
A BETTER CITY
BUILT TO LEAD:
LESSONS IN BUILDING RESILIENCE
LEARN MORE HERE

BUILT TO LEAD: LESSONS IN BUILDING DECARBONIZATION AND RESILIENCE

1. September 24, 2025, Built to Lead: Lessons in Building Decarbonization in Existing Buildings

2. October 30, 2025, Built to Lead: Lessons in Building Decarbonization in New Construction

3. December 18, 2025, Built to Lead: Lessons in New Technologies and Opportunities

4. February 3, 2026, Built to Lead: Lessons in Deconstruction and Embodied Carbon

5. **Built to Lead: Lessons in Building Resilience**

A BETTER CITY

AGENDA

10:00 AM	**Kate Dineen, A Better City**—Welcome
10:02 AM	**Yve Torrie, A Better City**—Introduction
10:10 AM	**Andy Dankwerth, Pembroke Real Estate**—*Commonwealth Pier*
10:22AM	**David S. Burson, Mass General Brigham**—*Mass General Brigham*
10:34 AM	**Doug Manz, HYM Investments**—*Suffolk Downs*
10:46 AM	**Andrew Wang, Related Beal**—*Channelside*
11.00 AM	**Q+A**
11:30 AM	**Event Concludes**

ANDY DANKWERTH, PEMBROKE

COMMONWEALTH PIER

Lessons in Building Resilience

Andrew Dankwerth
Senior Vice President, Design & Development
andrew.dankwerth@pembroke.com

PEMBROKE

DAVID BURSON, MASS GENERAL BRIGHAM

Mass General Brigham

ABC Lessons in Building Resilience

Real Estate and Facilities, Emergency Preparedness and Continuity

- MGB System Overview
- Spaulding Boston Case Study
- Assembly Row Administrative Campus
- MGB Systemwide Vulnerabilities Assessment
- MGH Cambridge Street Project
- Martha’s Vineyard Hospital Facilities Master Plan
- US Climate Resilience Toolkit

Mass General Brigham at-a-glance

$16 Billion
Total Operating Revenue

$2+ Billion
Over $2.2 Billion in research activity with more than $1 Billion in direct DHHS funding

Mass General Brigham System

12	Acute and Specialty Hospitals
5	Harvard-affiliated Teaching Hospitals
28	Rehabilitation Locations
4	Ambulatory Surgery Centers
22	Urgent Care Centers
5	Community Health Centers

Largest Private Employer in Massachusetts

~7,000
Physicians & Fellows

82,000
Employees

2.5 Million
Unique Patients

MASS GENERAL BRIGHAM SUSTAINABLE INITIATIVES
Leadership and Public Health

To support Mass General Brigham in becoming a leader for promoting a **healthy environment**, optimizing the **care of our patients** and the **well-being of our employees** while **conserving the resources we expend**.

Mass General Brigham cannot be viewed as contributing to the health problems manifested in the patients we are treating.

Resilient Design - Spaulding Rehabilitation Hospital

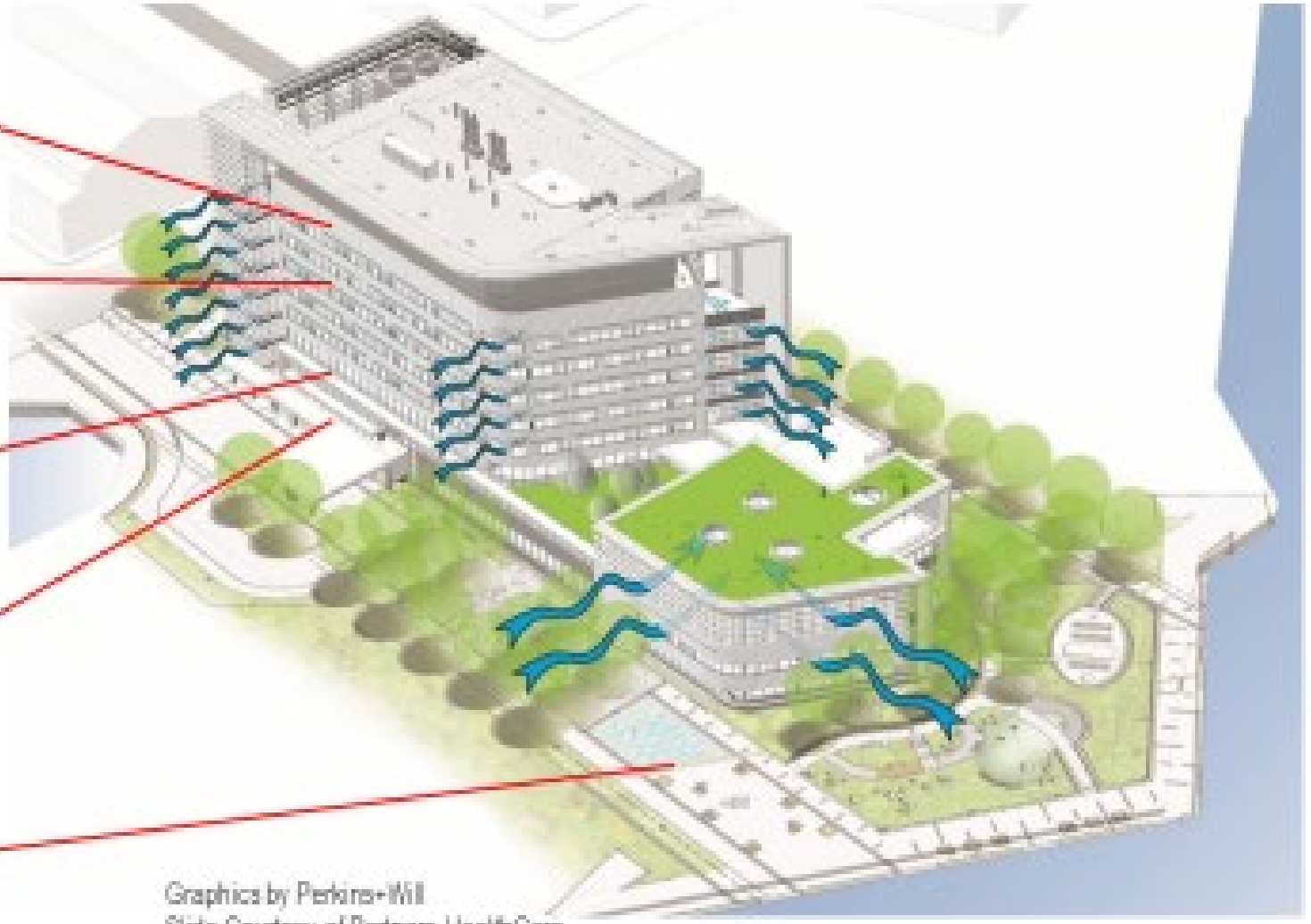
from Krieger, Cobb, Turner: *Mapping Boston*, 1999

SPAULDING REHABILITATION HOSPITAL

Resiliency Measures

Mass General Brigham

- Mechanical, electrical, & emergency generators in penthouse to avoid flooding issues.
- Operable windows in Patient Rooms keyed open in event of systems failure.
- Critical patient programs located above the ground floor.
- Ground floor and top of parking ramp set 30" above current 500-year flood level.
- Berms, retaining walls & plantings act as protective barriers to storm surge.



Graphics by Perkins+Will
Slide Courtesy of Partners HealthCare

SPAULDING REHABILITATION HOSPITAL
Lessons Learned

Mass General Brigham

- **Staff** must be **trained** in operational procedures in order **to realize** the **design intent** e.g., use of operable windows for patient satisfaction and energy savings as well as passive survivability.
- **Location** of the main **Kitchen** and **food supplies** on the Ground Floor were **driven by other considerations than resiliency**.
- **Rainwater/ other clean water capture not implemented**. **ROI** proved to be **too long** to be economically feasible.
- **Integration** of the **site** and **ground floor** with the **neighborhood** has **enabled Spaulding** to act as a **catalyst** for community **social resilience** as a means to address adaptation to climate change.

