Climate Resiliency in NYC

ASHRAE NY and BE-Ex host a panel event on climate resiliency, diving into the dual challenges of efficient and GHG-free building design that responds to increasing flooding, precipitation, and heat in the near future.

ASHRAE New York Chapter

be ex
building energy exchange

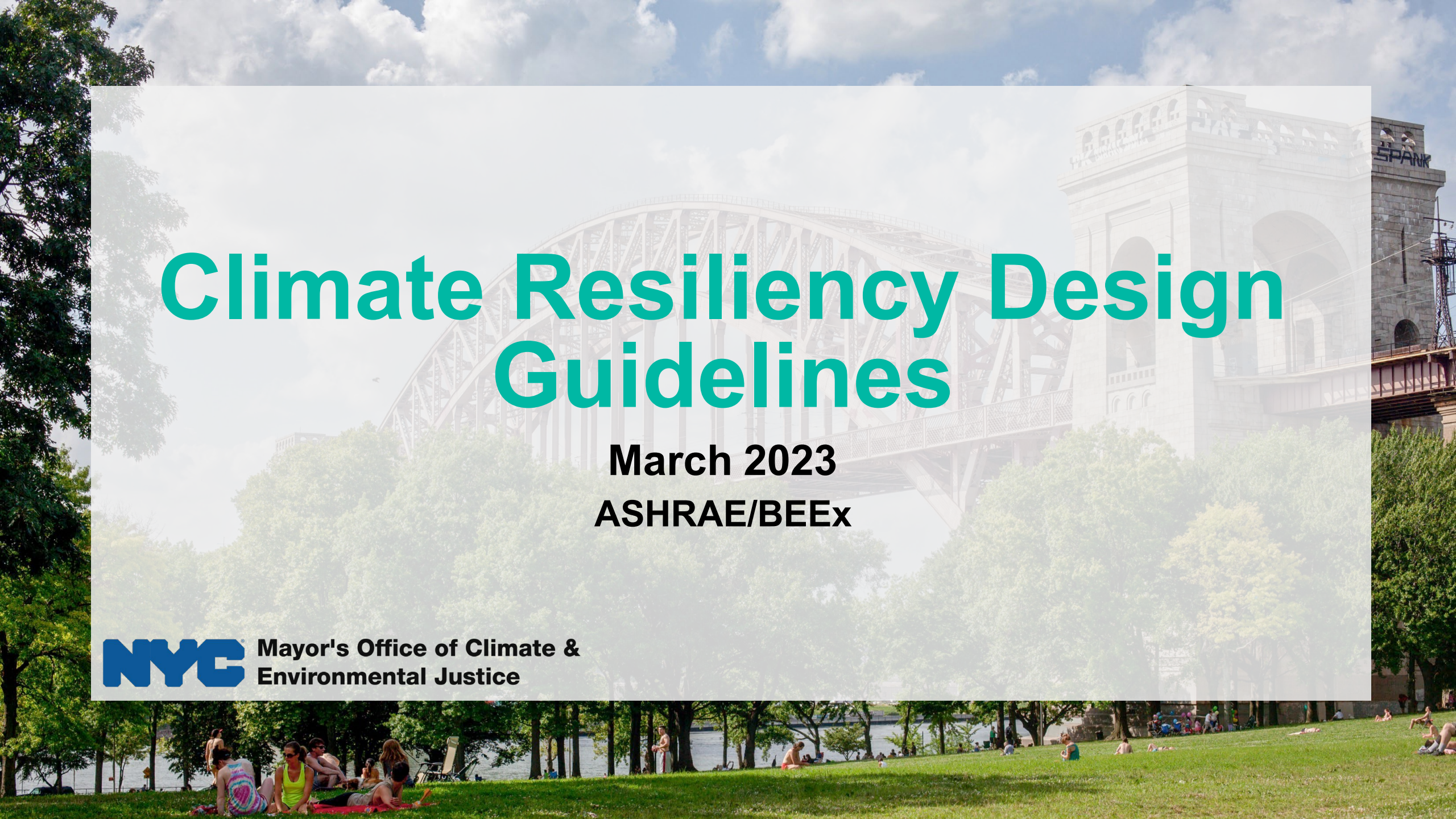
moderator
Amina Trabelsi, Senior Mechanical Engineer, BR+A Consulting Engineers

speakers
Johari Pondt, Senior Project Engineer, AKRF
Caaminee Pandit Vecchio, Vice President, Senior Development Manager, Lendlease
Erika Jozwiak, Program Manager NYC Major's Office of Resiliency

31 Chambers Street
New York, NY

March 23, 2023
5:30 to 7pm

1 AIA
LU | HSW



Climate Resiliency Design Guidelines

March 2023

ASHRAE/BEEx

NYC Mayor's Office of Climate & Environmental Justice

Background

Mayor's Office of Climate & Environmental Justice

SHOCKS

Hurricanes
Nor-easters
Cloudburst rain storms
Longer heat waves

Cosmos, Ave C and 7th Street, 2012

STRESSES

Tidal flooding
Higher average temperatures
Groundwater rise

Giles Ashford, **2018**. Edgemere

NYC must prepare for the full range of climate threats

COASTAL STORMS

+50% increase in intense hurricanes by 2100

MORE FREQUENT, MORE DESTRUCTIVE HURRICANES

SEA LEVEL RISE

Up to **30 in** SLR by 2050s

INCREASED TIDAL FLOODING + GROUNDWATER TABLE RISE

PRECIPITATION

Up to **1.5x** rain days > 1" by 2080s

FLOODING IN NON-COASTAL AREAS

TEMPERATURE

# of days above 90°F **TRIPLE** by 2050s

LONGER, MORE DANGEROUS HEAT WAVES

Climate Change and NYC

Projected climate changes from the NYC Panel on Climate Change

New York City Panel on Climate Change (NPCC)

- Made up of leading climate and social scientists
- Focus on climate risks: temperature, precipitation, changes in sea level, extreme events
- All projections subject to rigorous peer review

Climate Change and NYC

Projected climate changes from the NYC Panel on Climate Change

Table 8 – Projected mean annual changes[92]

a. Temperature Baseline (1971-2000) 54°F	Low estimate (10th percentile)	Middle range (25th to 75th percentile)	High estimate (90th percentile)
2020s	+ 1.5°F	+2.0-2.9°F	+3.2°F
2050s	+3.1°F	+4.1-5.7°F	+6.6°F
2080s	+3.8°F	+5.3-8.8°F	+10.3°F
2100	+4.2°F	+5.8-10.4°F	+12.1F

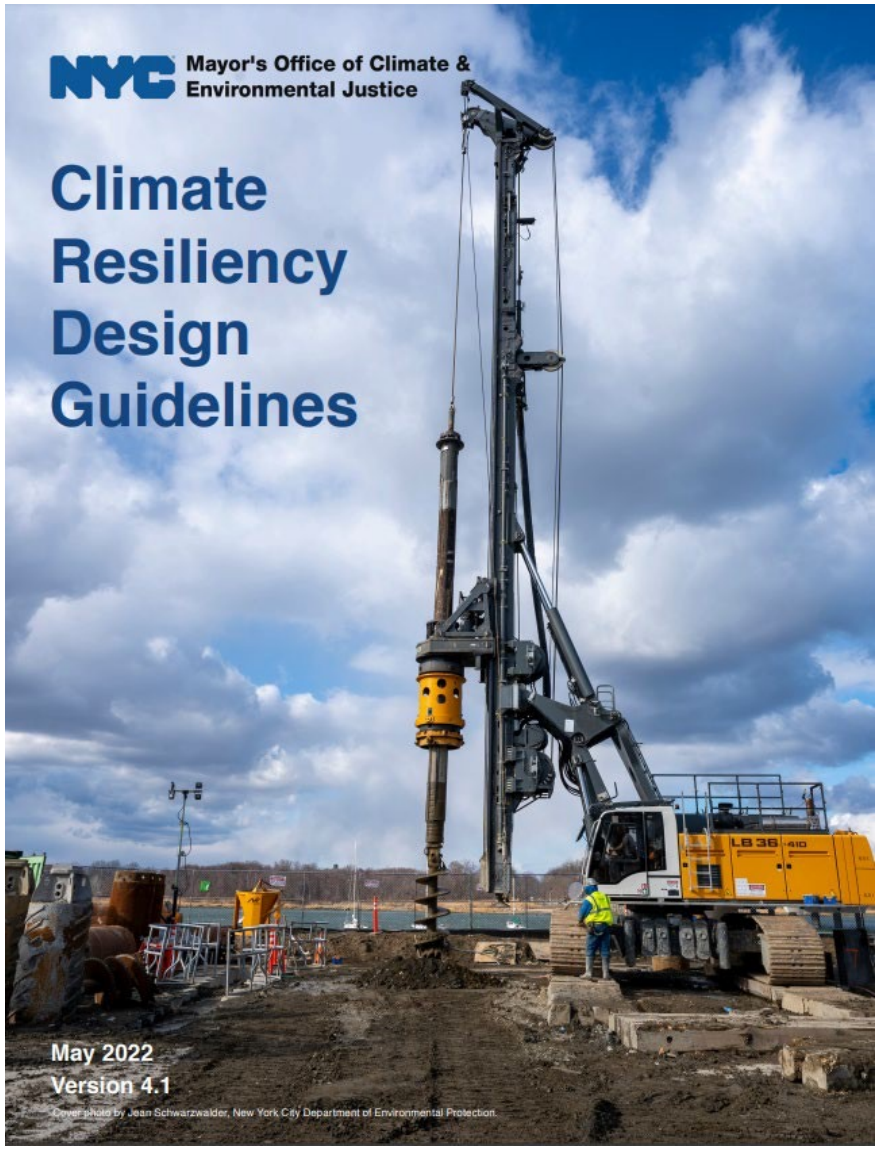
Table 7 – NYC sea level rise projections[91]

Baseline (2000-2004) 0 in	Low estimate (10th percentile)	Middle range (25th to 75th percentile)	High estimate (90th percentile)	Middle range (25th to 75th percentile)	High estimate (90th percentile)
				+1-8%	+10%
2020s	2 in	4-8 in	10 in	+4-11%	+13%
2050s	8 in	11-21 in	30 in	+5-13%	+19%
2080s	13 in	18-39 in	58 in	-1% to +19%	+25%
2100	15 in	22-50 in	75 in		

Source: NPCC 2015

Climate change data used in design improves the performance of capital projects

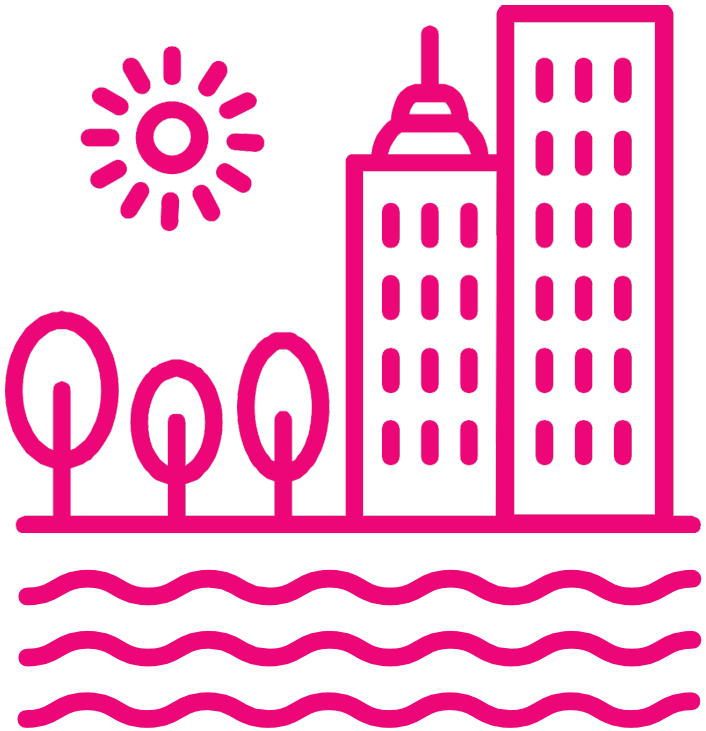
- **Goal of the Climate Resiliency Design Guidelines:** establish consistent approach for using forward-looking climate change data across the City capital plan
- **Addresses multiple hazards:** 1) extreme heat, 2) extreme rainfall, 3) tidal inundation with sea level rise, and 4) coastal storms.
- **For City of New York capital projects**, including new builds and substantial improvements
- **All types of capital projects:** buildings, infrastructure, and landscapes



