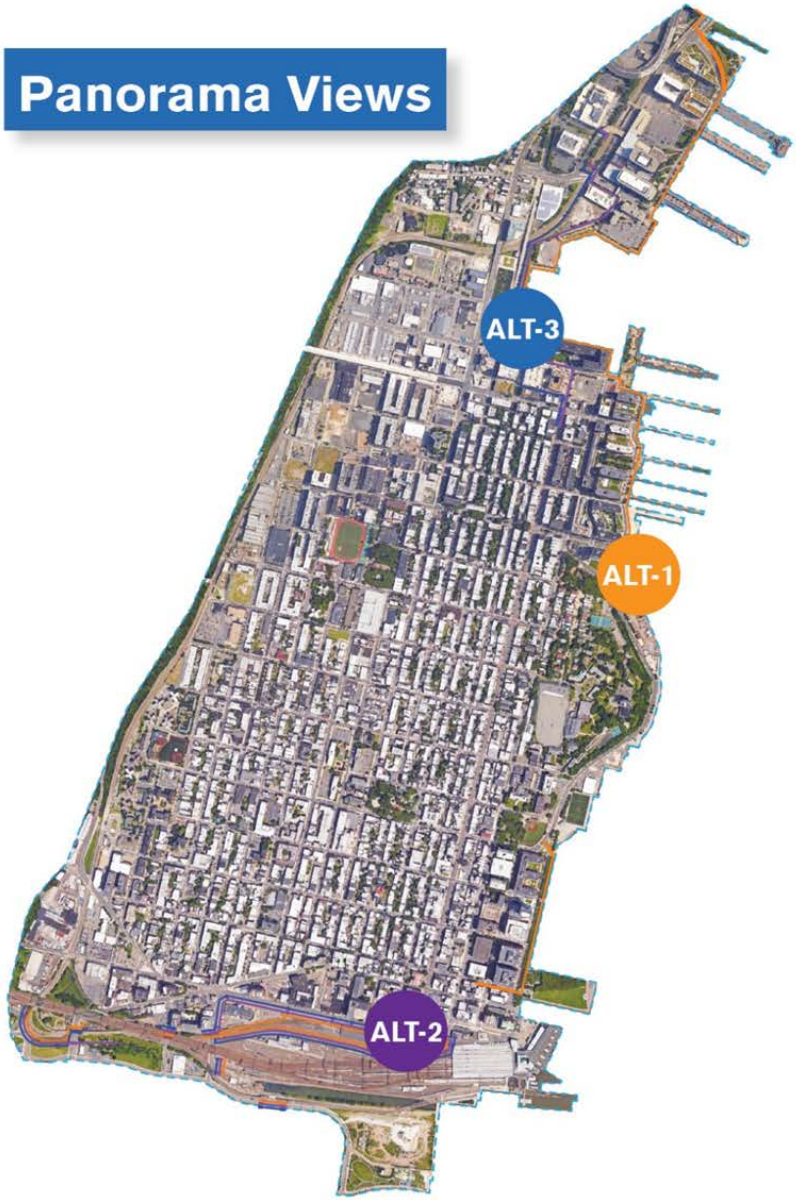

Kiosk
Existing View Impacted
ALT-1


Alt. 1 - Weehawken Park Space
ALT-1


Sloped + Sheltered
Waterfront Access Impacted
ALT-1

View Corridors	Waterfront Access	Park Space	Connectivity/Circulation
Recreational impacts Retail/Dining impacts	Waterfront access impacted	Improved Park Space	0 Parking Impacted, 5 Gates

Panorama Views



Cove Park

Maxwell Place Park

Observer Highway

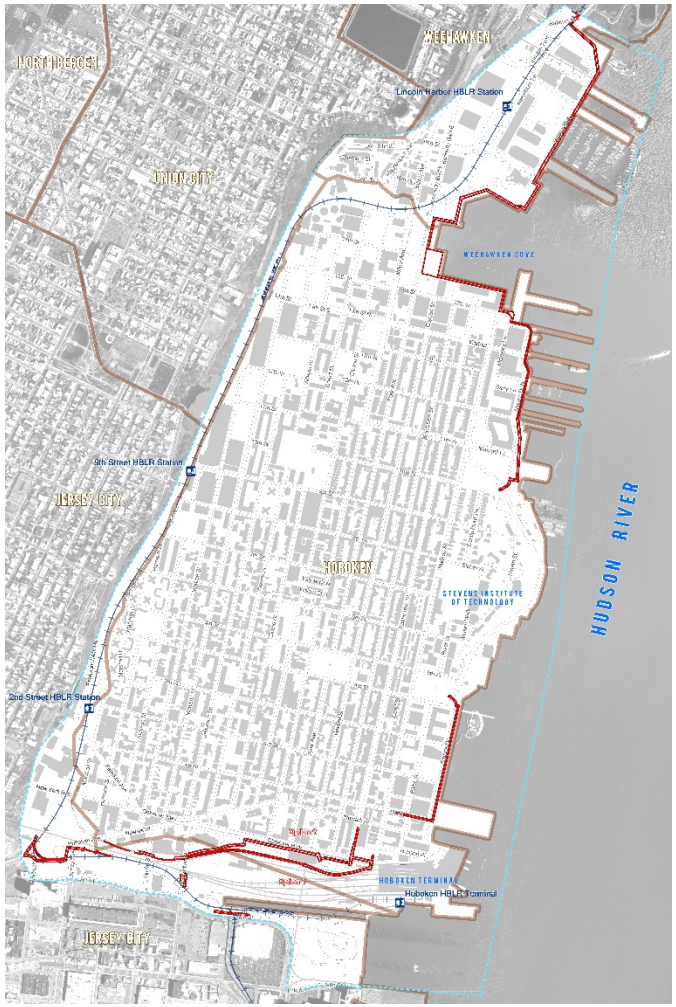
Benefit Cost Analysis

Benefit Cost Analysis (BCA) considers the project's cost and the value of its benefits