SPAULDING REHABILITATION HOSPITAL

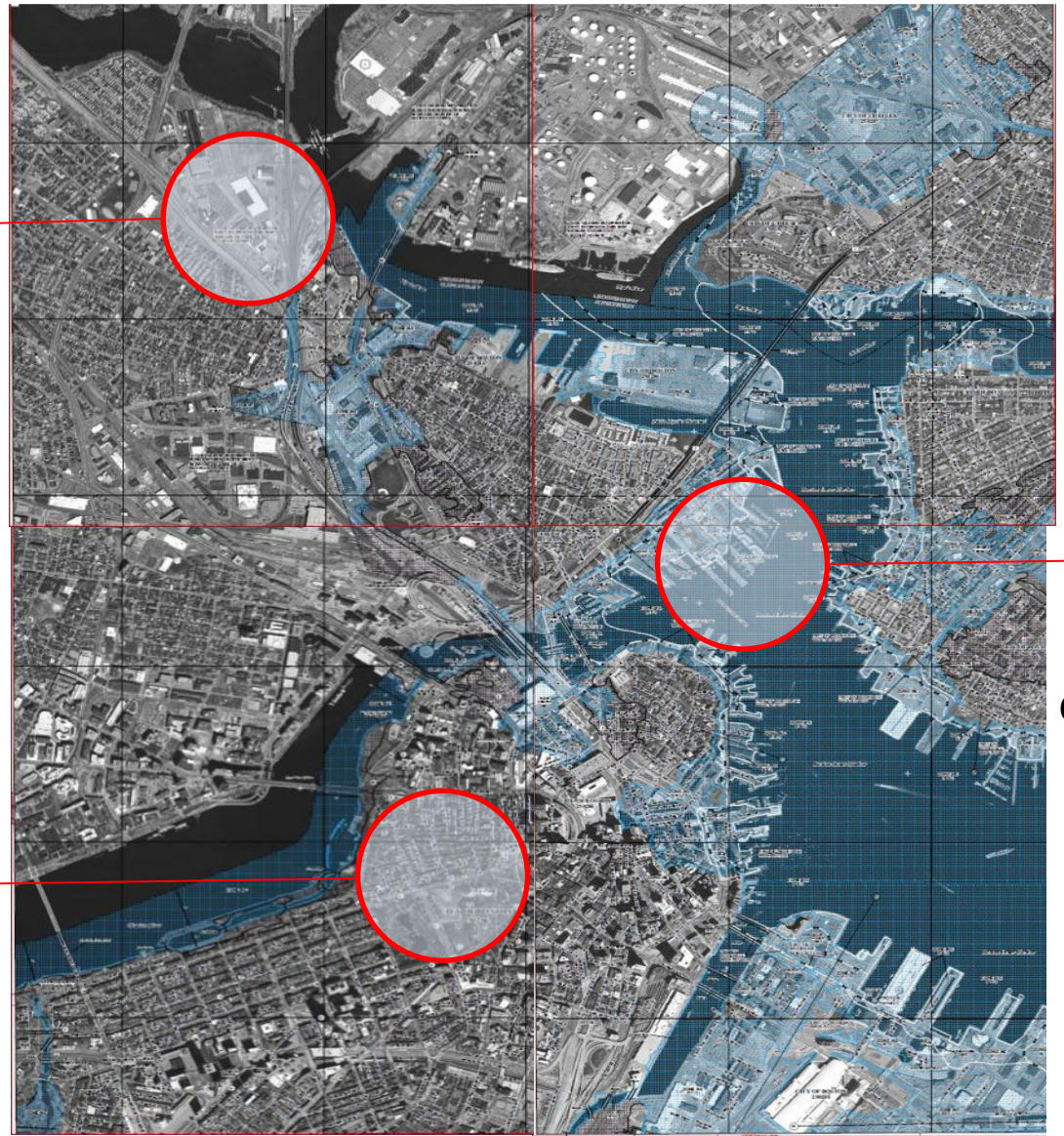
The Business Case for Resiliency

- The **premium** for **resiliency measures** was roughly $1.5 million out of a construction cost of $160 million. Utility rebates paid for roughly half of these additional costs.
- Investments in the high performance building enclosure and energy efficiency measures have a **5 – 8 year payback**.
- Many of the **resiliency measures** also provide **direct benefits to patients**, for example the landscape design which helps to mitigate storm surge is part of a therapy garden. This has **increased demand** for **Spaulding's services**.


10/29/2012

Vulnerabilities and Risk Management

Boston Harbor urban facilities: heat waves, high winds, storm surge, SLR + critical dependencies



Mass General Brigham
Assembly Row
1,087,500SF
Administrative
Campus

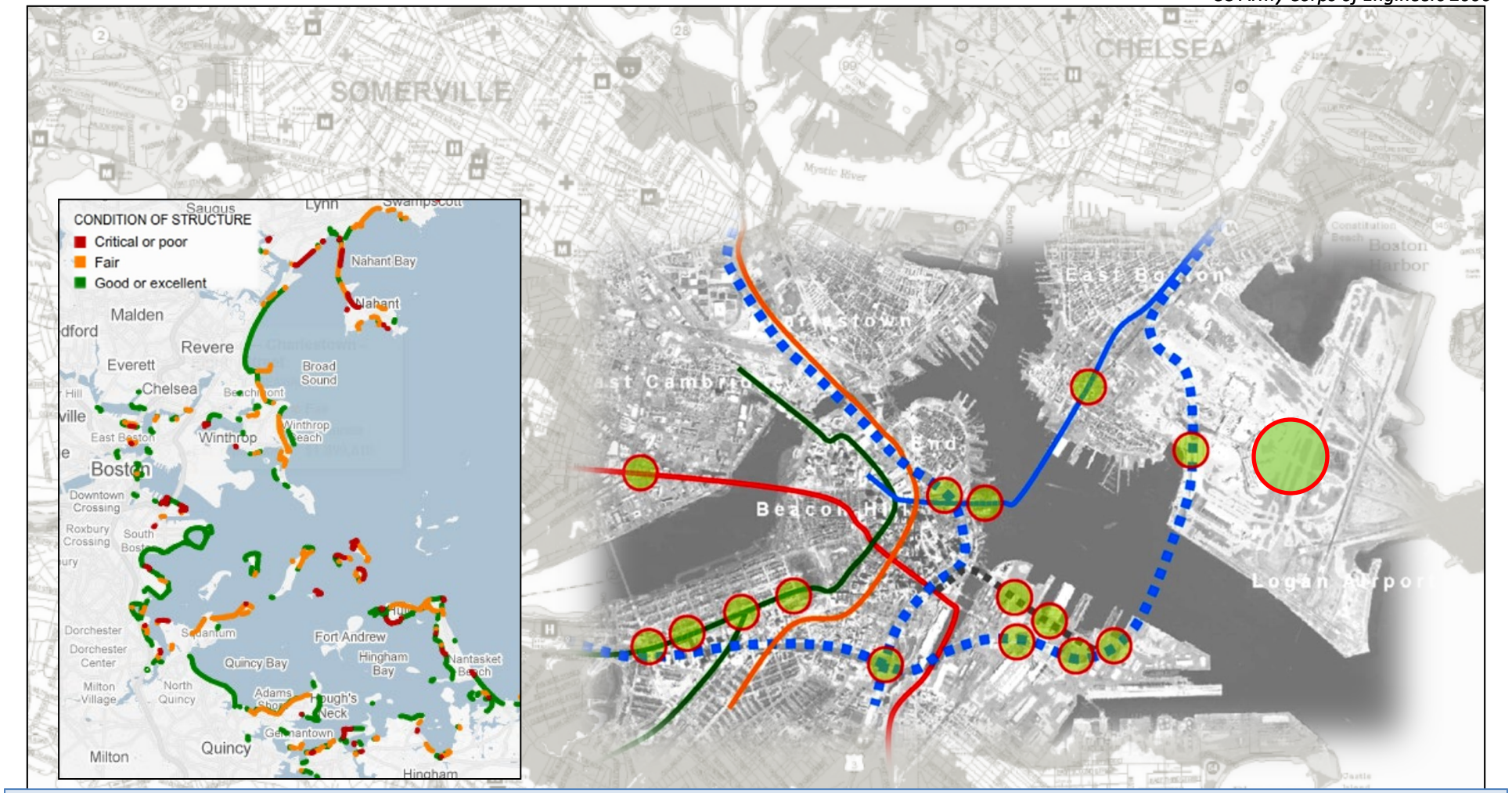
MGH Main Campus
4,309,811SF
1051 beds
70 OR's
Simches Research
Research Labs
405,900SF

Spaulding Boston
220,339SF
132 beds
Charlestown Navy Yard
Research labs
991,170SF