The Guidelines address changes in heat, rainfall, and sea level

Example Design Strategies for Climate Stressors		
Sea Level Rise	**Precipitation**	**Heat**
Elevate	Rain gardens	Improve solar reflectance
Wet floodproof	Bioretention	Add trees and shading canopies
Dry floodproof	Permeable pavements	Maximize green space
Protect critical equipment	Infiltration trenches	Upsize and improve HVAC redundancy
Deployable flood barriers	Green roofs	Add energy recovery ventilation

Local Law 41 of 2021



LL41(2021) provides a ramp-up period in advance of a full resilient design mandate

- ✓Implement the Guidelines in real-world NYC capital projects
- ✓Quantify costs and benefits of resilient design specific to NYC capital projects
- ✓Build internal agency knowledge on resilient design to prepare for full mandate
- ✓Improve the Guidelines based on results
- ✓Institutionalize resilient design via scoring metric

Overview – LL41(2021)

Climate Resiliency Design Guidelines pilots

- 35+ pilots (e.g. 1-5 pilots per agency) informed by capital plan analysis
- 5 year program

Updated Guidelines (December 31, 2026)

Resiliency scoring metric development

- Establish points or metrics that consider the performance of resilient design features
- Projects meet minimum score

Resilient design mandate, via the resiliency scoring metric, begins for covered projects December 31, 2026

Pilot Program Overview

Mayor's Office of Climate & Environmental Justice

Agencies will contribute pilots early in scoping that collectively must meet certain criteria:

- ✓At least 35 capital projects total
- ✓At least 35% located in environmental justice areas
- ✓At least 4 projects per borough
- ✓Most common capital projects
- ✓New construction and substantial improvements
- ✓Projects with a range of useful lives
- ✓Projects with a range of capital costs
- ✓Critical and non-critical facilities
- ✓Exposed to a variety of climate stressors

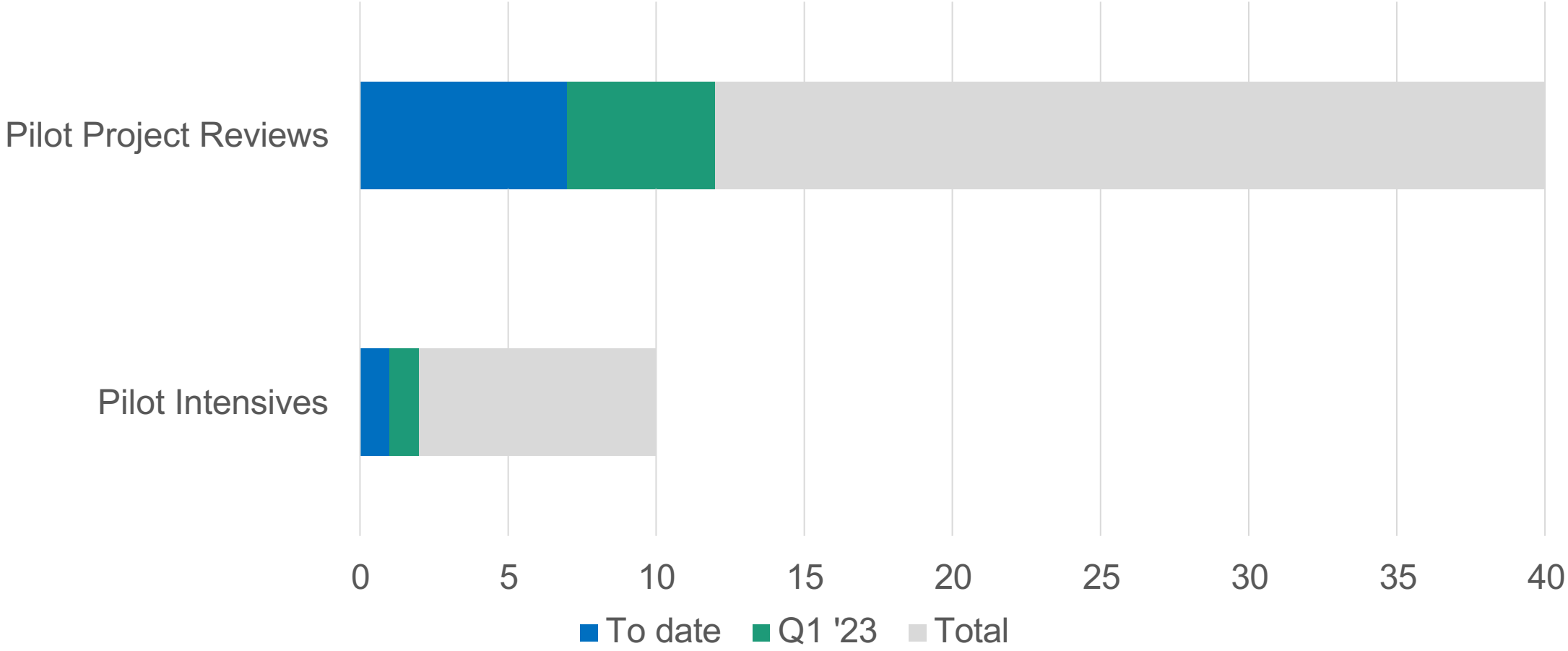
Overall – Project Characteristics

Mandated Criteria in LL41(2021)	Current Pilot Cohort
At least 35 pilots	39-40 pilots
Variety of capital costs	Highest: $1B (New Manhattan Detention Facility) Lowest: $3M (Jefferson Houses Playground)
Number of projects per borough	5 Bronx 10 Brooklyn 10 Manhattan 8 Queens 4 Staten Island 3 Other (Upstate/Pending)
New Construction vs. Substantial Improvement	38% New Construction 47% Substantial Improvements 15% Improvements to Existing Infrastructure
Useful life	0 pilots have a useful life under 10 years 72% of pilots have a useful life 10 to 50 years 28% of pilots have a useful life over 50 years
Criticality	45% Critical 55% Non Critical
Environmental Justice Areas (mandated 35%)	45% of pilots

Overall – Climate Exposure

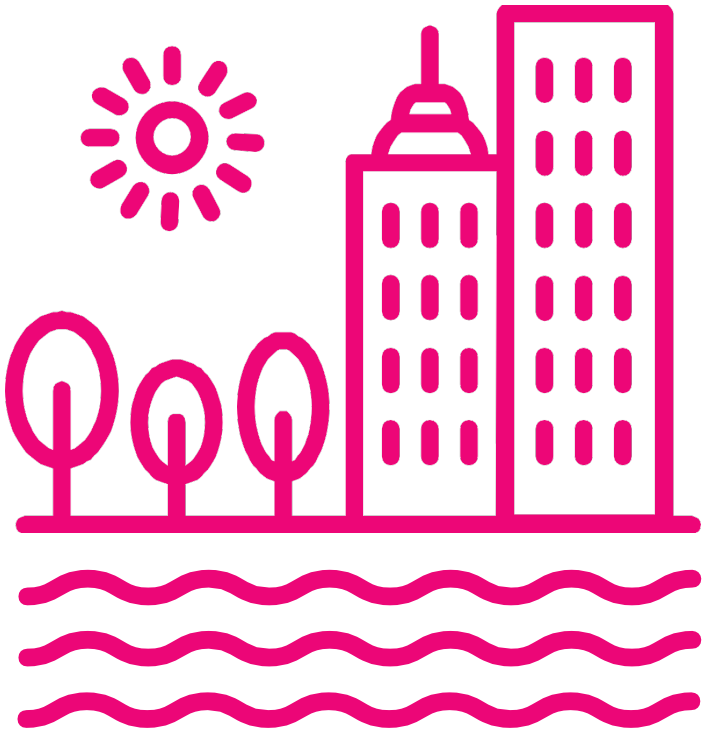
Mandated Criteria in LL41(2021)	Current Pilot Cohort
Located in Current 1% Annual Chance Floodplain	45%
Located in Future 1% Annual Chance Floodplain	57%
Located in Current Tidal Inundation Zone	17%
Located in Future Tidal Inundation Zone	30%
Located in High HVI Areas (4 and 5)	42%
Located in an area of Moderate Stormwater Flood Risk	22%
Located in an area of Extreme Stormwater Flood Risk	52%

Pilot Program Support Update



Deep dive agency workshops and resiliency design scoring metric development kicking off in 2023

Questions?

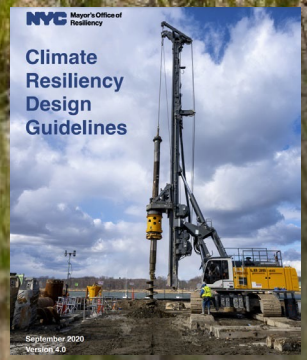


Thank you

Contact:

Erika Jozwiak at ejozwiak@cityhall.nyc.gov

Download NYC's Climate Resiliency Design Guidelines at nyc.gov/resiliency



Creating places where communities thrive

Development / Construction / Investments

Lendlease is a globally integrated real estate company with core expertise in shaping cities and creating strong and connected communities.

31
major urbanization projects across[1]

15
gateway cities globally

7,700
global employees
as of June 30, 2022

Global headquarters
Sydney, AUS

US headquarters
New York, NY

~19,542
residential units under development and in the pipeline in the US

13
US development projects involving over

21m
square feet

$20.8b
development pipeline in US

1 Java at a Glance

This major urban regeneration project, uniquely positioned on the Greenpoint waterfront, will transform a full city block into a mixed-use development

Approximately ***800 residential rental units***

30% of the apartments designated as affordable housing under the Affordable New York Housing Program.

Reimagined ***public waterfront esplanade***

Improved connection to the India Street Pier and NYC Water Ferry

Ground floor retail at the waterfront and at West Street.

Construction Schedule

Overall construction duration is from June 2022 to late 2025.

Park construction to be completed in late 2025.

June 2022 – August 2023 Foundations

- Soil remediation, excavation, foundations, and geothermal drilling will be phased on the site
- The site is part of the Brownfield Clean Up program
- Received all required NYS DEC and NYC DEP approvals
- Third party environmental monitor will be on site during remediation activities
- Completion of pile driving March 2023
- Geothermal drilling commenced December 2022

Sustainability at One Java

Energy Innovation

- Net zero carbon operations on Day 1
- All-electric mechanical design
- Maximized on-site renewables and energy storage
- Grid interactive
- Enhanced commissioning

Strategic Materials

- 20% embodied carbon reduction
- Construction waste reduction
- Advanced waste management infrastructure
- Materials supporting a circular economy
- ENERGY STAR appliances

Responsible Land Use

- Native and resilient landscape design
- Microhabitats for polliantors
- Transit connectivity
- Bicycle connectivity
- Climate change resilience assessment and mitigation strategies

Water Conservation

- Water reuse/capture
- Stormwater management to revitalize local hydrology
- Water-efficient landscapes

Focus on Human Health

- Enhanced indoor air quality
- Biophilic design
- Healthy materials
- Onsite mental health services during construction

Creating Social Value

- Inclusive hiring
- Public art
- Strong community partnerships with measured social return on investment
- Affordable housing component