- Benefits
- Cost
- Benefit/Cost Ratio

Project Costs - Resist

ALT-1	Option 1 ($M)	Option 2 ($M)
Construction Costs	$345-387	$354-395
Design, Engineering, and Project Management	$95	$97
Estimated Project Cost	$440-482	$451-492
Project Contingency	$96-107	$99-110
Total Project Cost	$537-589	$550-602



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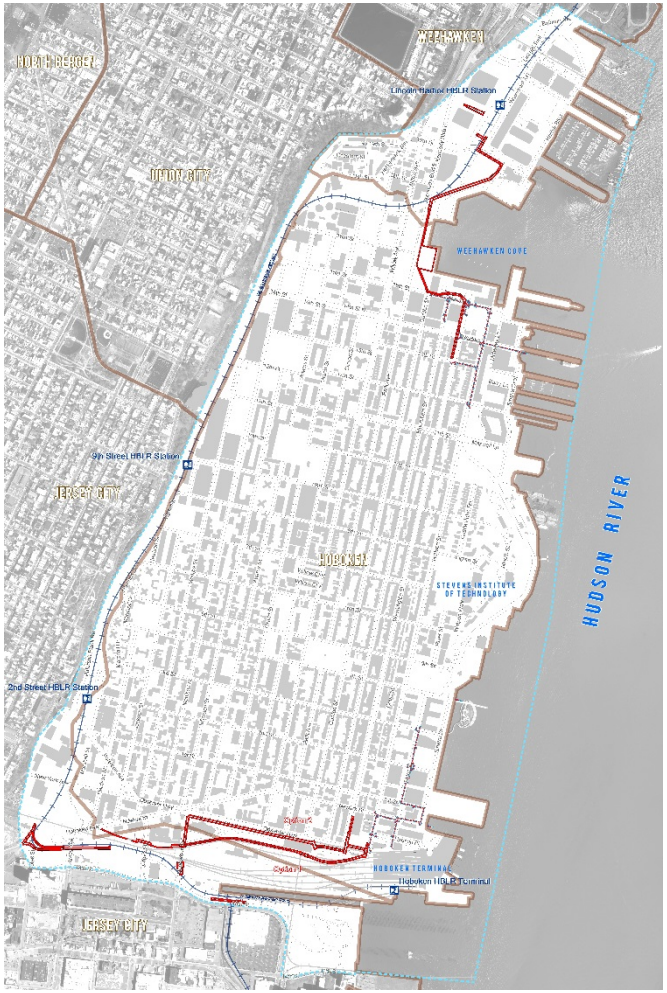
Project Costs - Resist

ALT-2	Option 1 ($M)	Option 2 ($M)
Construction Costs	$145-168	$155-174
Design, Engineering, and Project Management	$56	$57
Estimated Project Cost	$201-224	$212-232
Project Contingency	$43-49	$45-50
Total Project Cost	$243-273	$258-282



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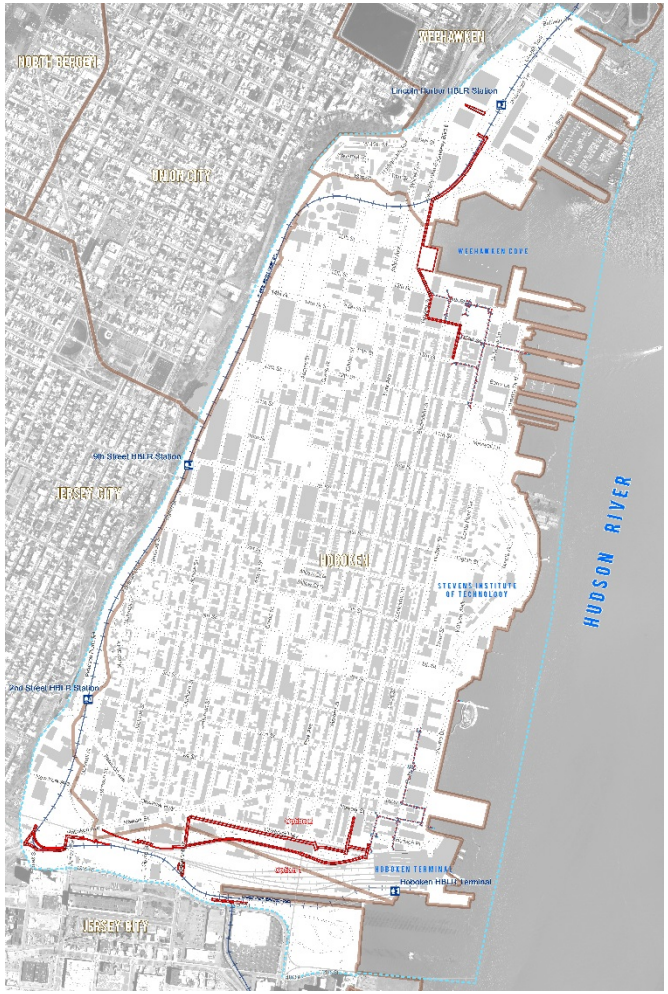
Project Costs - Resist