System Vulnerabilities

Urban and regional dependencies

US Army Corps of Engineers 2000



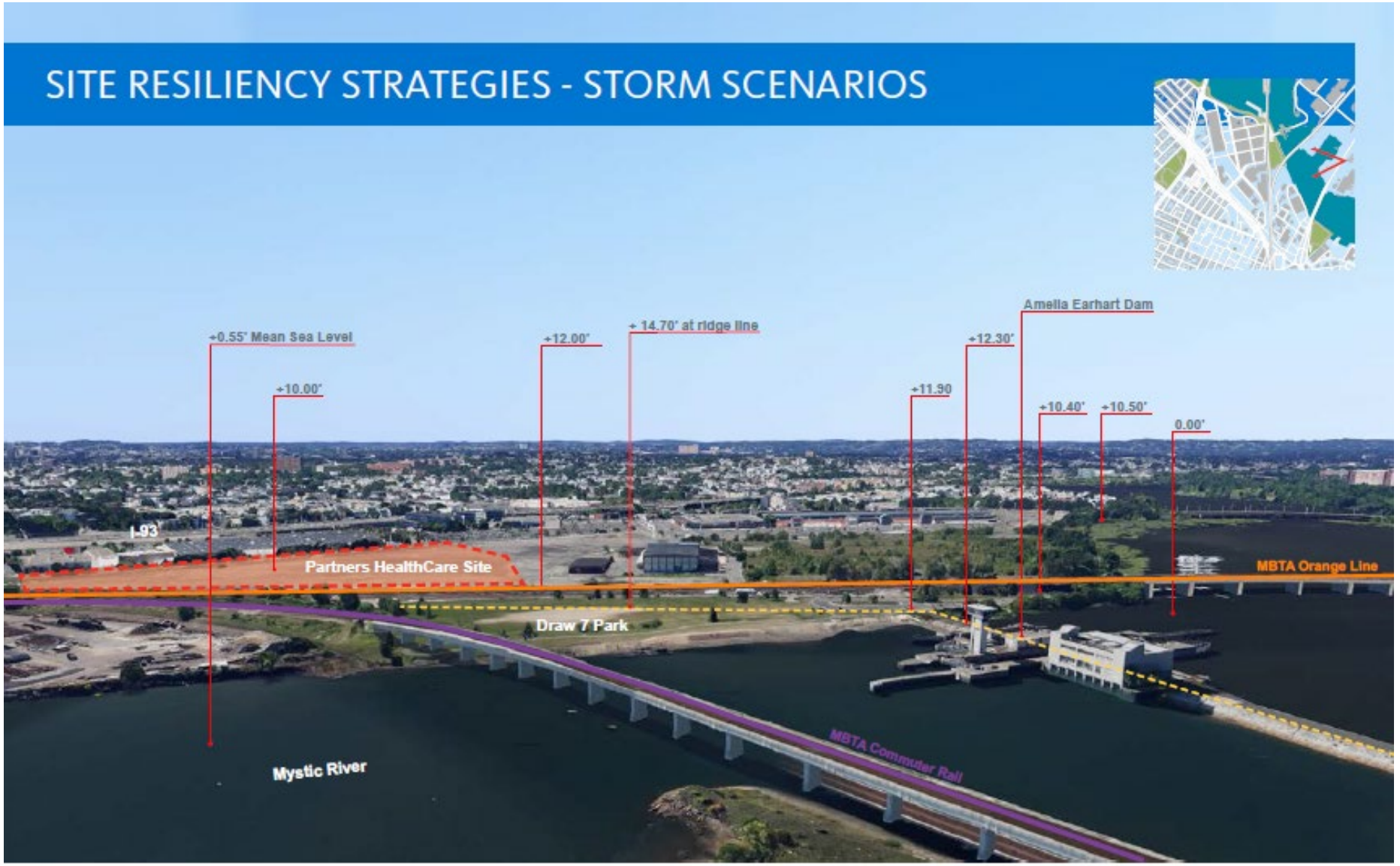
Capacity	Redundancy (85-90% occupancy)	Equivalence (ICU vs. Rehab.)
Access	Roads - interstate and local	Tunnels and Subways
Infrastructure	Power / Gas / Water / Sewers etc.	Shoreline protection

Resilient Design

Mass General Brigham Administrative Campus, Somerville, MA

Resilient Design

Mass General Brigham Corporate HQ, Somerville, MA



dcr Massachusetts

DRAW SEVEN PARK

Weston & Sampson


REGIONAL FBI HEADQUARTERS
MYSTIC MALL, MARKET BASKET, STOP & SHOP
ADDISON ORANGE NEIGHBORHOOD (EJ)
1%-annual-chance storm 2070.
EVERETT COMMERCIAL TRIANGLE
FHWA CRITICAL URBAN FREIGHT CORRIDORS SUPPORTING PORT AND DISTRIBUTION ACTIVITIES
MBTA COMMUTER RAIL & SILVERLINE STATION, RAMPS TO US RT 1, REVERE BEACH PARKWAY
REGIONALLY CRITICAL FOOD PRODUCTION, STORAGE, AND DISTRIBUTION INDUSTRY (ENTIRE EAST WEST FLOOD EXTENT)
MASS GENERAL HOSPITAL CHELSEA
MASS INFORMATION TECHNOLOGY CENTER
CHELSEA WILLIAMS MIDDLE SCHOOL

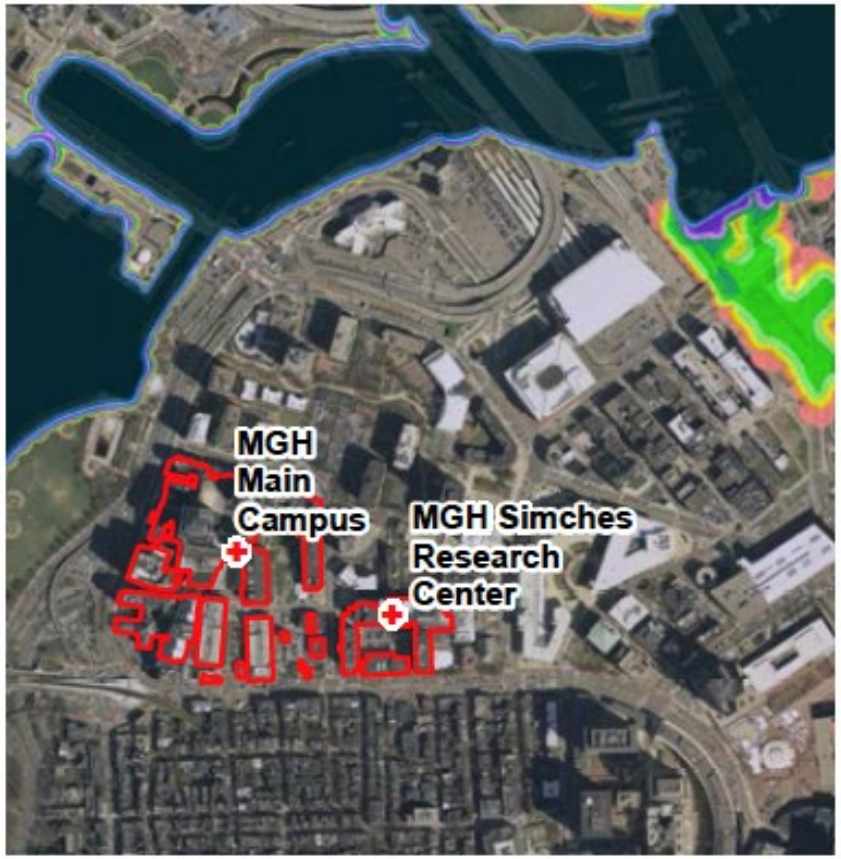

MyRWA
Mystic River Watershed Association
Draw 7 Park, Somerville
March 2, 2018 11:30 am (high tide)

Mass General Brigham

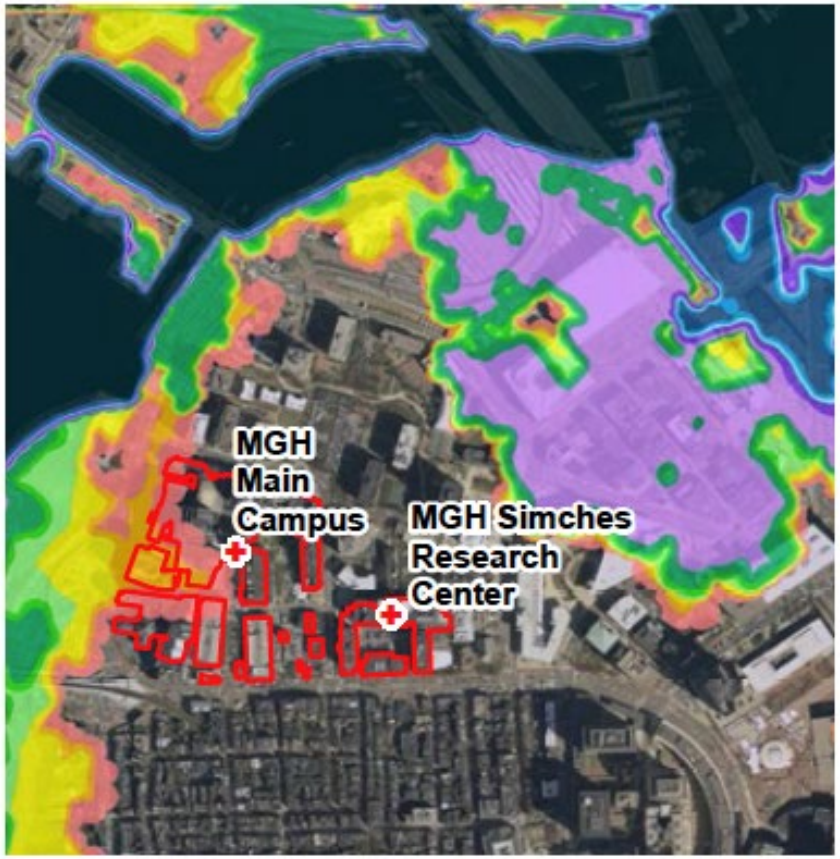
ARUP

Sea Level Rise and Storm Surge

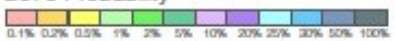
Probability-based Flooding



2030 Probability



2070 Probability



MGH Main Campus | Boston MA 02114 Lobby Elevations: White Bldg: 24.0' | Yawkey ACC: 19.8' | Wang ACC: 13.0' Latitude/Longitude: 42.36/-71.07