Third Party Certifications

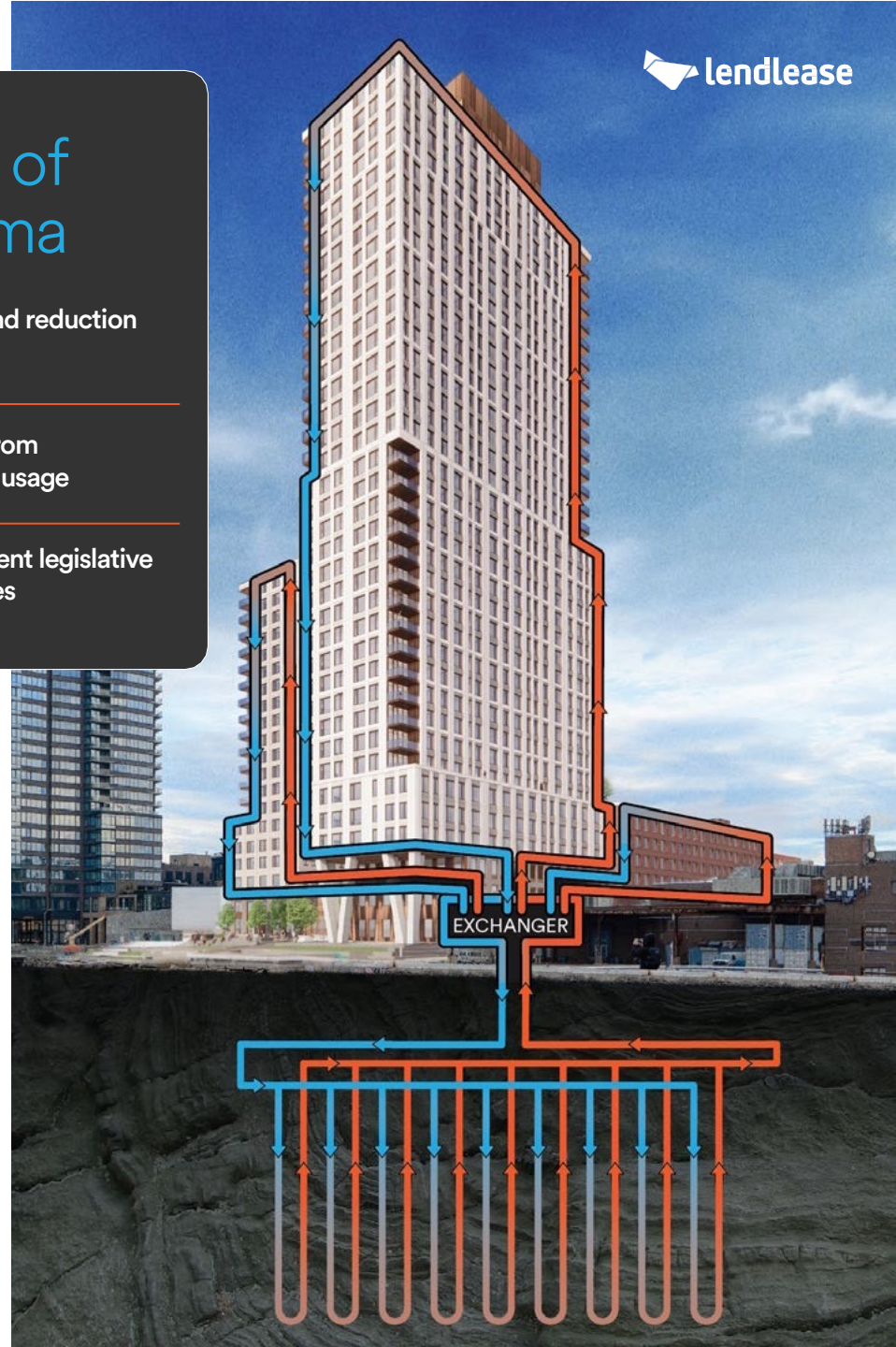
- LEED Gold or Platinum certification
- Fitwel certification
- Annual ENERGY STAR certification in operations

Benefits of geotherma l

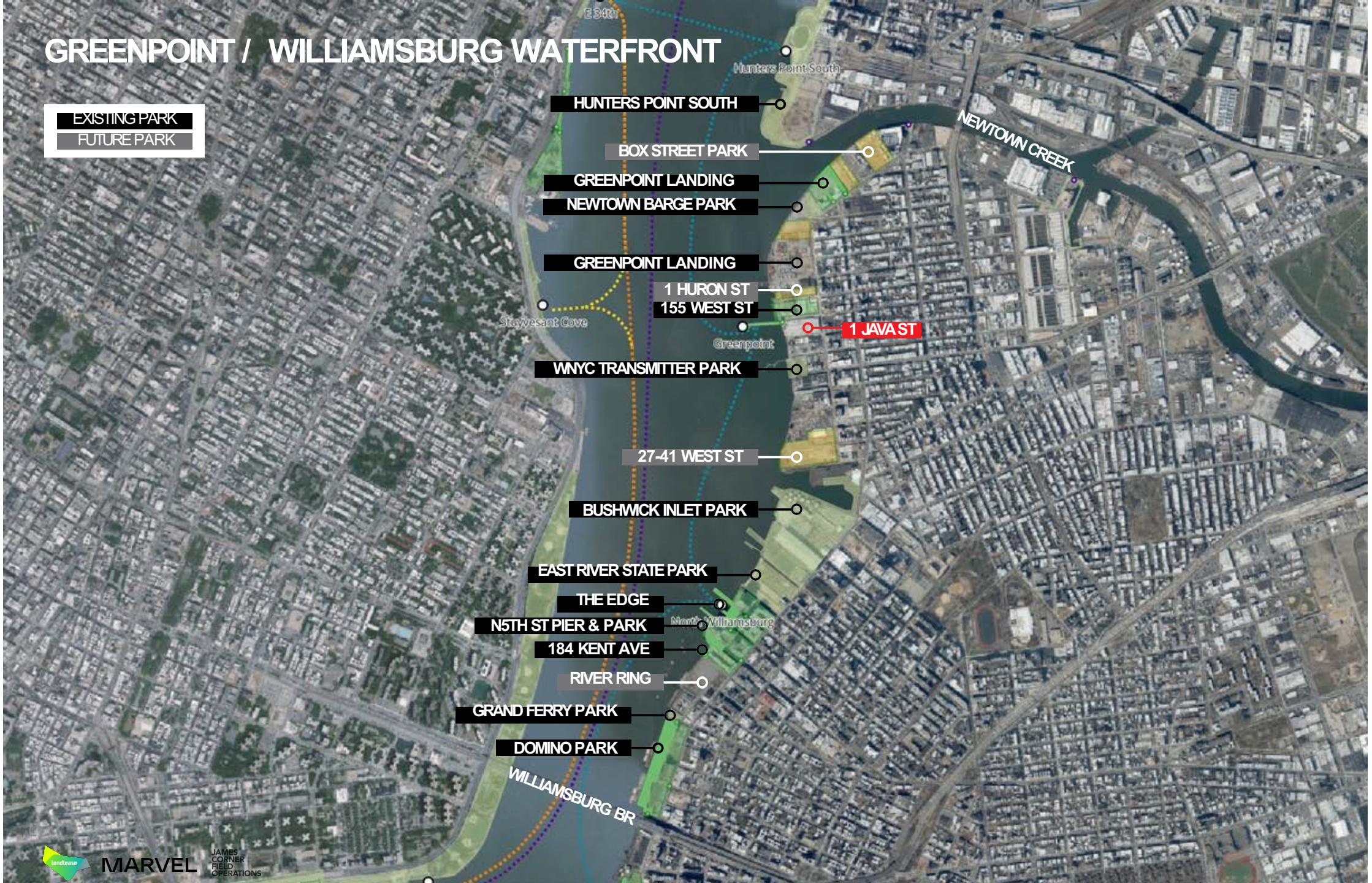
Elimination of gas and reduction of electricity usage

Additional savings from reduction of carbon usage

Alignment with current legislative trends and incentives

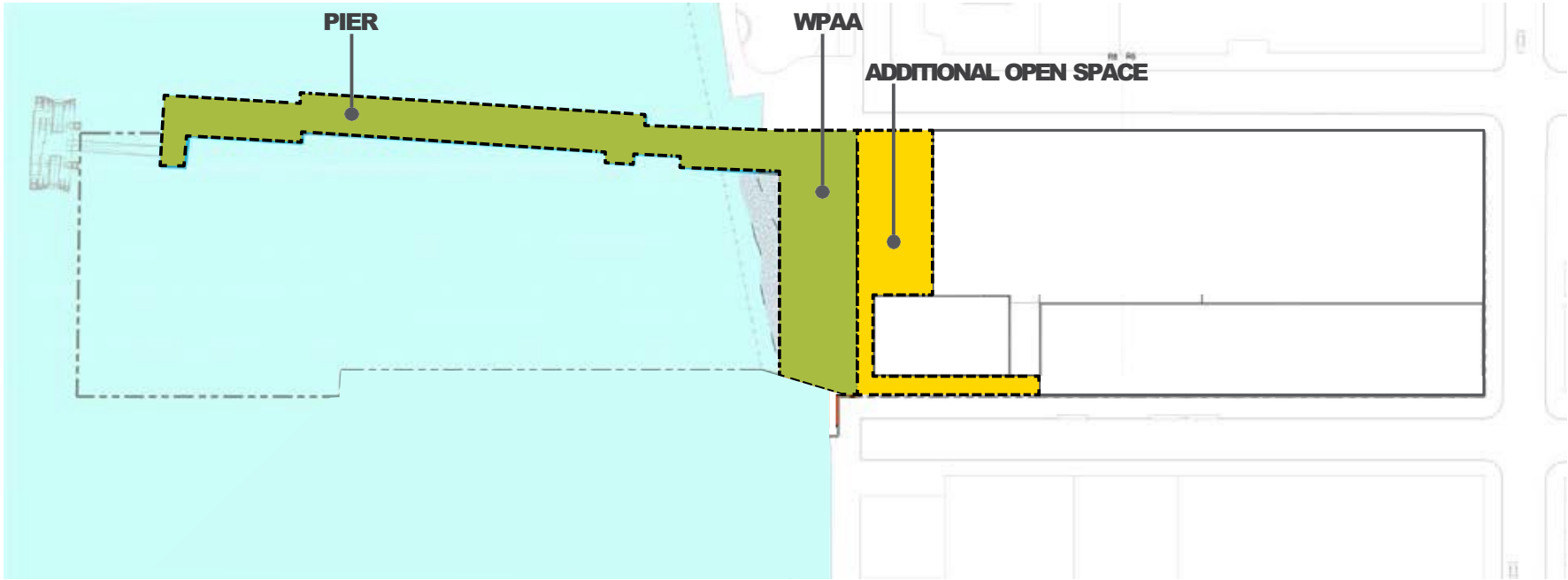


GREENPOINT / WILLIAMSBURG WATERFRONT



1 JAVA ST WATERFRONT SITE SCALE

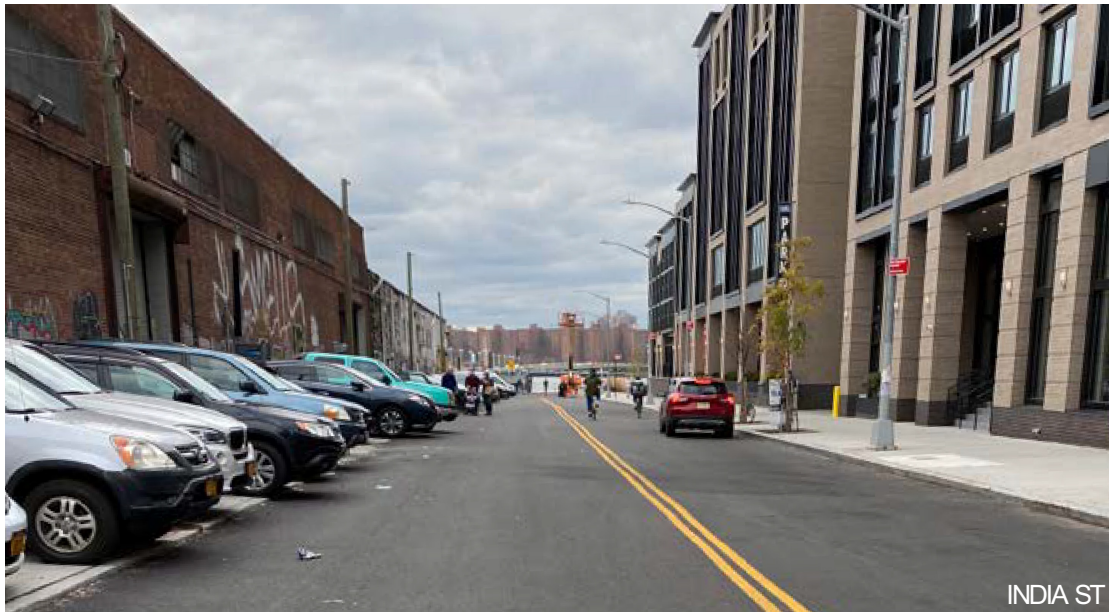
WATERFRONT PUBLIC ACCESS AREA [WPAA]



SITE CONTEXT


JAVA ST


01 JAVA ST


INDIA ST


INDIA ST PIER

SITE CONSTRAINTS

- Site condition – windy, salt spray, water's edge, existing streets elevations, scale of site
- East River's strong current, choppy water, and ferry wakes
- Flood elevation and projected Sea Level Rise
- DCP zoning requirements