ALT-3	Option 1 ($M)	Option 2 ($M)
Construction Costs	$136-156	$144-168
Design, Engineering, and Project Management	$54	$56
Estimated Project Cost	$189-210	$200-225
Project Contingency	$40-45	$43-49
Total Project Cost	$230-255	$243-274



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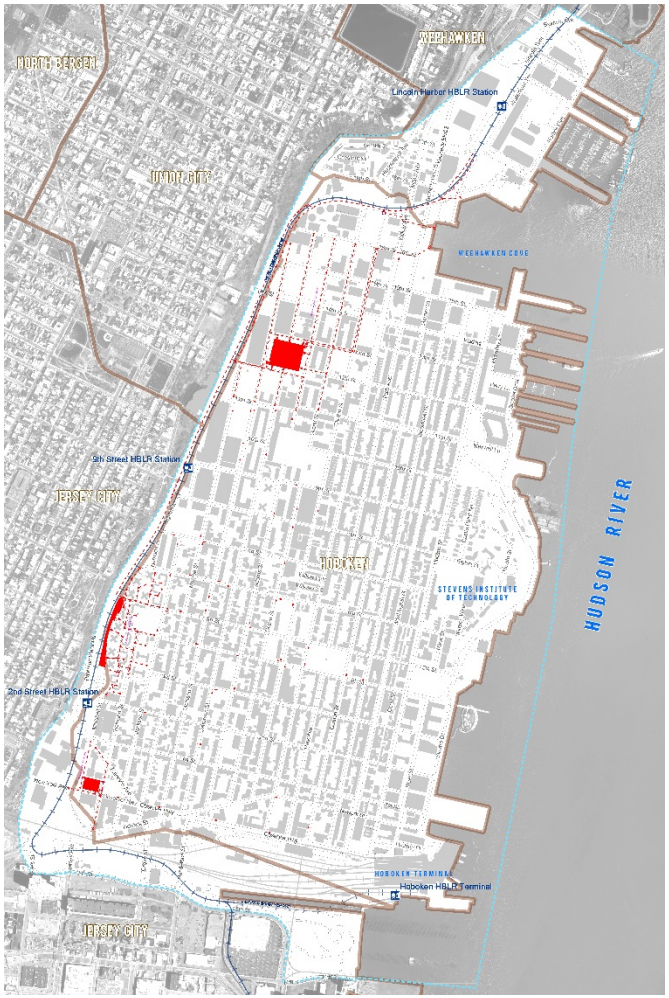
Project Costs - Delay, Store, Discharge (DSD)

	DSD ($M)
Construction Costs	$85.9-100.2
Design, Engineering, and Project Management	$17.9-21.2
Estimated Project Cost	$103.8-121.4
Project Contingency	$22.6-26.6
Total Project Cost	$126.4-148.0



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Benefit-Cost Analysis (BCA)

The purpose of a Benefit-Cost Analysis (BCA) is to demonstrate that the benefits of a project outweigh its costs, or the Benefit-Cost Ratio (BCR) is greater than 1.0

$$BCR = \frac{BENEFITS}{COSTS}$$

BCA can also provide a common basis for comparison of project alternatives

Benefit-Cost Analysis Methodology

Hazard Info

- Coastal flood analysis depth grids
- Rainfall/drainage flood analysis depth grids
- Event recurrence intervals

Project Costs

- Construction costs
- Design, engineering, project management
- Operation and maintenance

Project Benefits

- Avoided physical damages (structures, contents)
- Avoided loss of function (residential displacement, non-residential business, and/or service losses)
- Socioeconomics benefits (mental stress and anxiety, lost productivity)

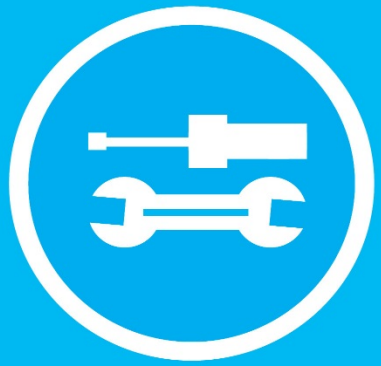
FEMA
BCA Software
(Version 5.2.1)

Inventory Information

- Structures and contents
- Displacement and service losses
- Depth-damage functions

$$BCR = \frac{BENEFITS}{COSTS}$$

Maintenance / Operations and Construction



Maintenance / Operations and Construction

Considers issues of constructability and maintenance and operation once the project elements are built