Page 8

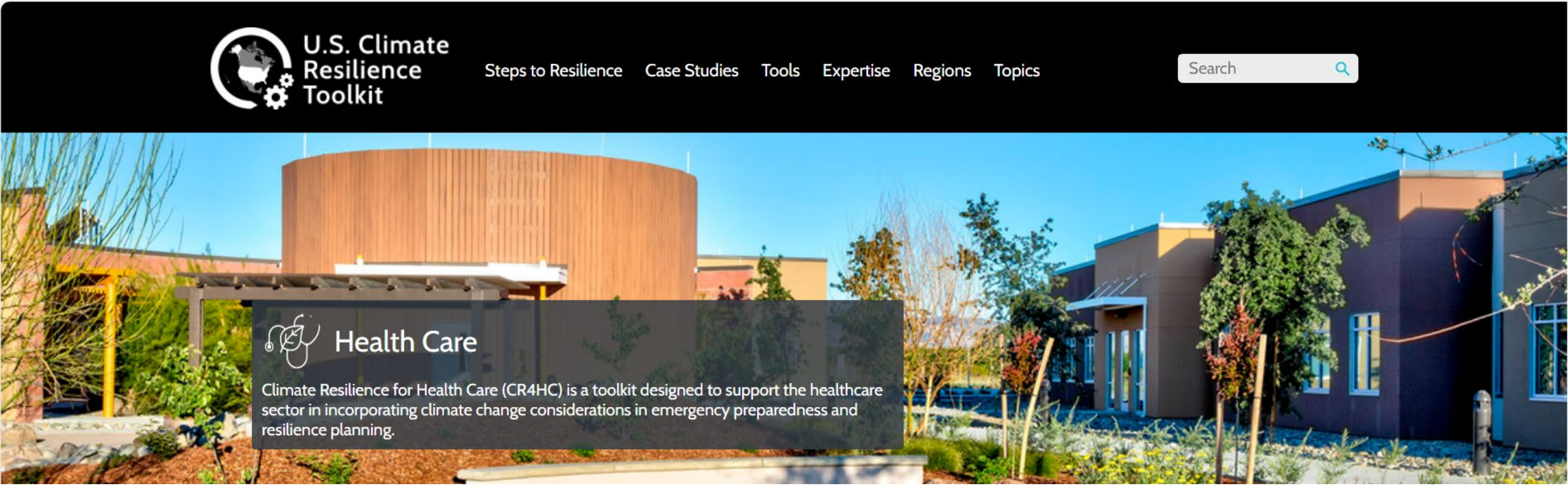
MGH CAMPUS RESILIENCY PROJECT: Philip and Susan Ragon Building

- Place of refuge for patients and staff across campus
- Capacity to shelter in place for up to four days
- Flood-proofing existing buildings and infrastructure

MGH CAMPUS EXPANSION
Philip and Susan Ragon Building

- 18 mo. permitting
- 2022-27 phase 1 construction
- 1.05M GSF; 12 stories
- 7 floors inpatient; 482 beds
- New campus services center
- 6 levels underground parking


GATE
E



[Health Care | U.S. Climate Resilience Toolkit]

(https://toolkit.climate.gov/topics/health-care)

David S. Burson, AIA, NCARB
Mass General Brigham Real Estate & Facilities
dburson@mgb.org

DOUG MANZ, HYM INVESTMENTS

A Better City

Built to Lead: Lessons in Resilience

April 2026

The HYM Investment Group (HYM)

Successfully managing many of Massachusetts' innovative urban mixed-use developments

Quick Facts

- Boston-based real estate development and investment firm founded in 2009
- Our team is made up of 50% women, 35% people of color
- Currently leading the development of more than 20 million square feet
- Our projects have created 25,000 jobs, totaling $12 billion of investments
- Proven track record permitting/developing complicated, mixed-use projects


BOSTON LOGAN INTERNATIONAL AIRPORT
SEAPORT
DOWNTOWN BOSTON
KENDALL SQ./MIT
HARVARD/ CAMBRIDGE
93
90
T
EAST BOSTON GREENWAY
CONSTITUTION BEACH
1A
ORIENT HEIGHTS
CHELSEA CREEK
SUFFOLK DOWNS
BELLE ISLE MARSH
BENNINGTON STREET
BEACHMONT
REVERE BEACH PARKWAY