PASSIVE PROGAMMING

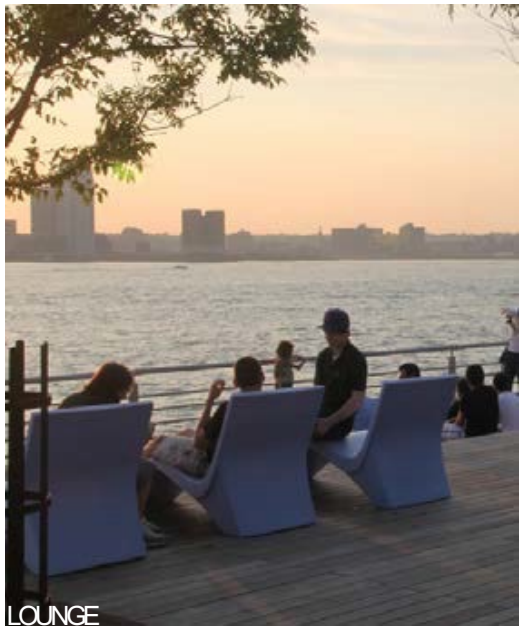

NATIVE PLANTING


SOFT EDGES


PICNIC


SOCIALZE


CAFE


LOUNGE


GETDOWN


ECOLOGICAL EDUCATION

ACTIVE PROGAMMING


FITNESS CLASSES


MARKETS


PERFORMANCES


COMMUNITY MEETING


WORKSHOPS


DANCES


MOVIE NIGHT


BLOCK PARTY

SITE PLAN

overlook bar

river perch

seating steps

the lawn

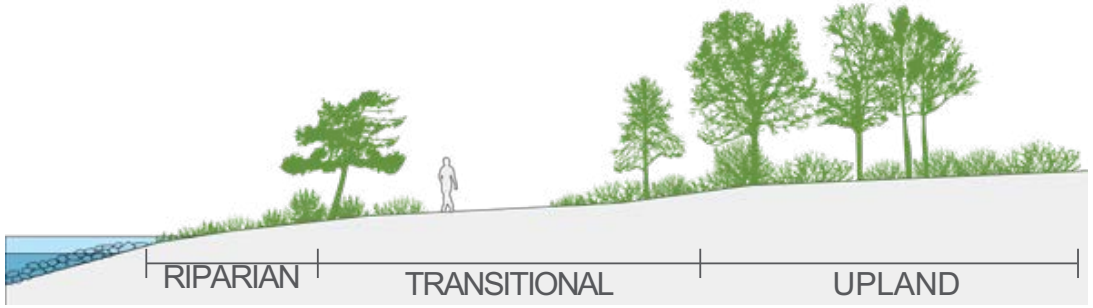
picnic grove

porch swings

the java steps

MARVEL JAMES CORNER FIELD OPERATIONS

SOFTSCAPE


RIPARIAN
TRANSITIONAL
UPLAND


RIPARIAN


GROUNDSEL BUSH

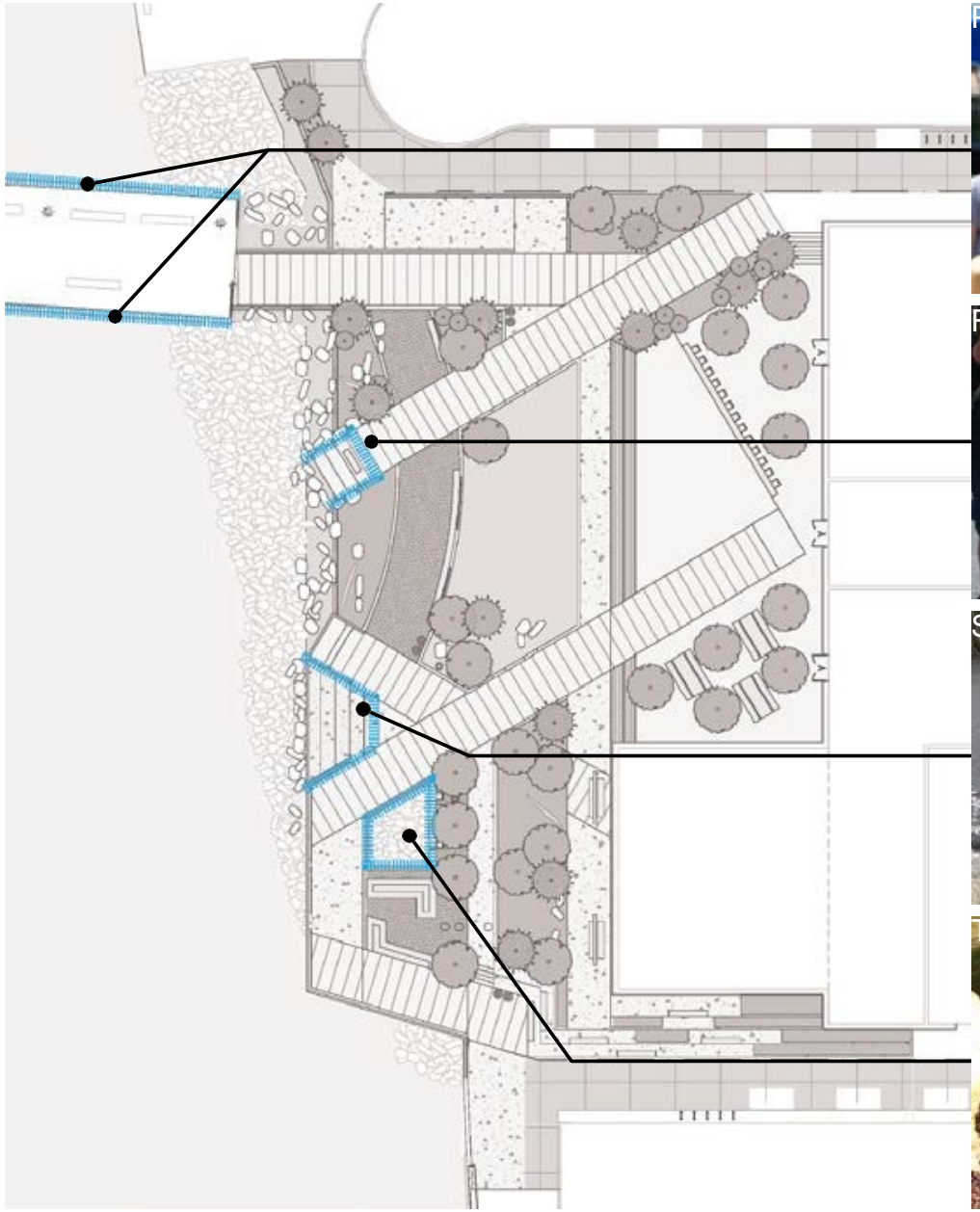

TRANSITIONAL


PITCH PINE


UPLAND


TUPELO

CONNECTING TO THE RIVER



SOCIAL ALCOVE & REVEAL

THE GET DOWN & PROW

lendlease MARVEL JAMES CORNER FIELD OPERATIONS

THE RIVER LOOK

VIEW FROM THE PIER

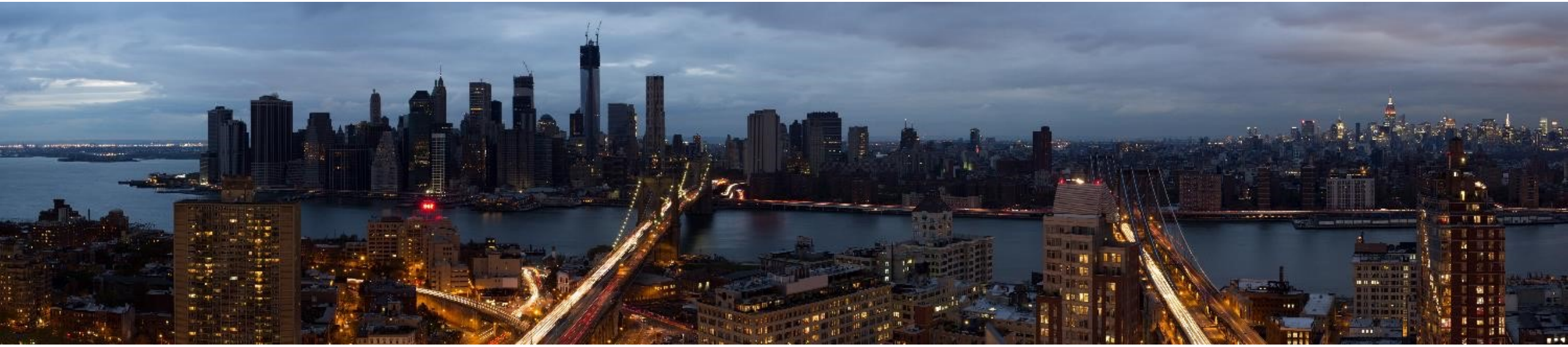
BIRD'S EYE VIEW OF WATERFRONT

Climate Resiliency in New York City

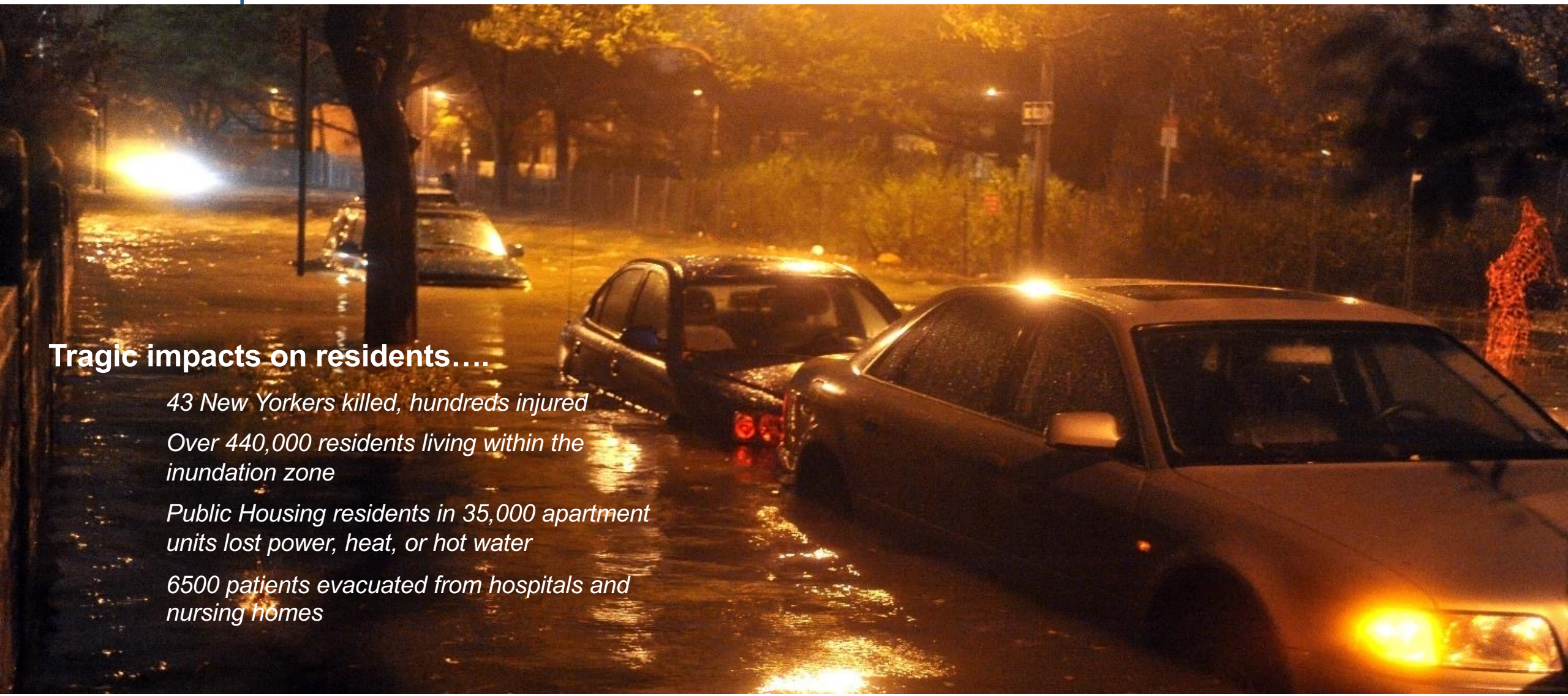
Johari Pondt, EIT

AKRF

Superstorm Sandy – October 29, 2012



Storm Impacts - New Yorkers



Tragic impacts on residents….

- *43 New Yorkers killed, hundreds injured*
- *Over 440,000 residents living within the inundation zone*
- *Public Housing residents in 35,000 apartment units lost power, heat, or hot water*
- *6500 patients evacuated from hospitals and nursing homes*

Storm Impacts - Property

Extensive damage to public and private property…

Over 50 square miles of NYC flooded

Over 88,000 buildings within the inundation zone

80 buildings sustained structural damage

Waterfront parks and beaches damaged or destroyed

Estimate of over $19 Billion in damage in New York City

Storm Impacts - Transportation

NYC Transportation networks crippled….