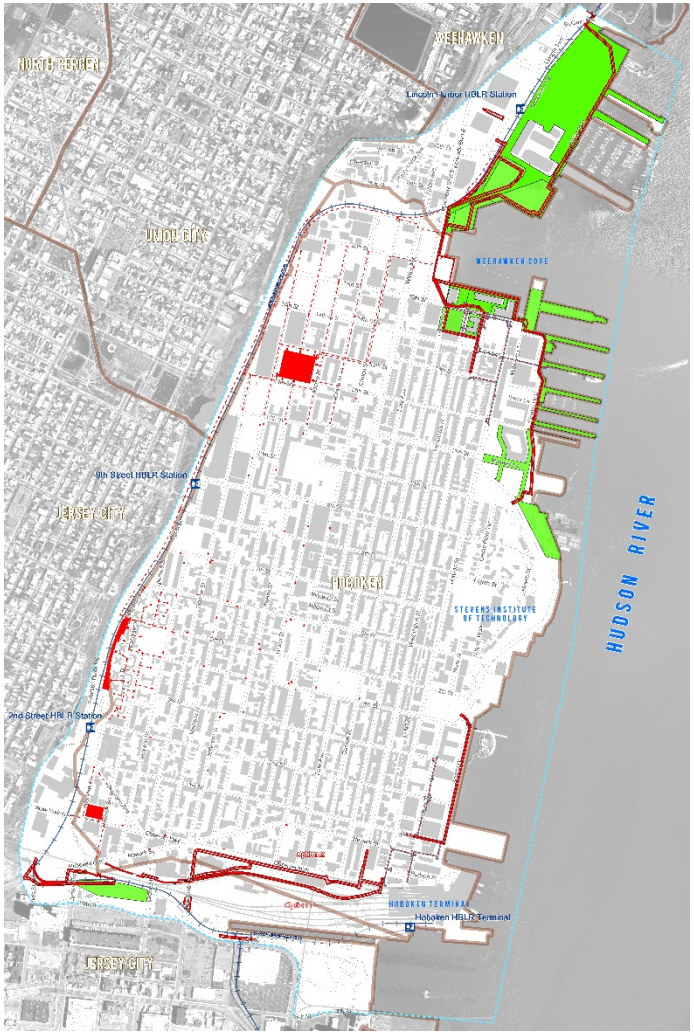
- **Constructability**
- **Temporary Construction Impacts**
- **Estimated Annual Maintenance Costs**

Maintenance / Operations and Construction

Resist Feature: Operations and Maintenance Annual Cost (Estimate, $M)	
ALT-1 Option 1	$3.6 - $5.4
ALT-1 Option 2	$3.7 - $5.5
ALT-2 Option 1	$1.5 - $2.4
ALT-2 Option 2	$1.6 - $2.6
ALT-3 Option 1	$1.4 - $2.3
ALT-3 Option 2	$1.5 - $2.4

Delay Store Discharge Annual O&M Estimate: $1 - $2M

Constructability - Potential Private Property Easement



Legend

- Study Area
- Proposed Resist Structure
- Proposed Underground Tank
- Proposed Underground Piping
- Municipal Boundary
- Hudson-Bergen Light Rail (HBLR)
- Potential Private Property Easement

ALT-1	**- 15 properties with potential easements** **- Approx. 4,860-4,600 feet of utility relocation**
ALT-2	**- 6 properties with potential easements** **- Approx. 2,300-2,060 feet of utility relocation**
ALT-3	**- 6 properties with potential easements** **- Approx. 1,280-1,030 feet of utility relocation**

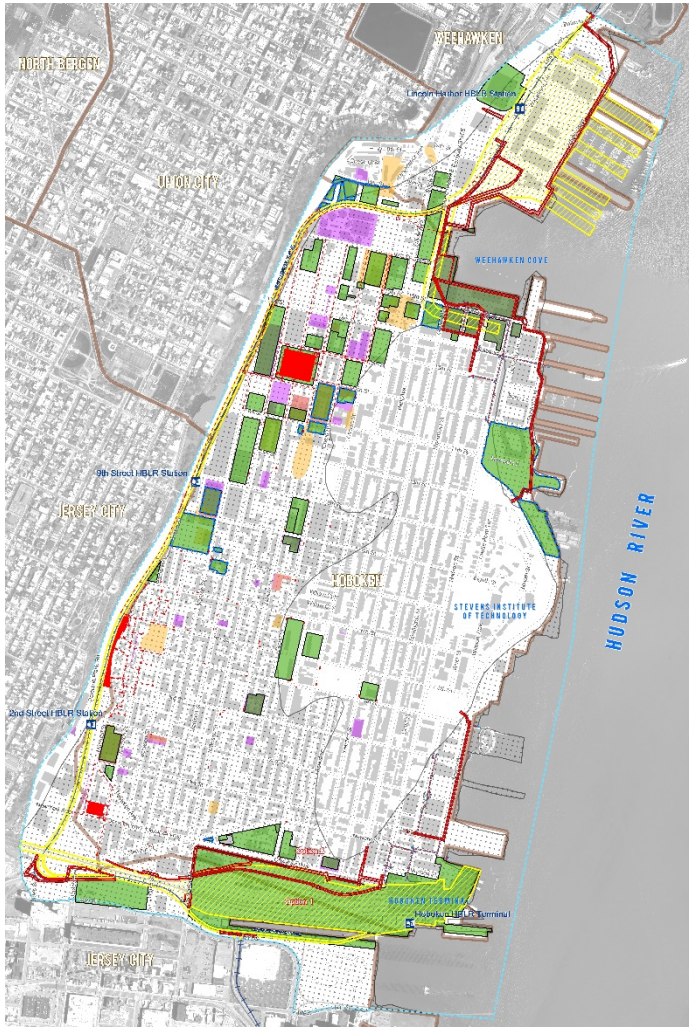
Environmental Impacts

Environmental Impacts

Compares the impacts of the Build Alternatives on the built and natural environment, including resources such as historic properties and species habitat

- **Recognized Environmental Conditions**
- **Environmental Permitting**
- **Historic/Archaeological Resources**
- **Noise Receptors**