16.2 MSF of Dynamic Uses

2
MBTA Blue Line stations

40
acres of open space

Direct
Access from Route 1A

5.2MSF
life science/commercial office

450,000
sf of creative retail and civic spaces

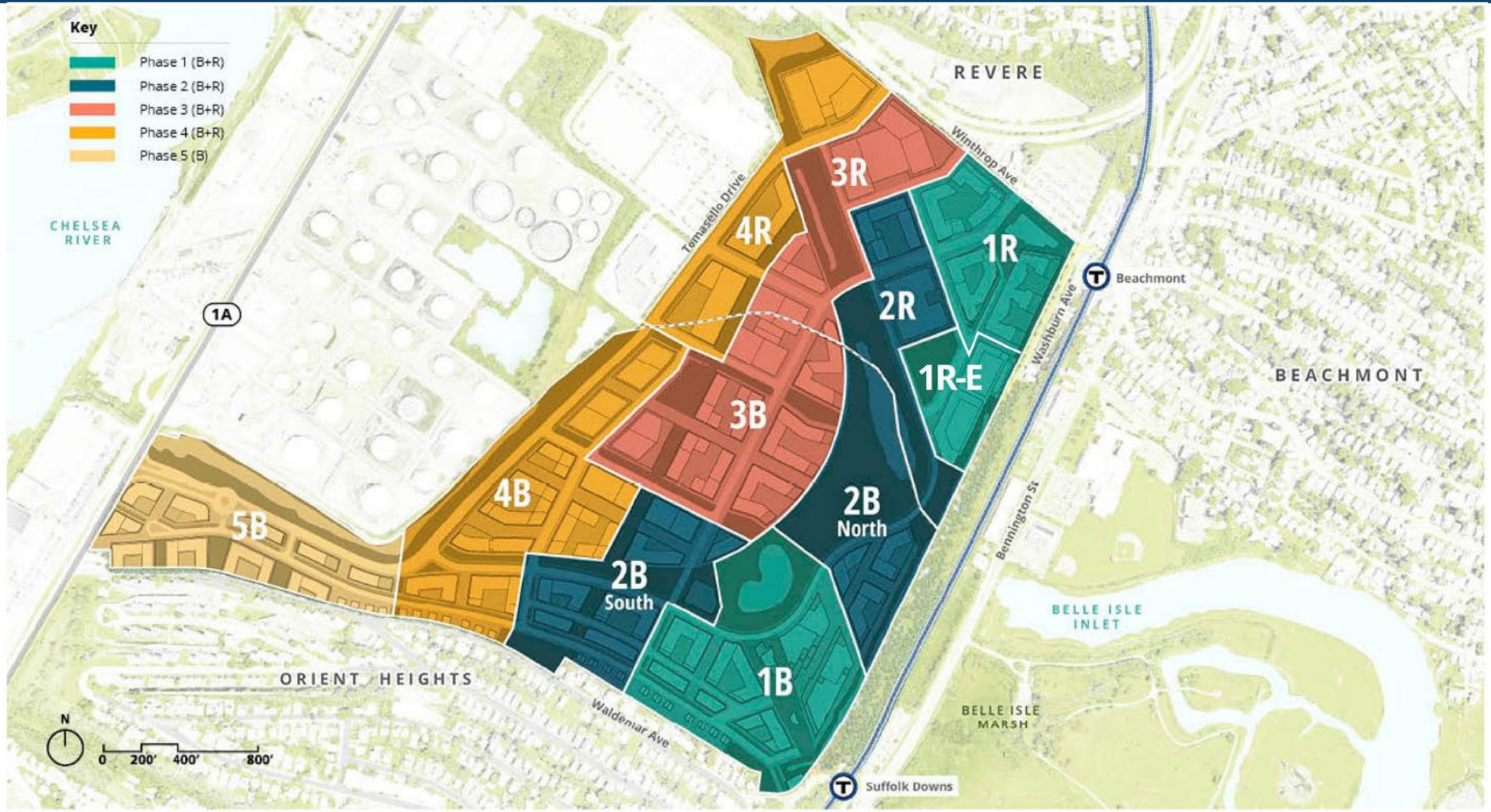
800
keys at 3 hotels

10,000
diverse residential units

$337M+
on and offsite infrastructure investment

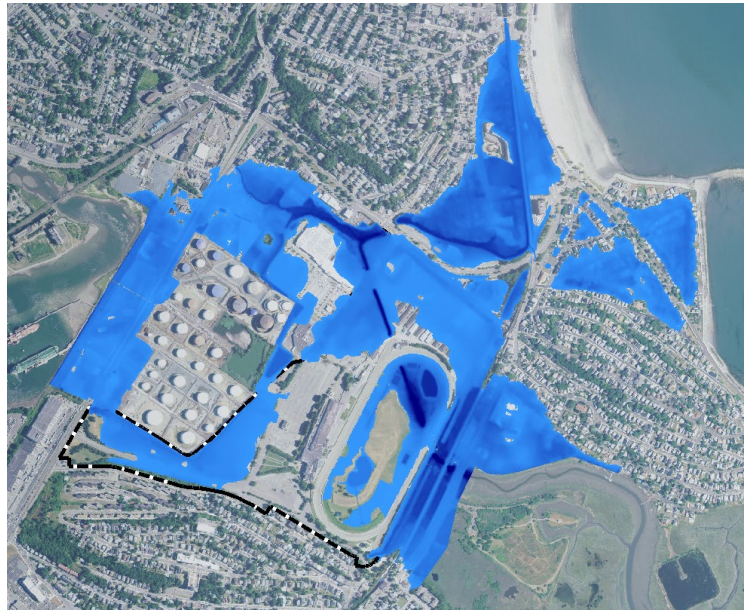
Land Use Plan

Phasing Plan



Resiliency Approach

- Clean canvas of 161 acres
- Accommodate 4.2 feet of sea level rise through 2100 & heavier rainfall events
- Use 40 acres of Open Space to mitigate coastal flooding & high rain fall events
- Allow for a phased approach to mitigation



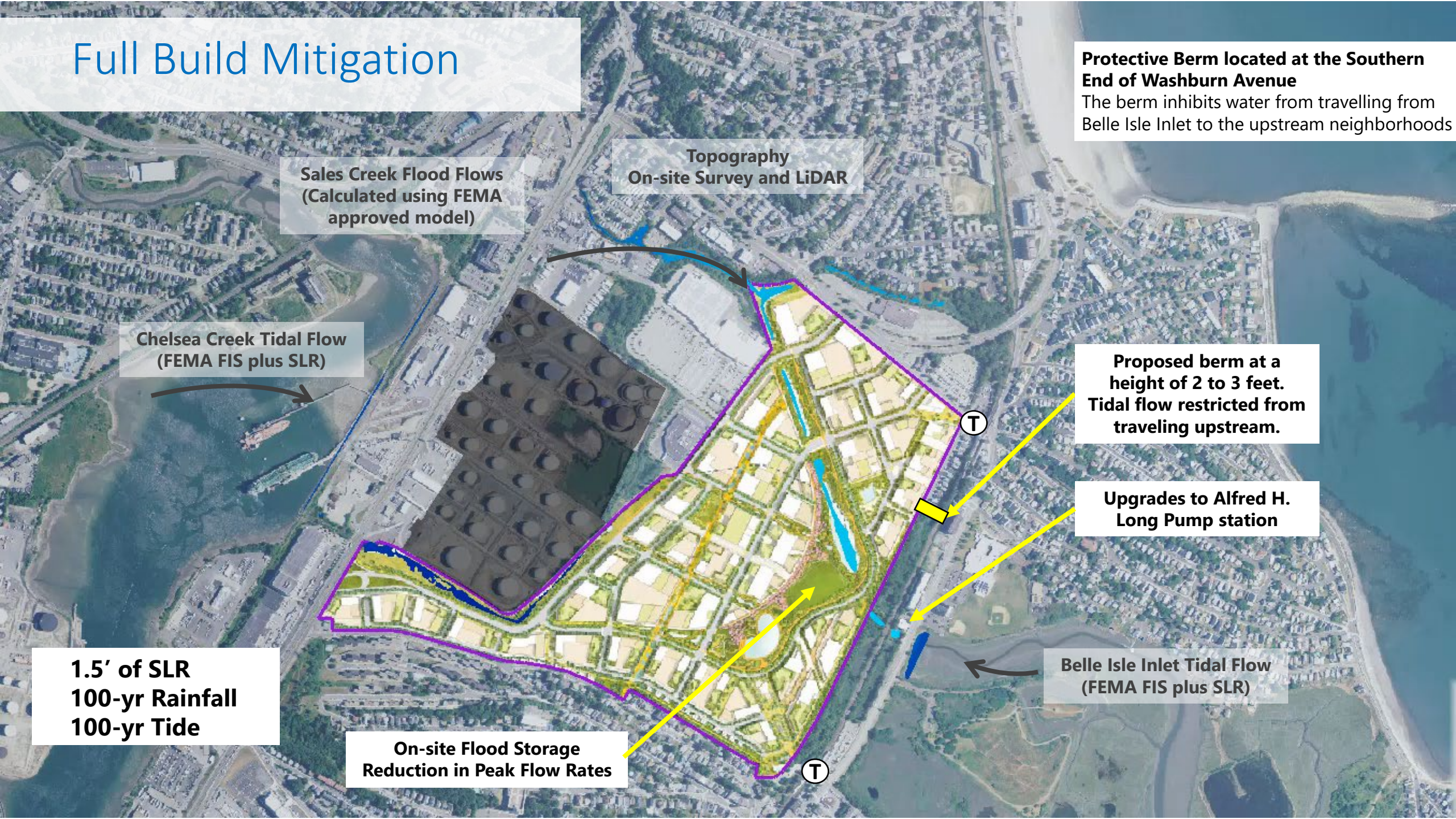
No Build

Build

The Amp

Washburn Berm

Full Build Mitigation



Protective Berm located at the Southern End of Washburn Avenue
The berm inhibits water from travelling from Belle Isle Inlet to the upstream neighborhoods

1.5′ of SLR
100-yr Rainfall
100-yr Tide

Transportation Demand Management Monitoring (TDM)

- Currently have over 400 residents living at Amaya
- Sent out a survey with 176 responses
- Trip Generation
  - 75% take Public Transit
    - 71% Blue Line
    - 2% Bus
    - 2% Commuter Rail
  - 22% Drive
  - 3% Walk/Other
- Bicycle Ownership (9%)
- Parking Ownership
  - .5 Cars/Leased Unit
  - 30 Electric Vehicles
  - 10 Charging Stations

Current Status

- Complete & Open
  - Amaya (475 Units & 20,000 SF Retail)
  - Beachmont Square Open Space
  - The Yard At Suffolk Downs
  - $75 million of Infrastructure in Place
- Under Construction
  - Portico (473 Units & 30,000 SF Retail)
  - The Amp at Suffolk Downs
- 2026 Starts
  - Arden (243 Units)
  - 150-Key Hotel

Thank you!