East River Subway, Train, and Roadway Tunnels flooded

East River Ferry Service halted

Significant damage to over 500 miles of roads

Storm Impacts - Utilities

Utility network vulnerabilities exposed….

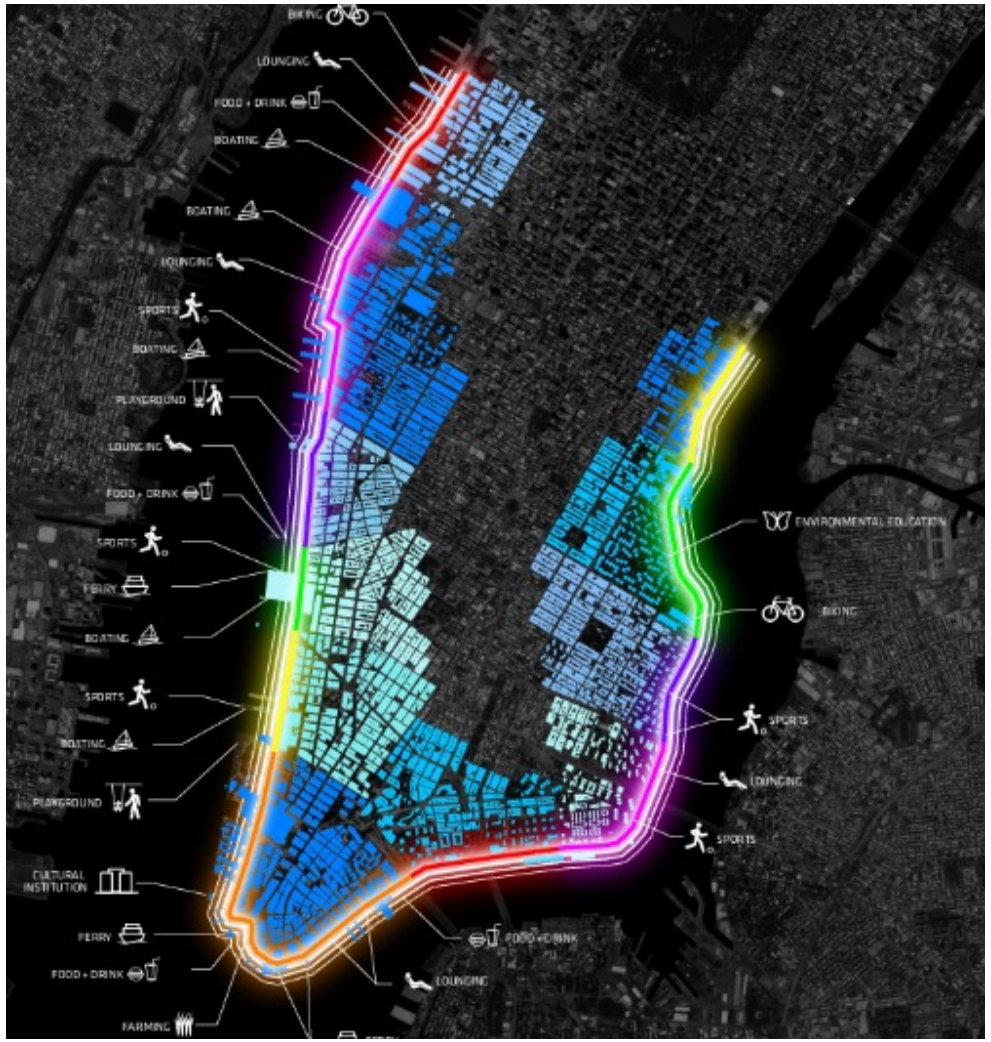
Power to over 2 million people lost for up to 2 weeks

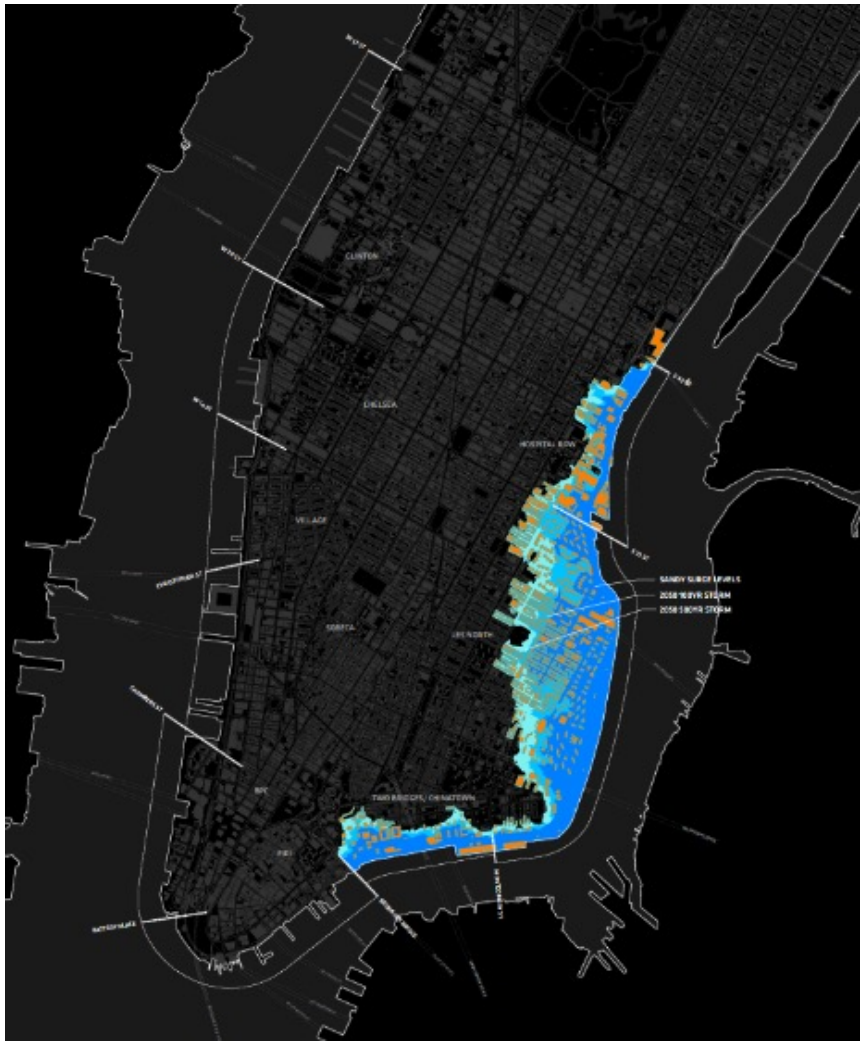
10 of 14 wastewater treatment plants and 42 of 96 pumping stations affected

Phone, wireless, cable, and internet services disrupted

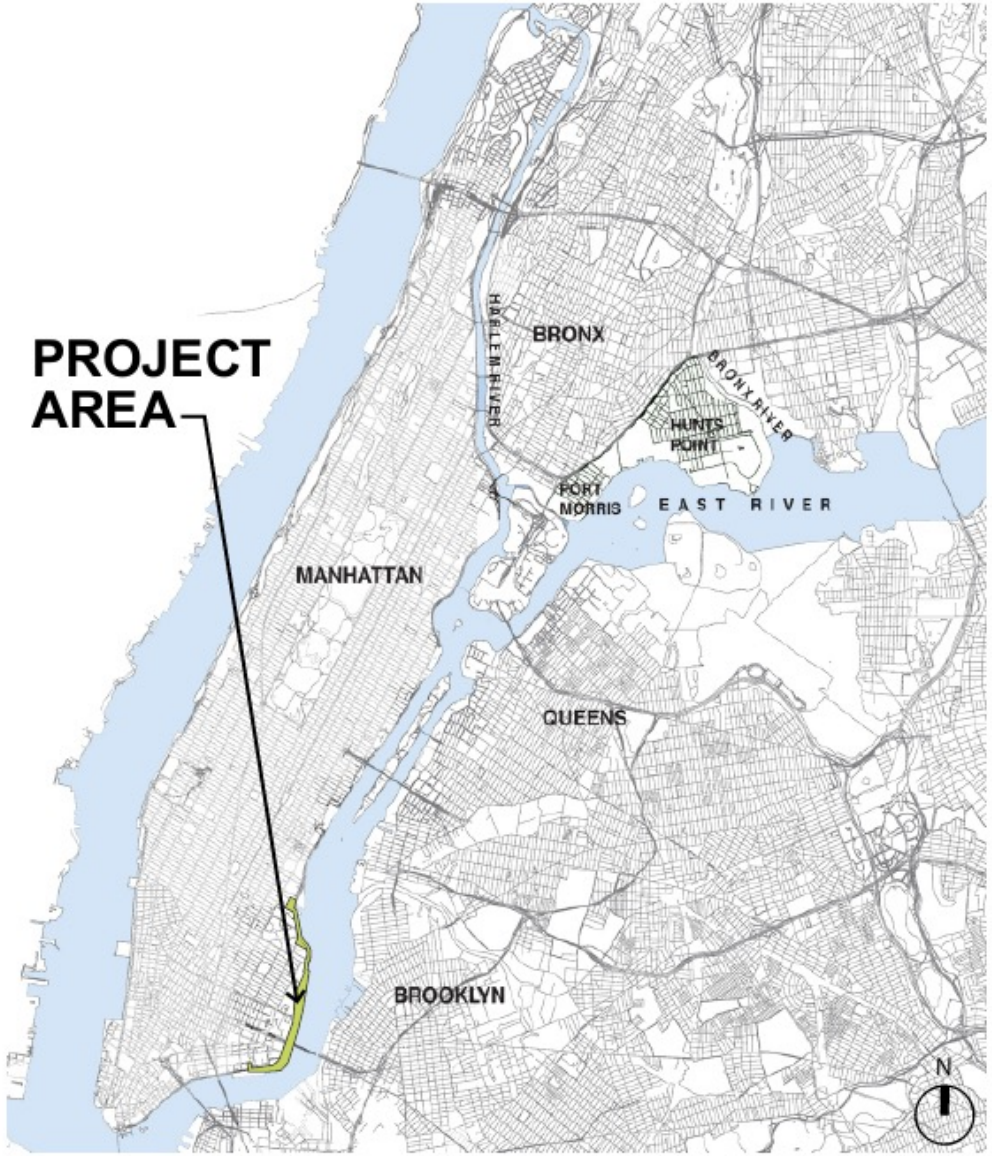
4 of 6 steam generating stations inundated