Recognized Environmental Conditions

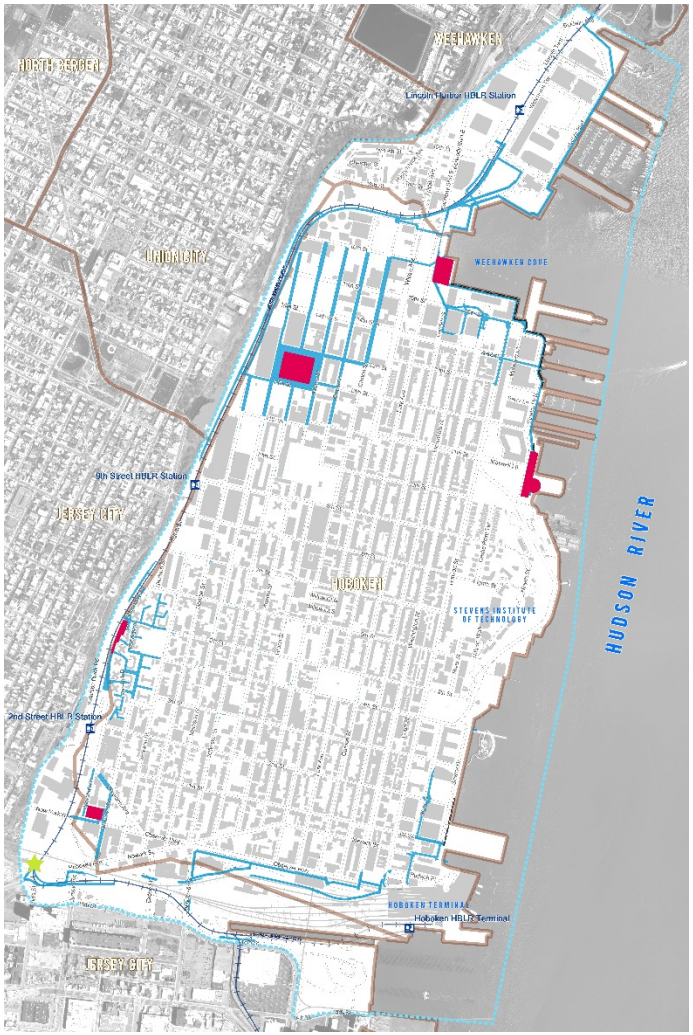


Legend:

- Study Area
- Proposed Resist Structure
- High Level Storm Sewer System
- Proposed Underground Tank
- Proposed Underground Piping
- Municipal Boundary
- Hudson-Bergen Light Rail (HBLR)
- NJDEP Mapped Historic Fill (REC 1)
- Current and Historic Rail Area (REC 2)
- REC Site Impacted by Chlorinated Solvents
- REC Parcels
- NJDEP Mapped Classification Exception Areas
- NJDEP Mapped Deed Notice Parcels

ALT-1	**- 43-46 RECs - Approx. 150,000 tons soil (total) potentially requiring off-site disposal**
ALT-2	**- 45-49 RECs - Approx. 138,000 tons soil (total) potentially requiring off-site disposal**
ALT-3	**- 45-49 RECs - Approx. 137,000 tons soil (total) potentially requiring off-site disposal**

Environmental Permitting



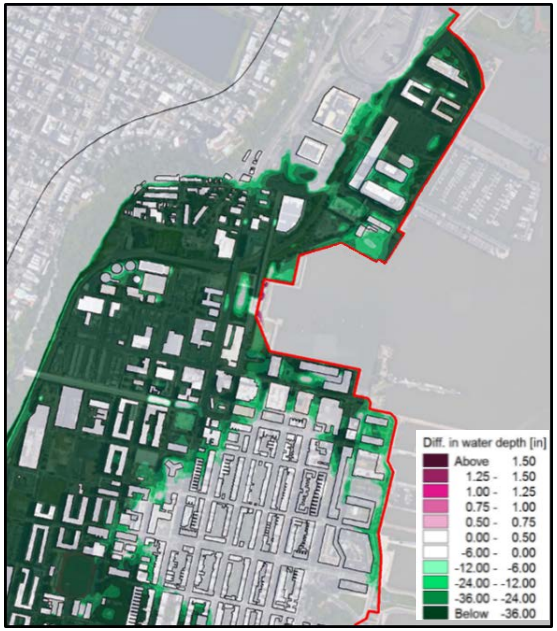
Legend

- Study Area
- Municipal Boundary
- Hudson-Bergen Light Rail (HBLR)
- Positive Floodplain Benefit
- Bulkhead Replacement
- Permanent and Temporary Floodplain Impacts
- Freshwater Wetland Impact

ALT-1	**- Potential minor impacts due to in-water work** **- Individual permits (USACE, NJDEP)**
ALT-2	**- Negligible impacts from outfalls** **- Nationwide Permit (USACE)** **- Individual Permits (NJDEP)**
ALT-3	**- Negligible impacts from outfalls** **- Nationwide Permits (USACE)** **- Individual Permits (NJDEP)**