Doug Manz

Partner, Chief Investment Officer

dmanz@hyminvestments.com

One Beacon Street, 31st Floor

Boston, MA 02108

HYM

ANDREW WANG, RELATED BEAL

CHANNELSIDE

A Better City

Built to Lead: Lessons in Building Decarbonization and Resilience

RELATED BEAL

CHANNELSIDE

Boston's Next Mixed-Use Destination

1.1M SF
OFFICE, LAB, RETAIL, & RESIDENTIAL SPACE

3.5+ Acres
PUBLIC PARKS & OPEN SPACE

340
RESIDENTIAL UNITS

40+
MILES OF HARBORWALK & BIKE PATHS

357K SF
RESIDENTIAL SPACE & GROUND FLOOR MIXED-USE SPACE

322K SF
COMMERCIAL SPACE & GROUND FLOOR MIXED-USE SPACE

418K SF
LAB / R&D SPACE & GROUND FLOOR MIXED-USE SPACE

RELATED BEAL

6.35 Acres on A Street in Fort Point Channel

Channelside Site Program

Site Sustainability & Resiliency Features

HEAT ISLAND EFFECT

Shade tree coverage

Public shade structures

Porous high albedo pavement

SEA LEVEL RISE

Elevated critical infrastructure

Sea level rise protection berm

STORM WATER MANAGEMENT

Improved permeability, storm water retention, and on-site ground water recharge

RELATED BEAL

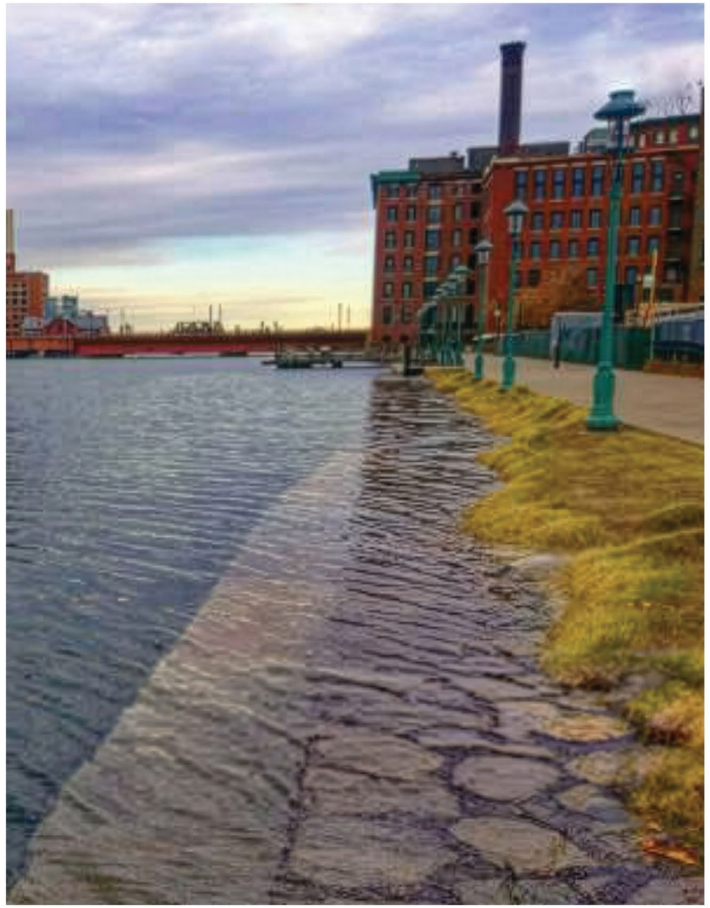

South Station
Fort Point Channel
CHANNELSIDE
RELATED
BEAL

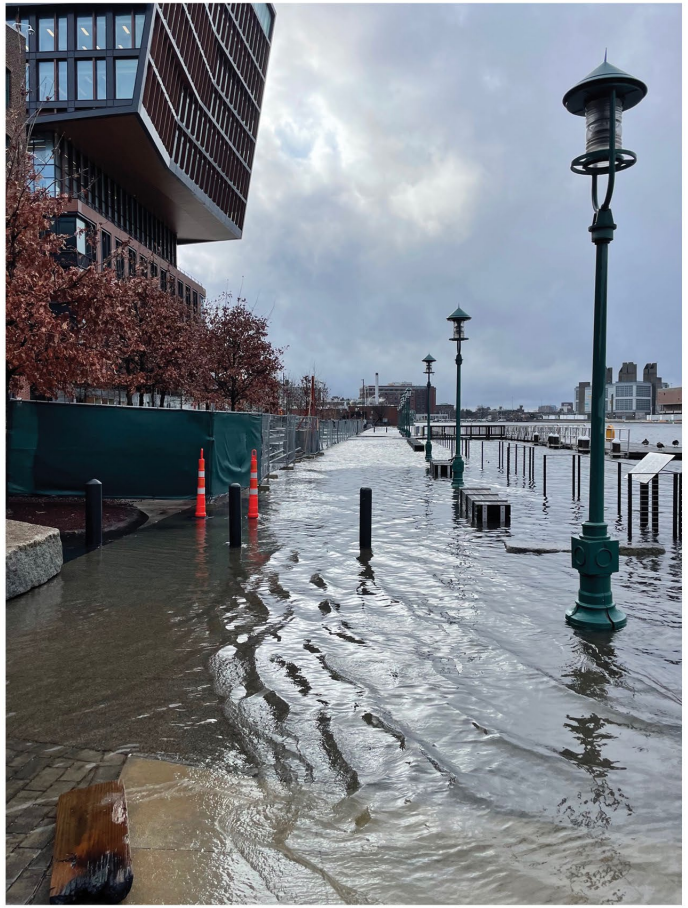
BPDA 100 Acres Open Space Concept Plan

Sasaki, December 2020

Sea Level Rise & Coastal Resilience

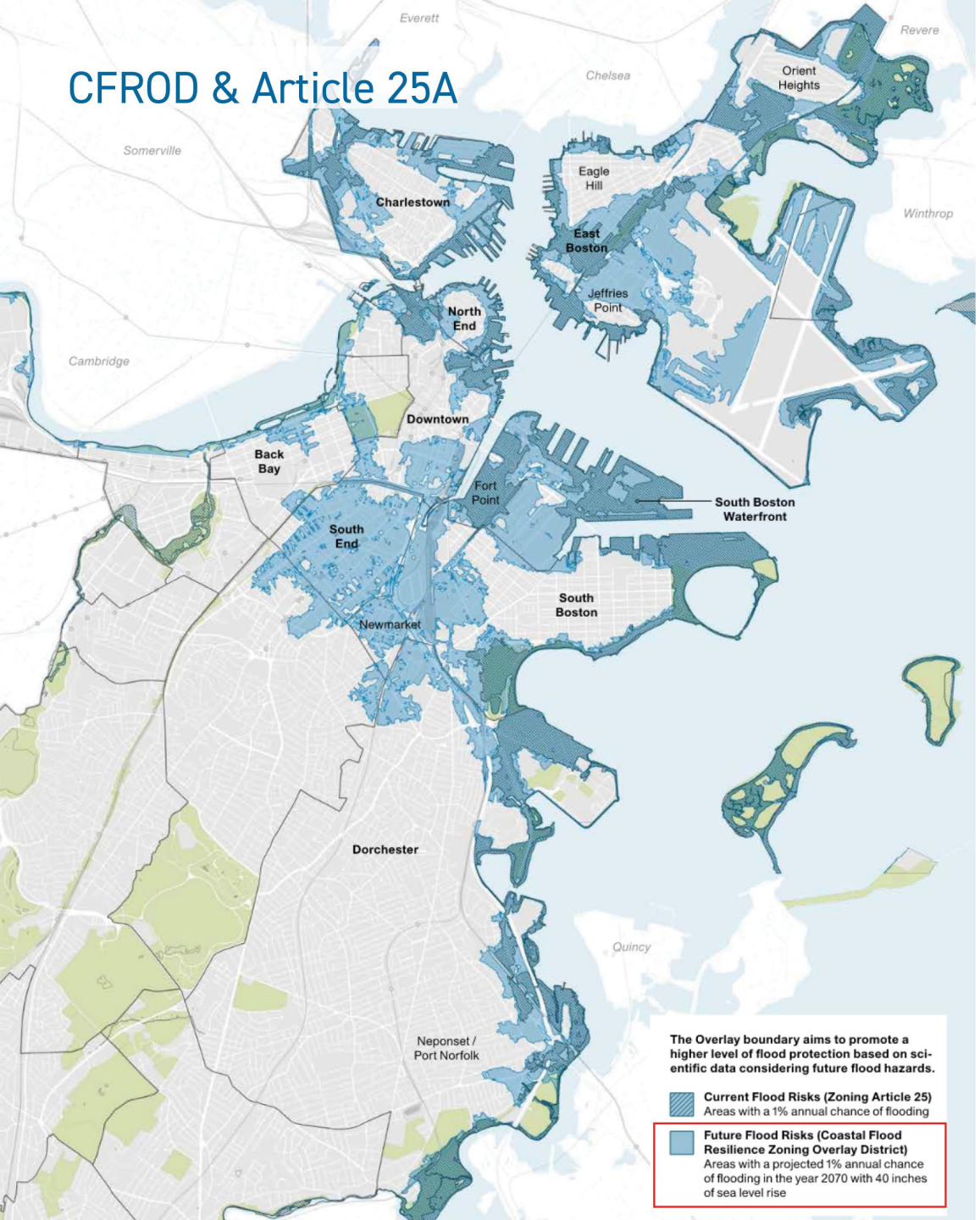
King Tide Flooding





RELATED BEAL

CFROD & Article 25A



NEWS & UPDATES

MAYOR KIM JANEY SIGNS UPDATED ZONING MEASURE TO PREPARE NEW AND RETROFITTED DEVELOPMENT FOR FUTURE CLIMATE RISKS

OCT 26, 2021

Mayor Kim Janey today signed a new zoning overlay into effect requiring new development and retrofits to take additional steps to limit the damage and displacement related to the impacts of coastal storms and sea level rise. The Coastal Flood Resilience Zoning Overlay District, goes

ARTICLE 25A
COASTAL FLOOD RESILIENCE OVERLAY DISTRICT

Section 25A-1. Statement of Purposes, Goals, and Objectives.