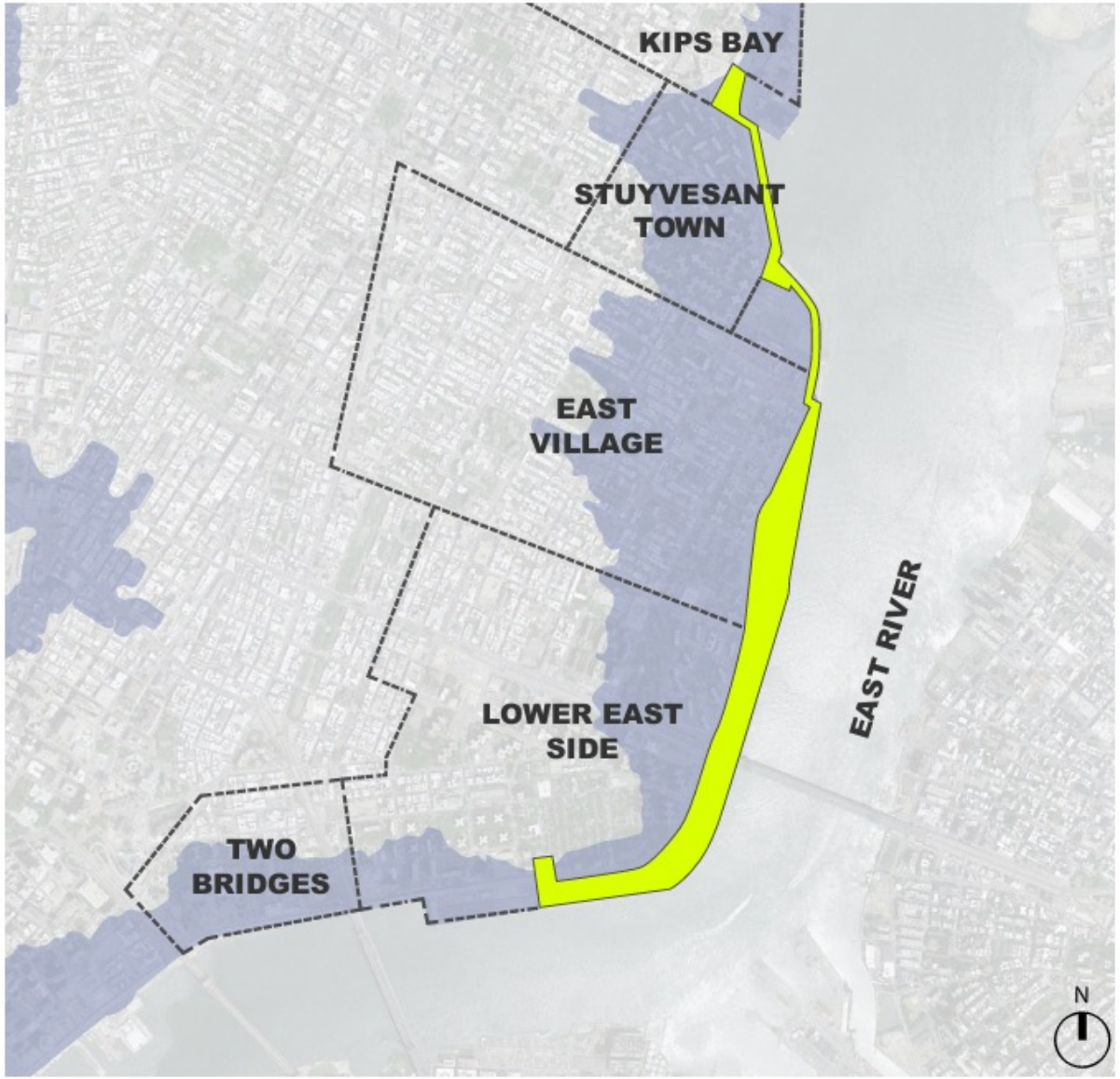
The BIG U to ESCR



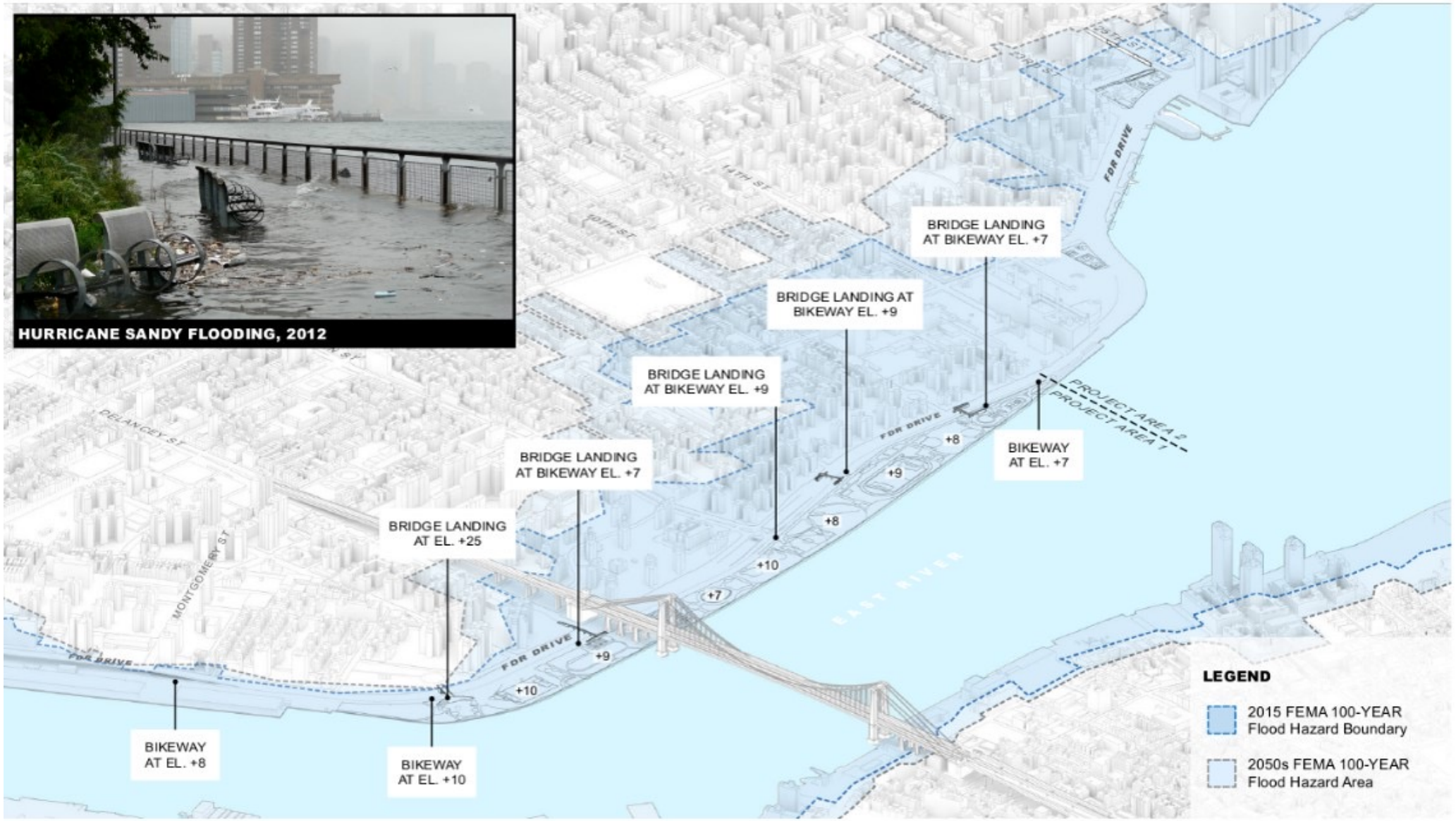


Project Location



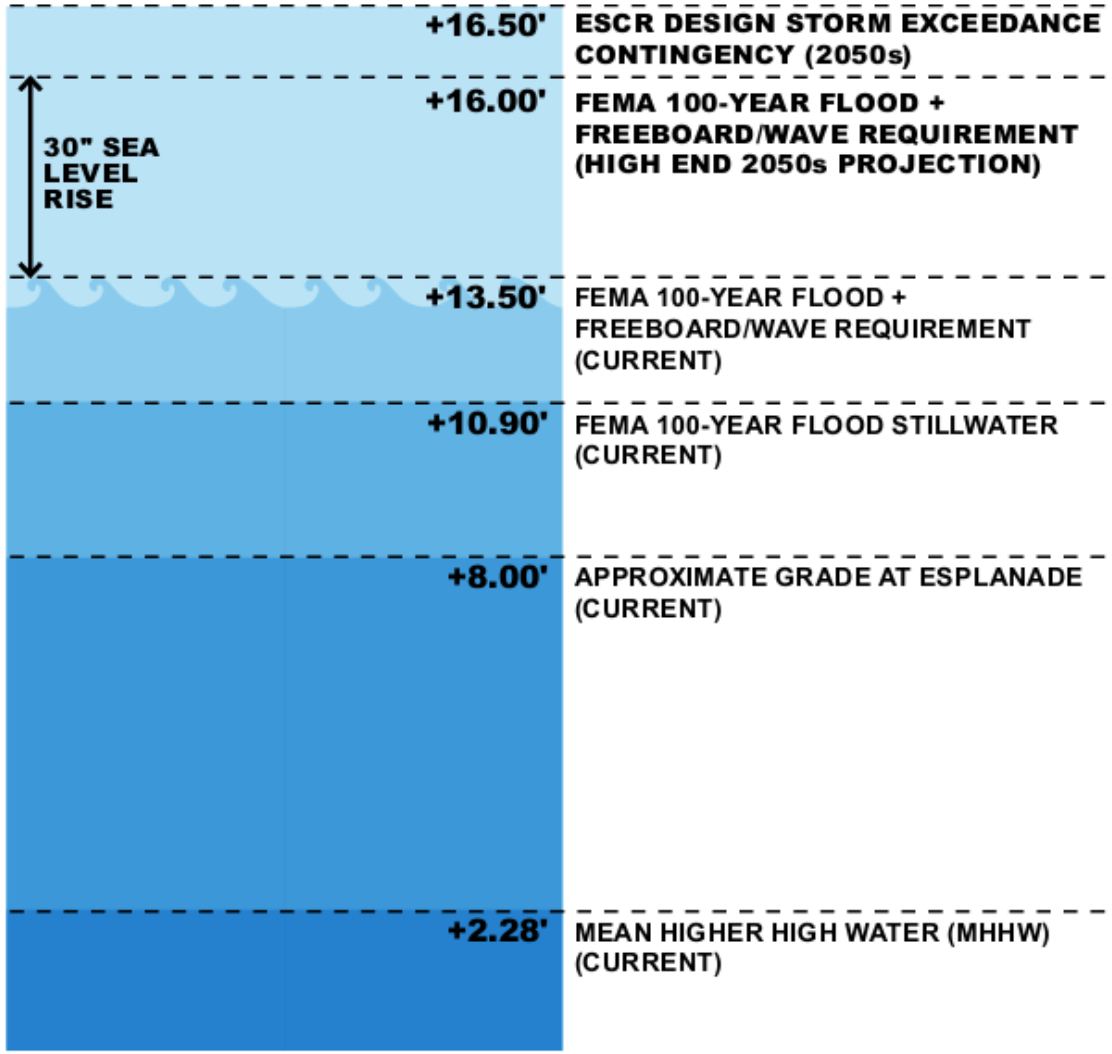


East Side Coastal Resiliency Project Area



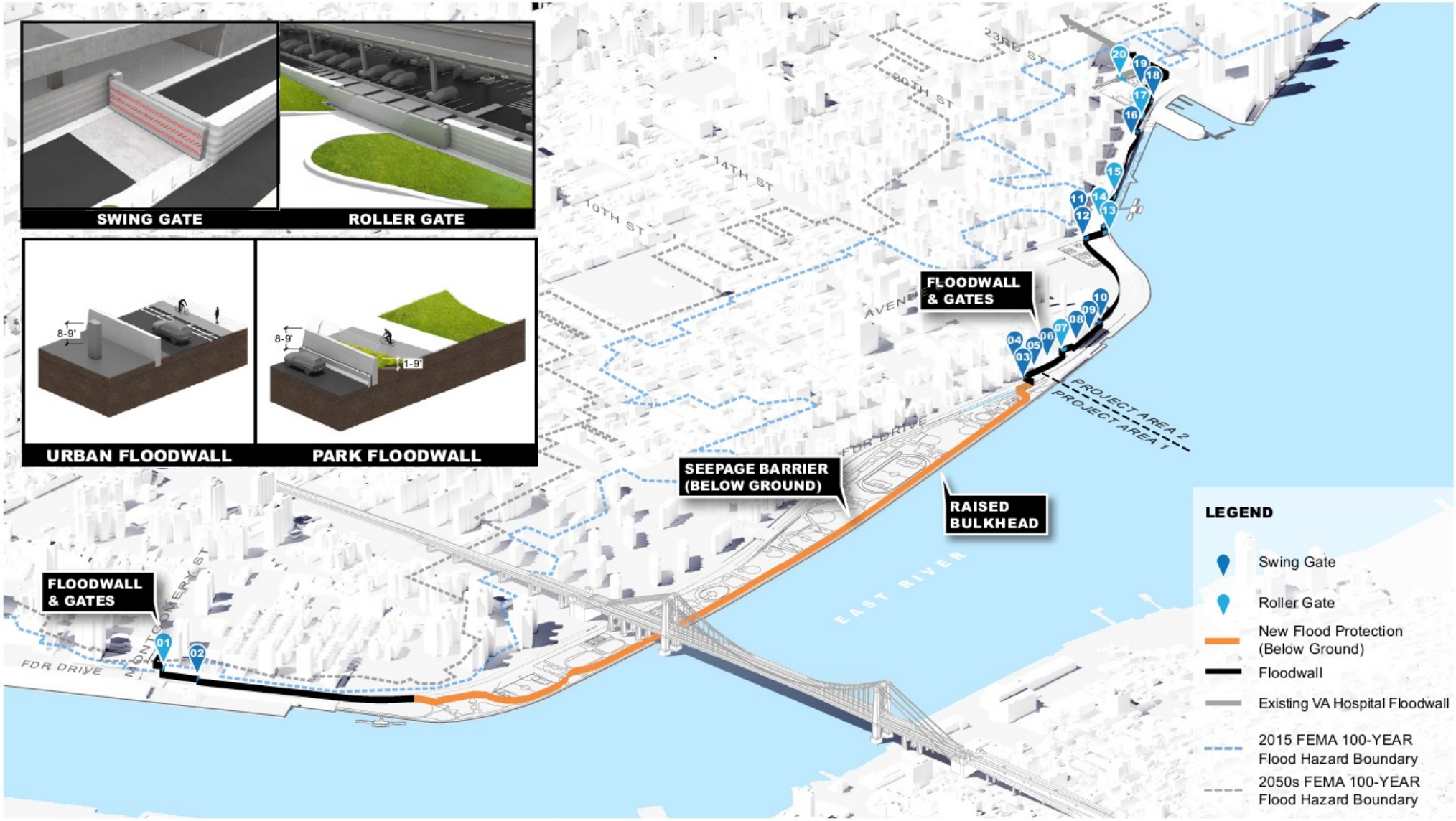
Design Elevation

HUD FUNDING REQUIREMENT: THE SYSTEM MUST PURSUE FEMA ACCREDITATION WITH MINIMUM SYSTEM ELEVATION AT CURRENT FEMA 100-YEAR STORM ELEVATION + FREEBOARD