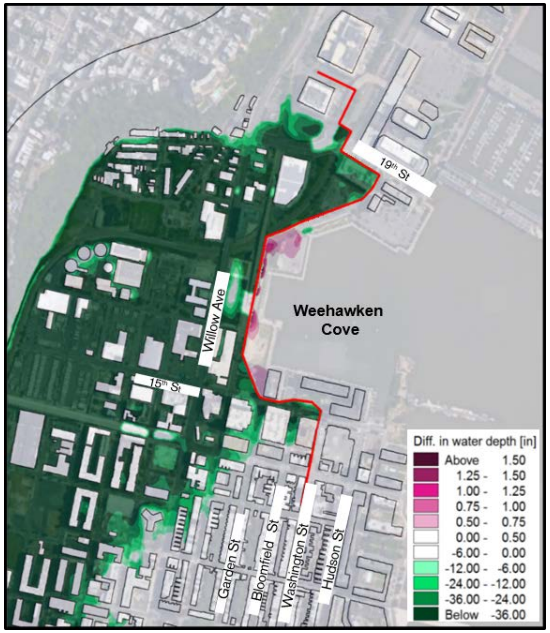
COMPARISON OF DIFFERENCES IN WATER DEPTH (IN INCHES) BETWEEN NAA THREE ALTERNATIVES IN THE NORTH STUDY AREA FOR THE 100-YEAR COASTAL STORM

ALT-1



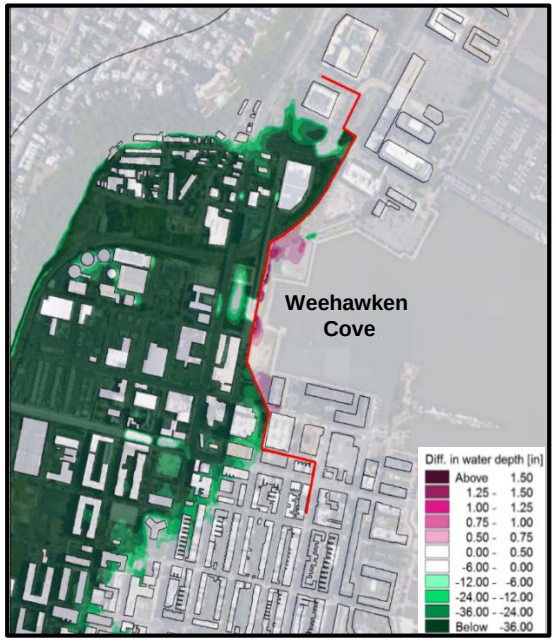
GREEN shows decreases in flood depth in inches

ALT-2



PINK shows increases in flood depth in inches

ALT-3



shows resist feature alignment

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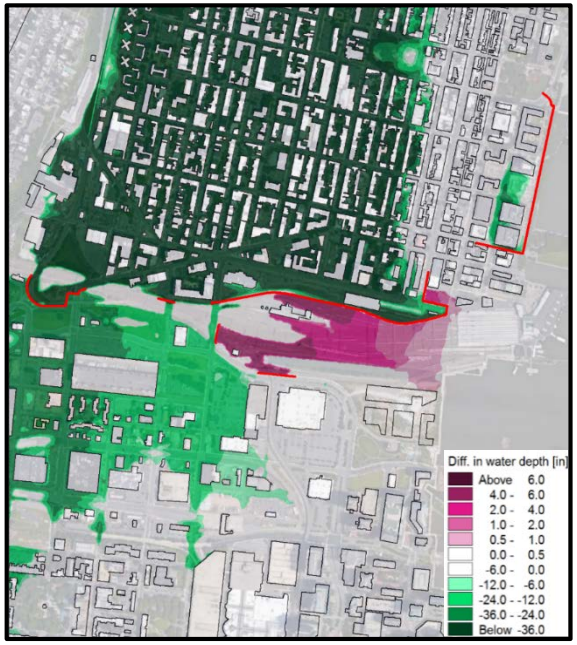
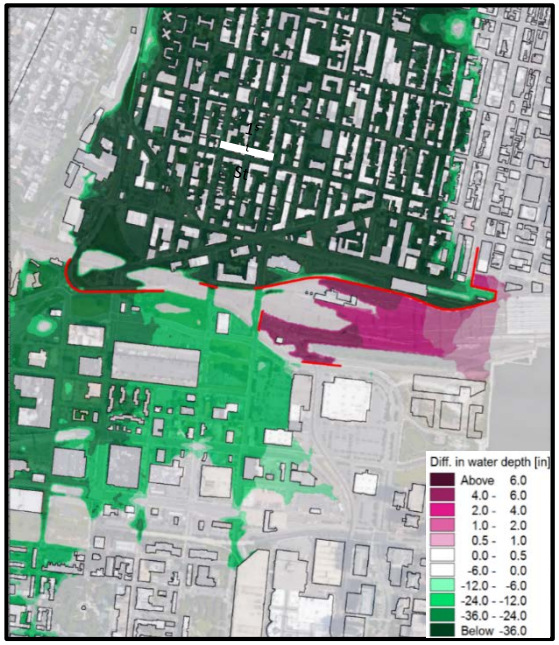
COMPARISON OF DIFFERENCES IN WATER DEPTH (IN INCHES) BETWEEN NAA THREE ALTERNATIVES IN THE SOUTH STUDY AREA FOR THE 100-YEAR COASTAL STORM