The purposes of this Article are to protect persons and structures from the adverse effects of sea level rise and storm surge associated with climate change by

- promoting resilient planning and design;
- providing consistent standards for the review of projects;
- maximizing the benefits of long-lived investments in coastal resilience;
- promoting the co-benefits of sustainable designs that address multiple climate impacts;
- advancing adaptation strategies that are future-looking and draw on best practices for long-term resilience; and
- encouraging design that responds to the unique conditions of Boston's building types, advancing resilience for individual buildings, district-scale resilience plans, and enhancing the public realm.

This Article conforms to the general plan for the City of Boston, as expressed in Imagine Boston 2030, Climate Ready Boston, and related plans. The Zoning Commission hereby recognizes the parts of the City's general plan that address the geographic areas governed by this Article, together with the parts that address coastal flood resilience, as the plan for the Coastal Flood Resilience Overlay District.

(Text Amd. No. 451, 10-13-2021.)

Section 25A-2. Definitions.

For the purposes of this Article 25A only, words and phrases defined in Appendix B hereto shall have the meanings indicated in that Appendix, notwithstanding any contrary provision of the Underlying Zoning.

(Text Amd. No. 451, 10-13-2021.)

Section 25A-3 Establishment of Coastal Flood Resilience Overlay District (CFROD).

1. **Physical Boundaries.** The geographic areas and zoning districts shown on Appendix A (Coastal Flood Resilience Overlay District) are subject to the provisions of this Article 25A.
2. **Warning and Disclaimer of Liability.** The degree of flood protection and resilience design required by this Article 25A is based on current scientific and engineering considerations and best resilience practices. Larger and more frequent floods may occur. This Article 25A does not imply that areas or structures in compliance with the requirements and guidelines of this Article will be free from flooding or flood damage. This Article shall not create liability on the part of the City of Boston or any officer or employee thereof for any flood damage that may result from reliance on this Article 25A, or from any administrative decision lawfully made thereunder.