NOTE: ALL ELEVATIONS SHOWN IN NAVD88

Flood Protection Alignment



East River Park – Existing

East River Park – Proposed

East River Park – Proposed

FDR Drive Crossing – Existing

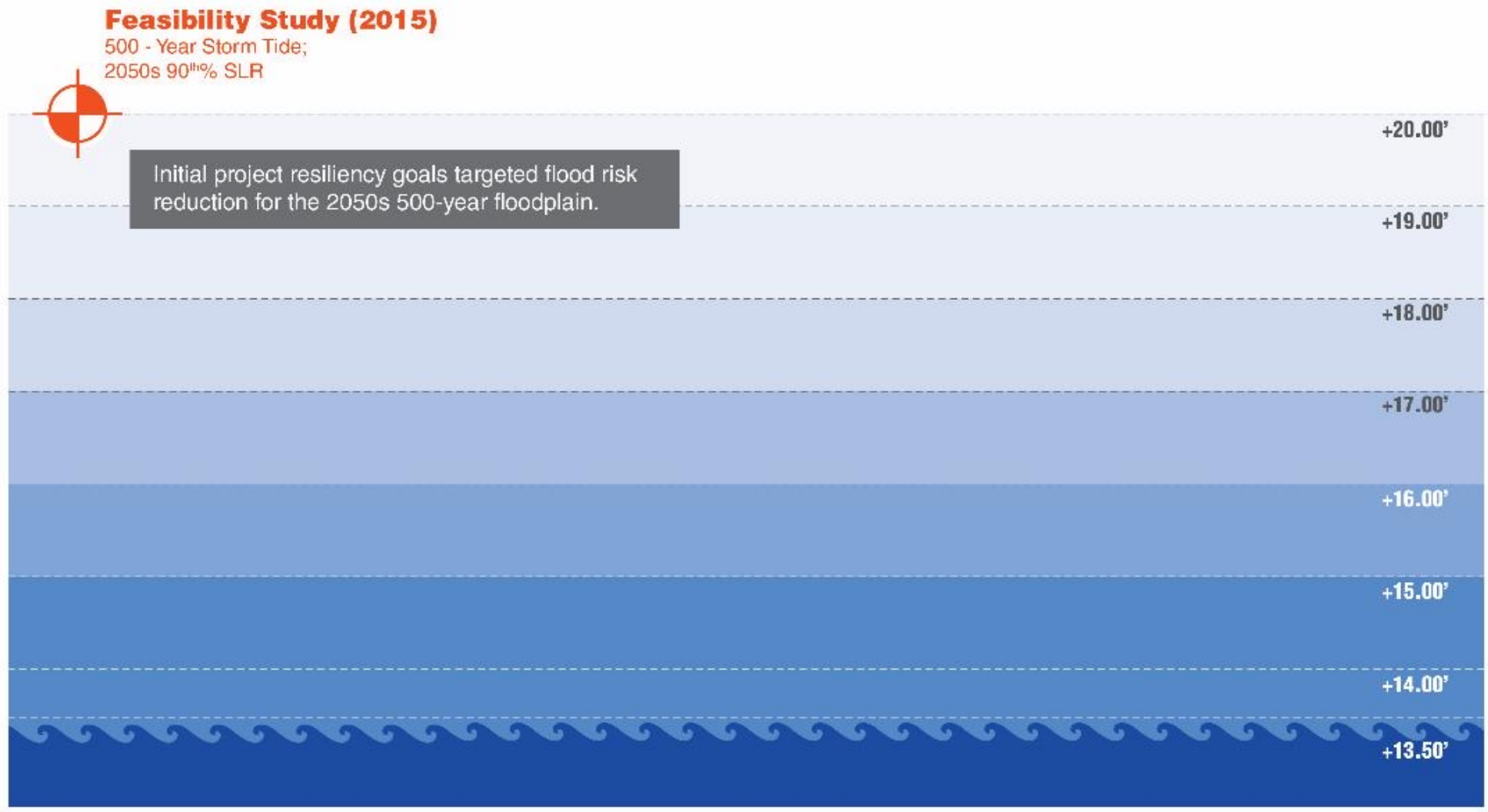
FDR Drive Crossing – Proposed

FDR Drive Crossing – Proposed

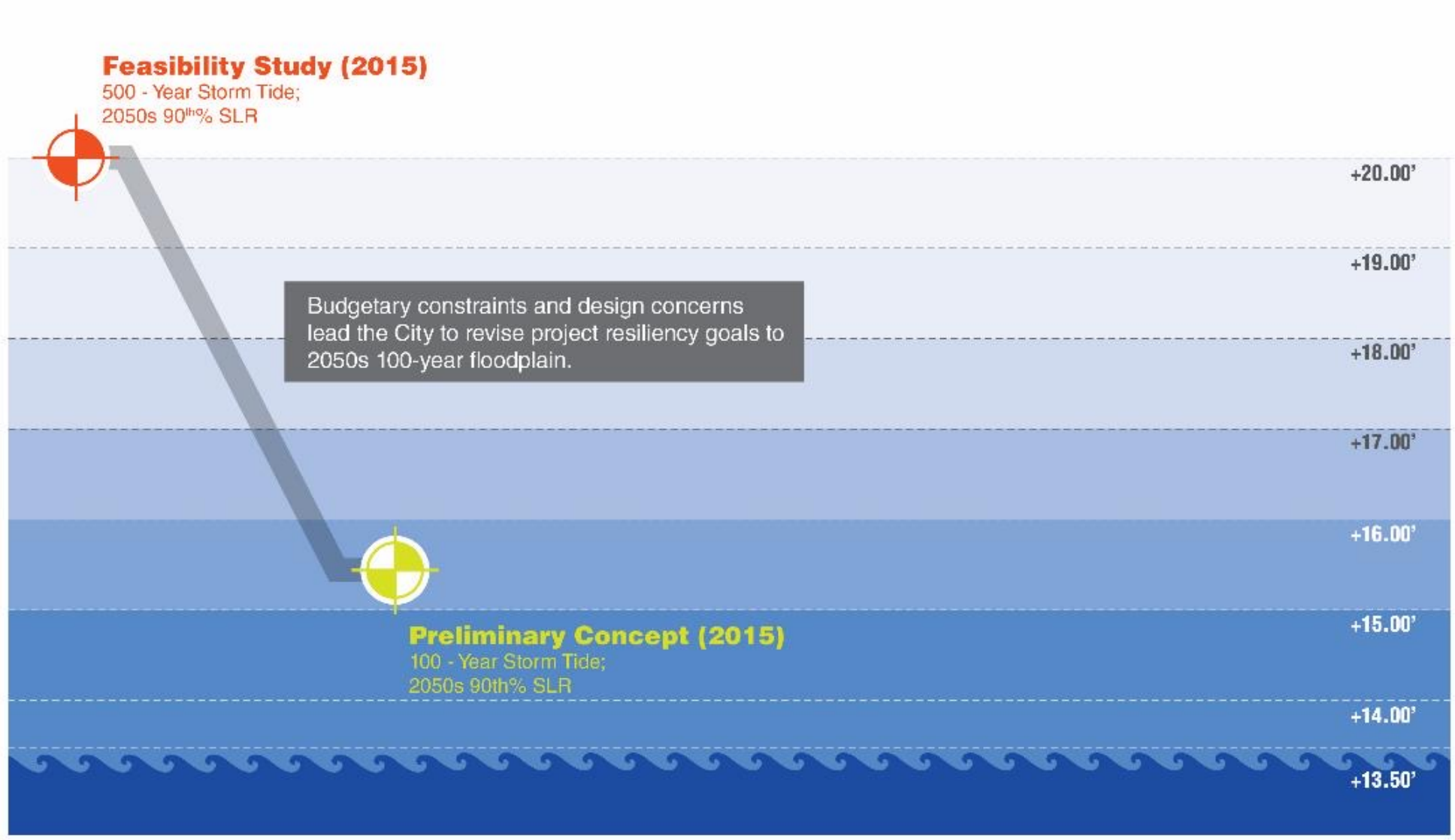
Stuyvesant Cove Park Floodwall

Stuyvesant Cove Park Floodwall

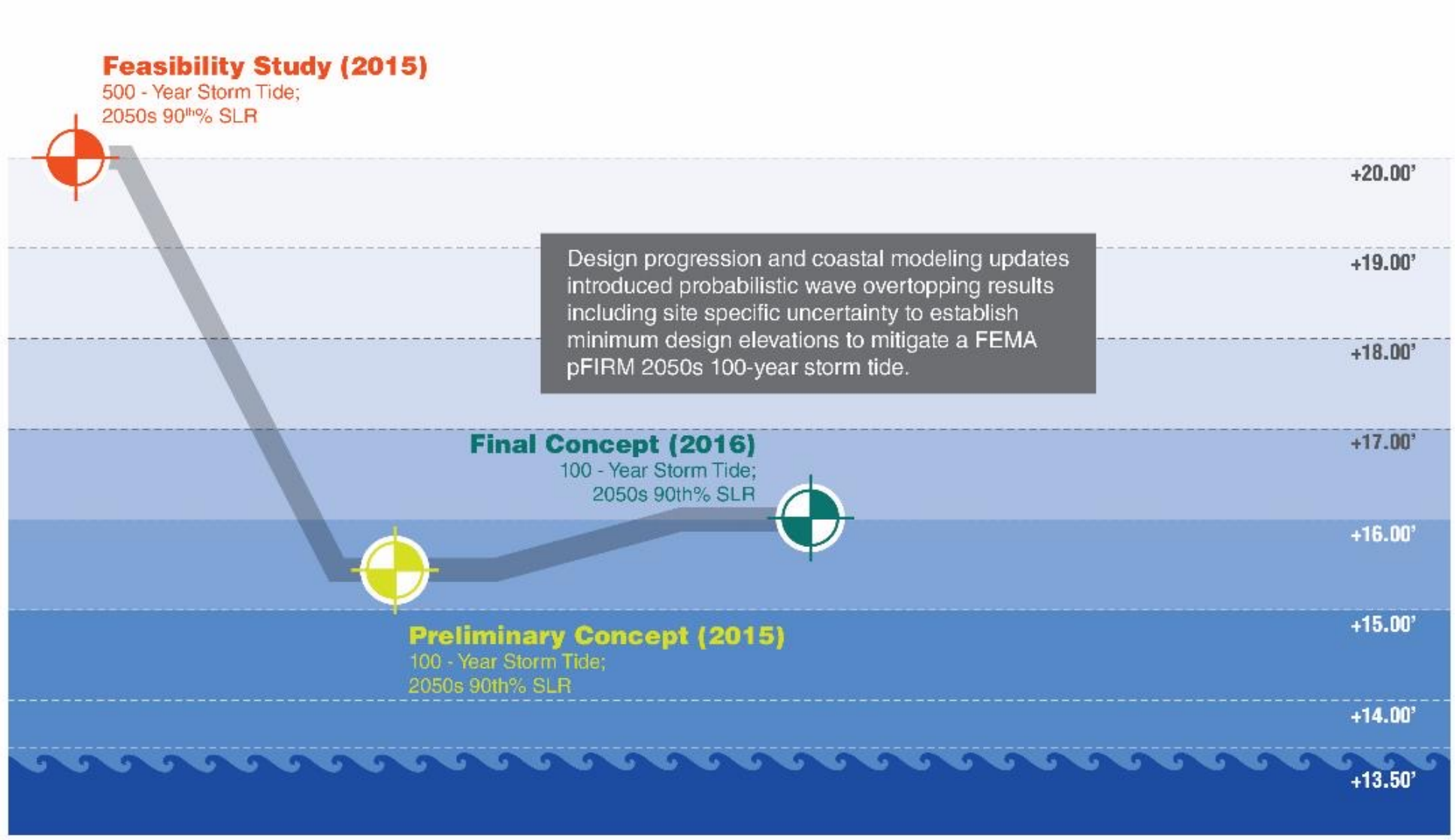
Resilient, Maintainable, Adaptable