ALT-1



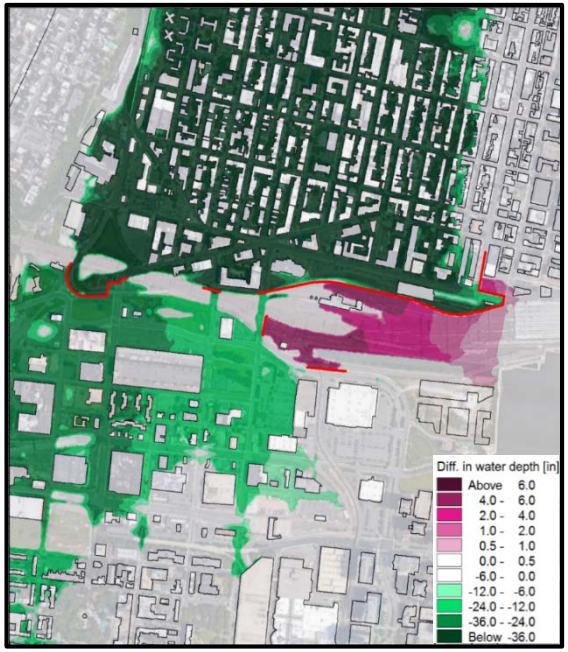
GREEN shows decreases in flood depth in inches

ALT-2



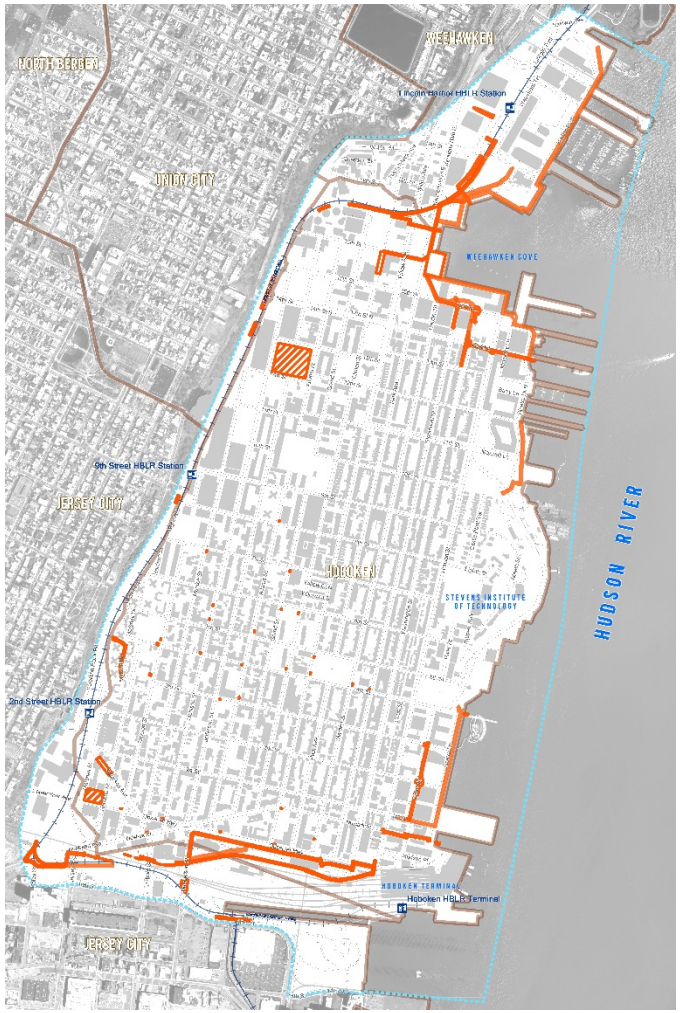
PINK shows increases in flood depth in inches

ALT-3



shows resist feature alignment

Area of Archaeological Potential Impact

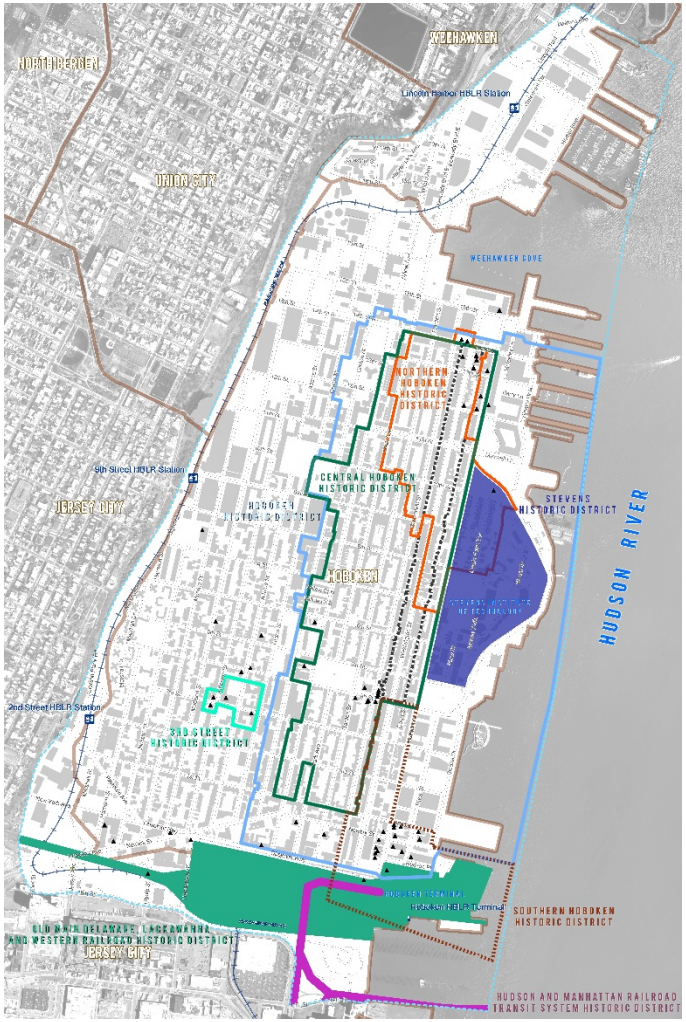


Legend:

- Study Area
- Municipal Boundary
- Hudson-Bergen Light Rail (HBLR)
- Area of Archaeological Potential Impact

ALT-1	**Approx. 16.6 acres potentially impacted**
ALT-2	**Approx. 15.5 acres potentially impacted**
ALT-3	**Approx. 14.5 acres potentially impacted**

Historic Architecture

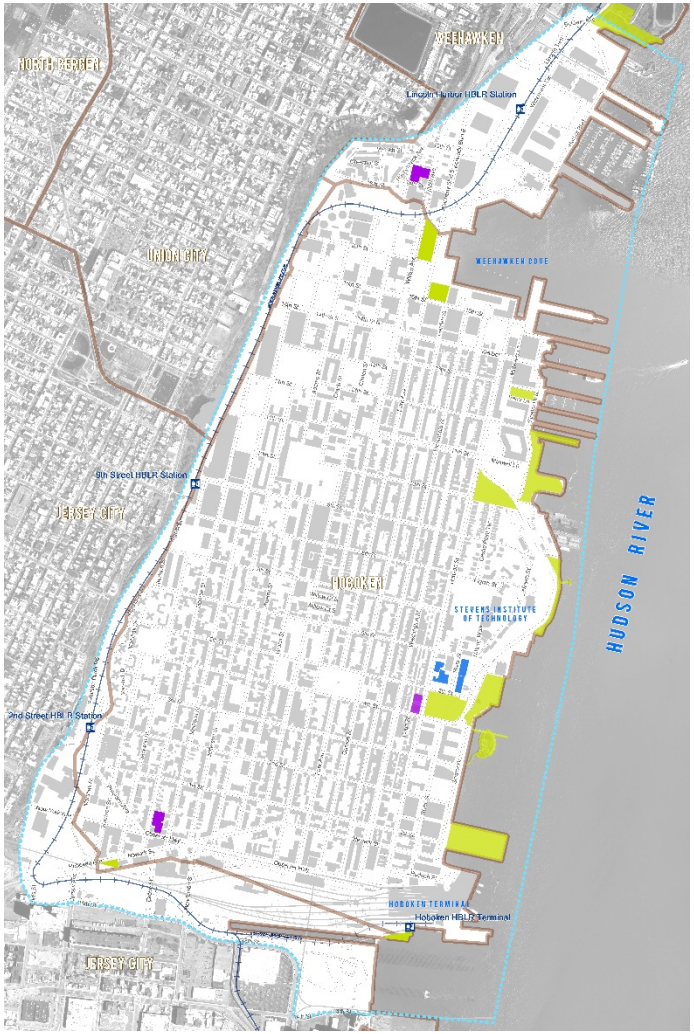


Legend

- Study Area
- Historic Properties with Potential Adverse Affects
- Municipal Boundary
- Hudson-Bergen Light Rail (HBLR)
- Proposed Resist Structure
- Proposed Underground Tank
- Proposed Underground Piping
- Southern Hoboken Historic District
- 3rd Street Historic District
- Central Hoboken Historic District
- Hoboken Historic District
- Hudson and Manhattan Railroad Transit System Historic District
- Old Main Delaware, Lackawanna and Western Railroad Historic District
- Stevens Historic District
- Northern Historic District
- Southern Hoboken Extension Historic District

ALT-1	**45 historic properties potentially impacted**
ALT-2	**61 historic properties potentially impacted**
ALT-3	**60 historic properties potentially impacted**

Noise Receptors



Legend

- Study Area
- Municipal Boundary
- Hudson-Bergen Light Rail (HBLR)
- Proposed Resist Structure
- Proposed Underground Tank
- Proposed Underground Piping
- Noise Receptor - Parks
- Noise Receptor - Schools
- Noise Receptor - Places of Worship

ALT-1	**- Schools: 4** **- Parks: 13** **- Places of Worship: 3**
ALT-2	**- Schools: 0** **- Parks: 4** **- Places of Worship: 2**
ALT-3	**- Schools: 0** **- Parks: 4** **- Places of Worship: 2**

Key Takeaways

- All three Build Alternatives provide a substantial level of flood risk reduction
- All three build alternatives screen with benefits and impacts and will continue to be assessed.
- Community input has and will continue to help shape the project
- Design process will continue
- The screening criteria results show that we have viable alternatives for advancement

Next Steps

Period for Alternatives Analysis ..... **Aug. 18, 2016 (3 weeks)**

Recommendation of Preferred Alternative Meeting ..... **Sept. 8, 2016**

Publication of the Draft Environmental Impact Statement (DEIS) ..... **Late Nov. 2016**

Public Hearing for DEIS ..... **Dec. 2016**

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Q&A

Breakout Stations

Station 1 Three Alternatives and Comment Table

Station 2 NEPA/Alternatives Analysis Process

Station 3 Flood Risk Reduction

Station 4 Built Environment / Socioeconomics

Station 5 Construction, Maintenance, and Operations

Station 6 Environmental Impacts

Station 7 Benefit Cost Analysis