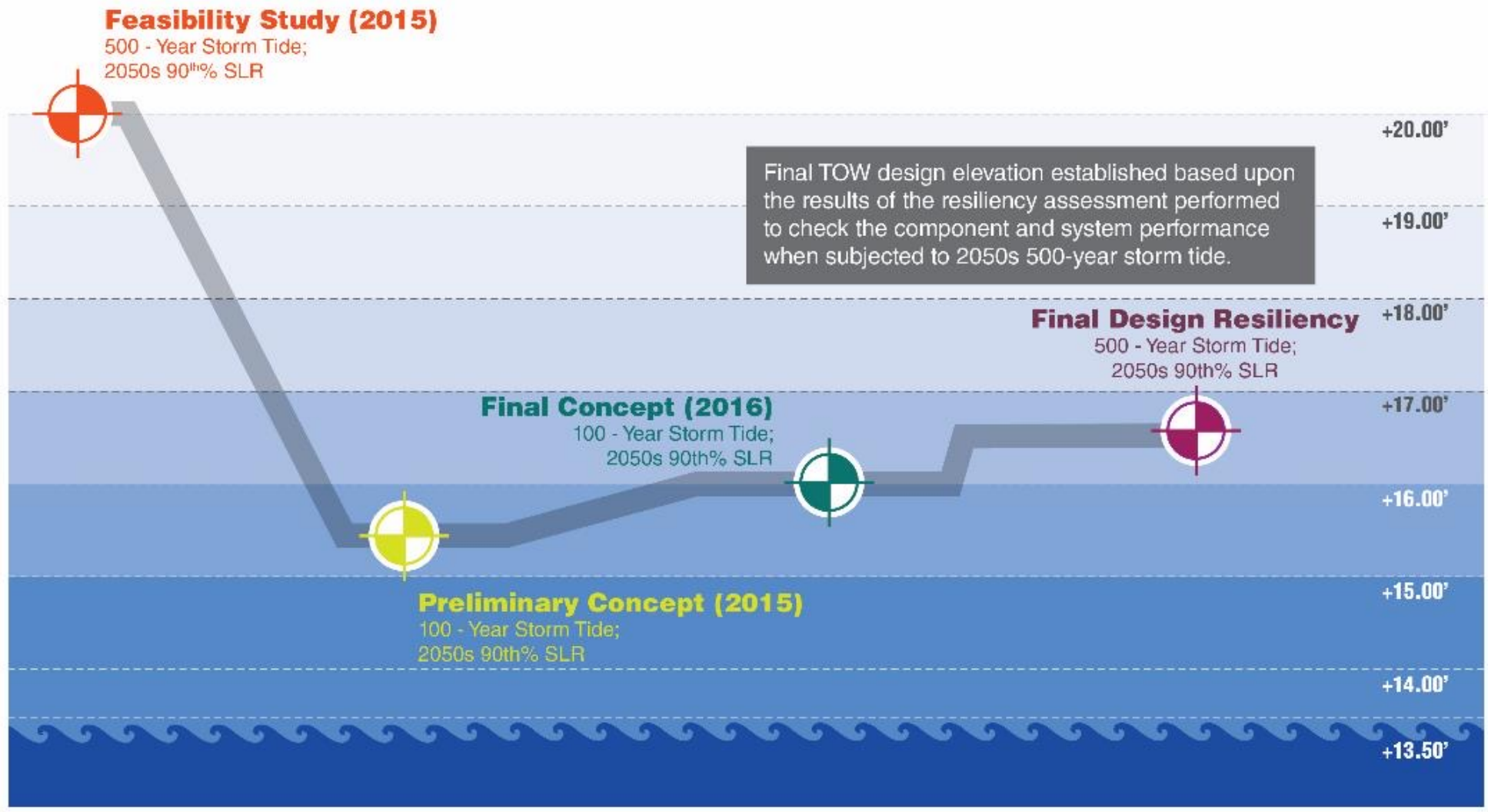
Resilient, Maintainable, Adaptable



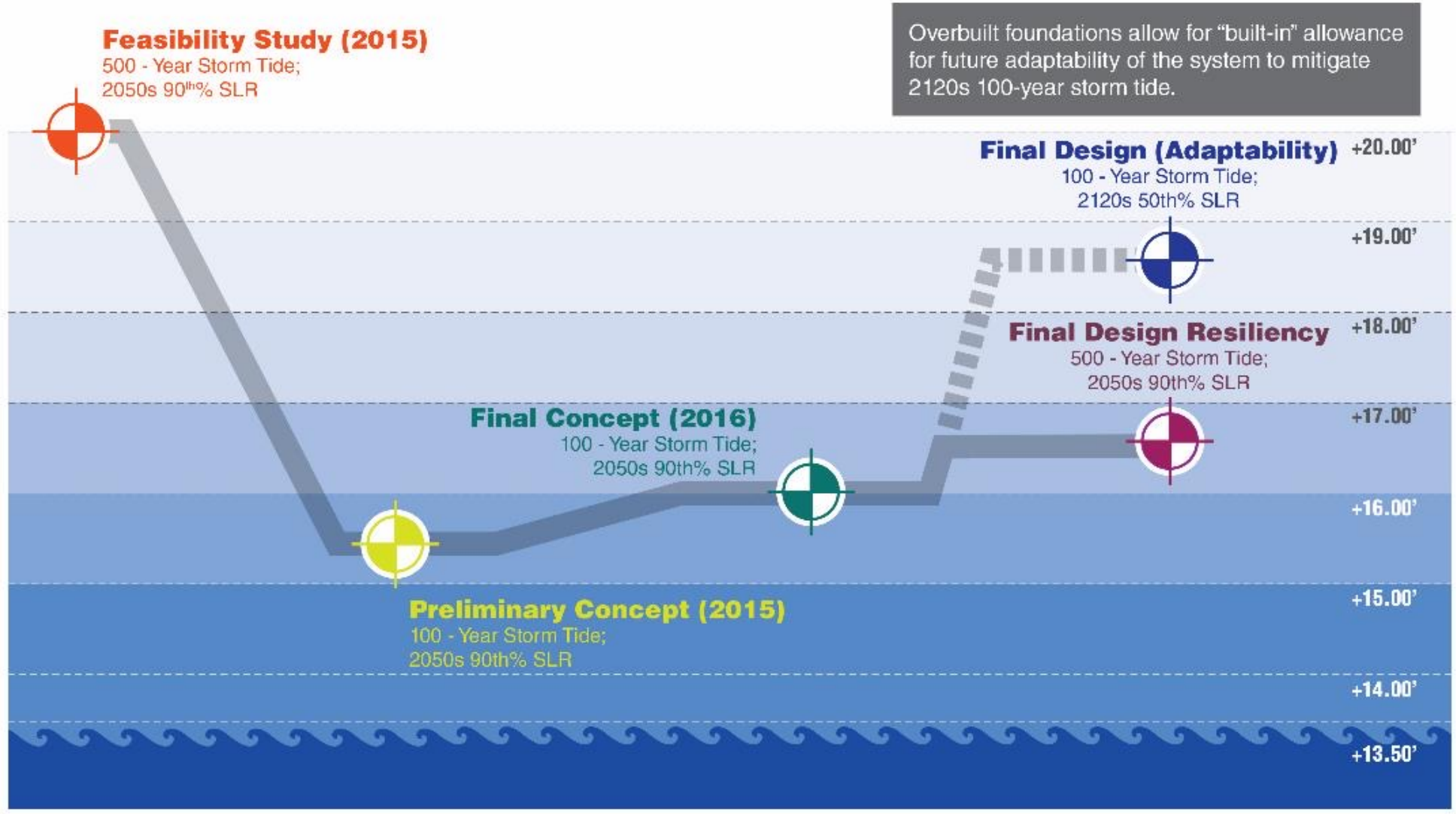
Resilient, Maintainable, Adaptable



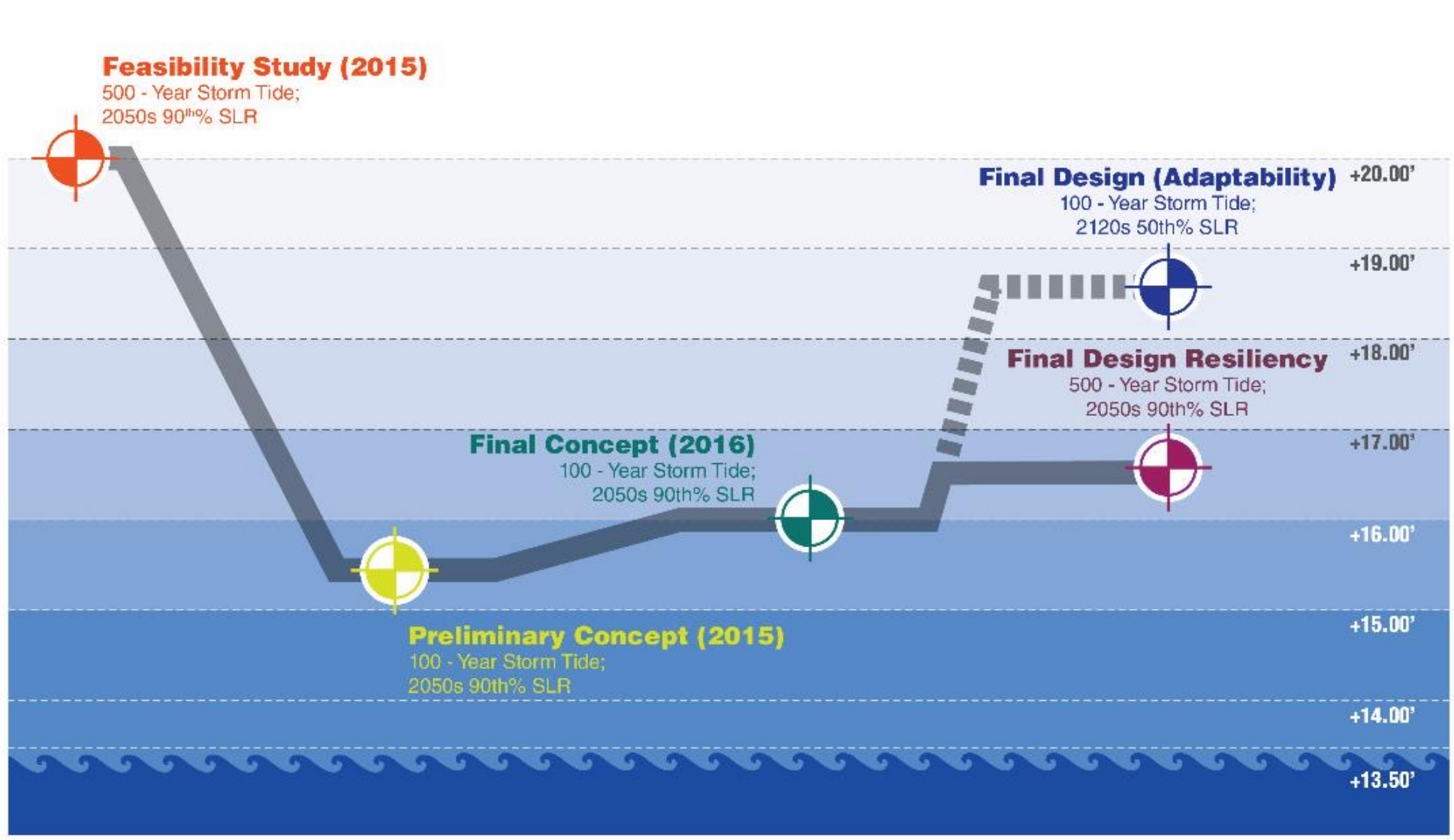
Resilient, Maintainable, Adaptable



Resilient, Maintainable, Adaptable



Resilient, Maintainable, Adaptable



AKRF

EAST SIDE COASTAL RESILIENCY

be ex discuss.

building energy exchange

Moderator

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be
ex
building
energy
exchange
thank you.