1% Annual Chance of Flooding in

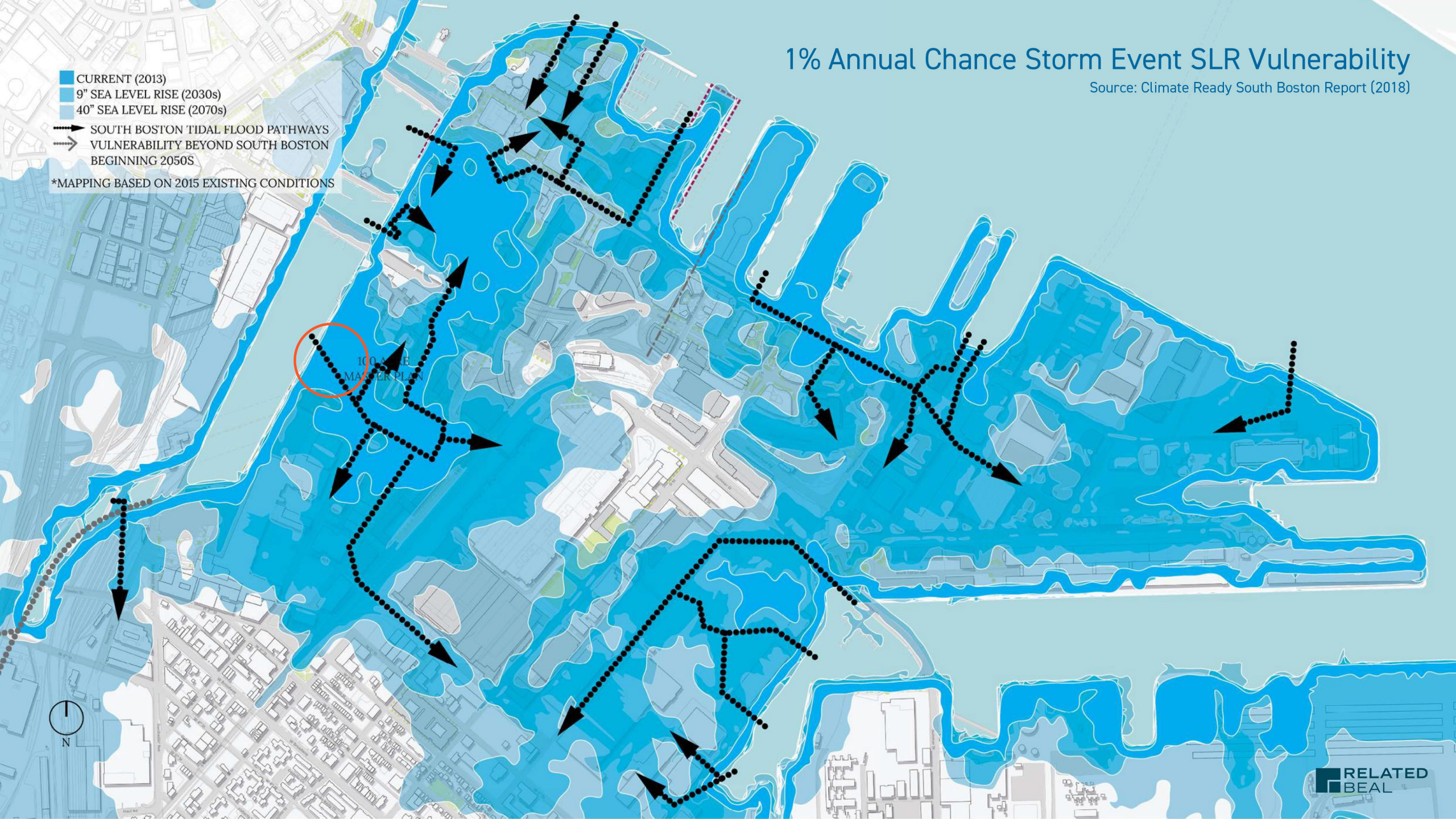
2070 with

40" of Sea Level Rise

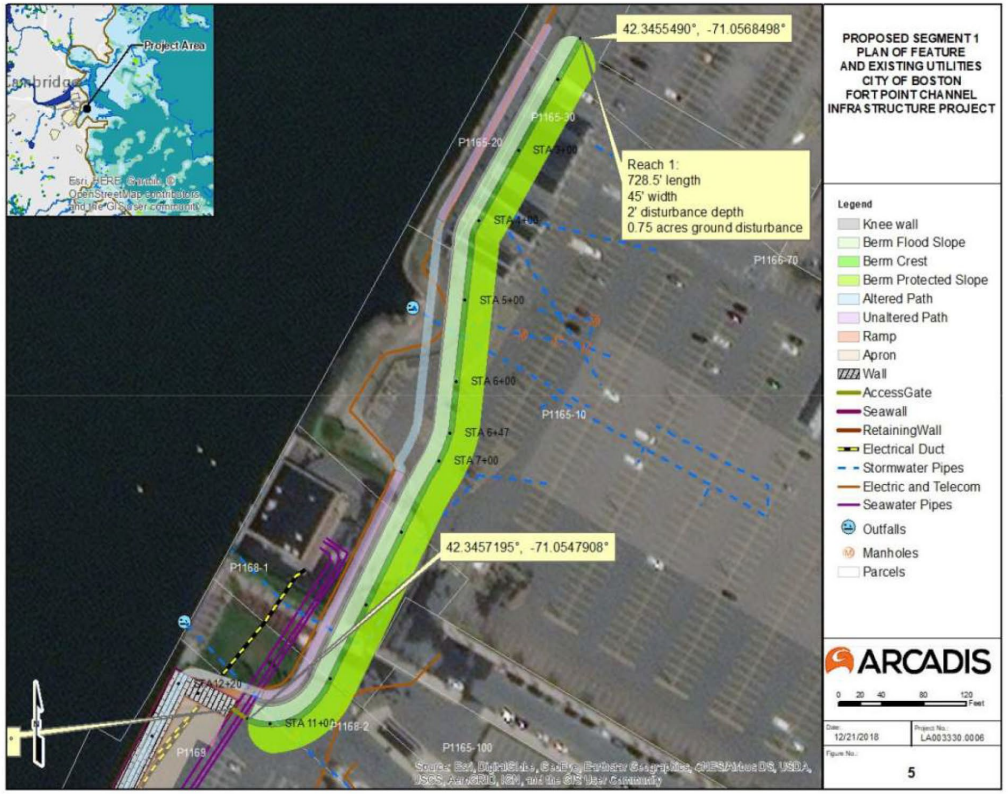
RELATED BEAL

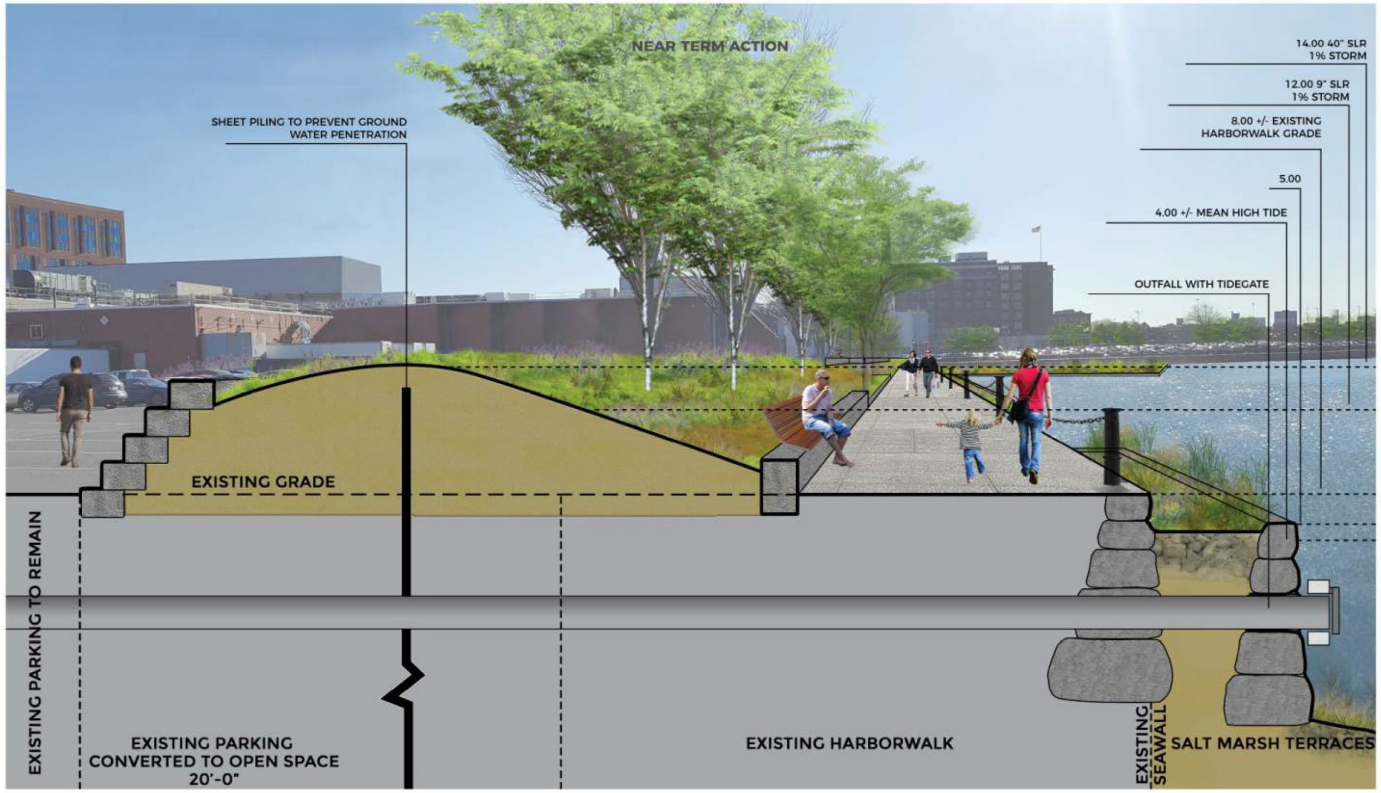
1% Annual Chance Storm Event SLR Vulnerability

Source: Climate Ready South Boston Report (2018)



City of Boston Berm Design





RELATED BEAL

A Resilient & Raised Landform

Raised landform to meet projected 2070 Sea Level Rise Design Flood Elevations while providing an accessible, non-obstructive landscape at a gentle slope with less than 5% rise.

Datums

BCB or Boston City Base = +6.46 feet above NAVD88

+21.5 BCB = +15.04 NAVD88

BPDA SLR-BFE 19.5 FT BCB

BPDA SLR-DFE 20.5 FT BCB Non-Residential

BPDA SLR-DFE 21.5 FT BCB Residential

- Project line of protection above grade (exposed)
- Project line of protection below grade
- Line of protection above grade (exposed) by others
- Line of protection below grade by others
- Project Elevated Core & Critical Infrastructure (BCB +21.50)

Channelside Site Plan


A Street Plaza Entrance
RELATED BEAL

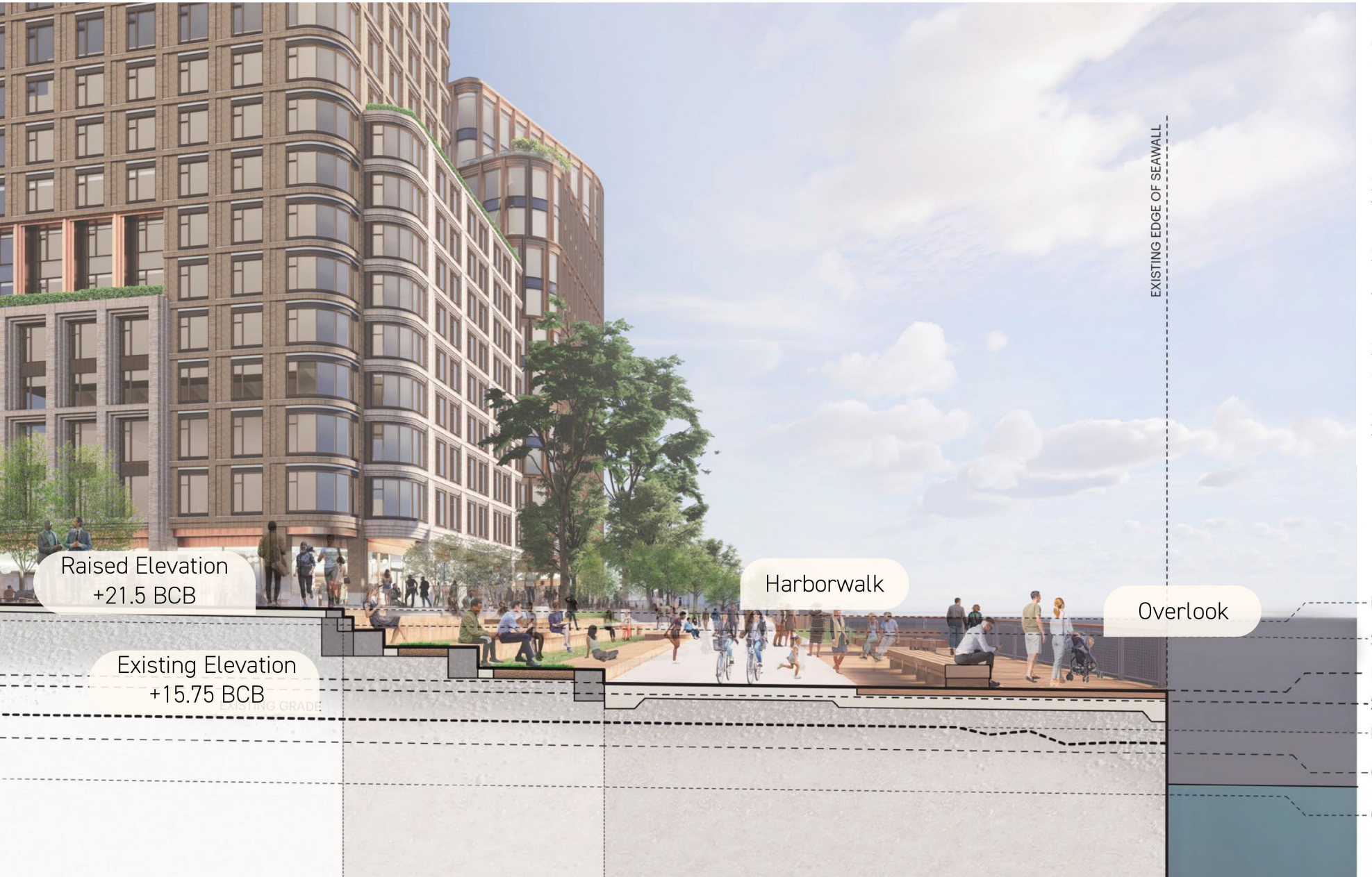

Necco Street Park
RELATED
BEAL

Amphitheater & Harborwalk

RELATED BEAL

Amphitheater, Harborwalk & Overlook

Proposed Design at Harborwalk



Information on Tides (Based on NOAA Buoy at mouth of Fort Point Channel)

Highest tides occur once a month on a new or full moon

2021 Monthly high tides range from 11.56 to 13.16 BCB

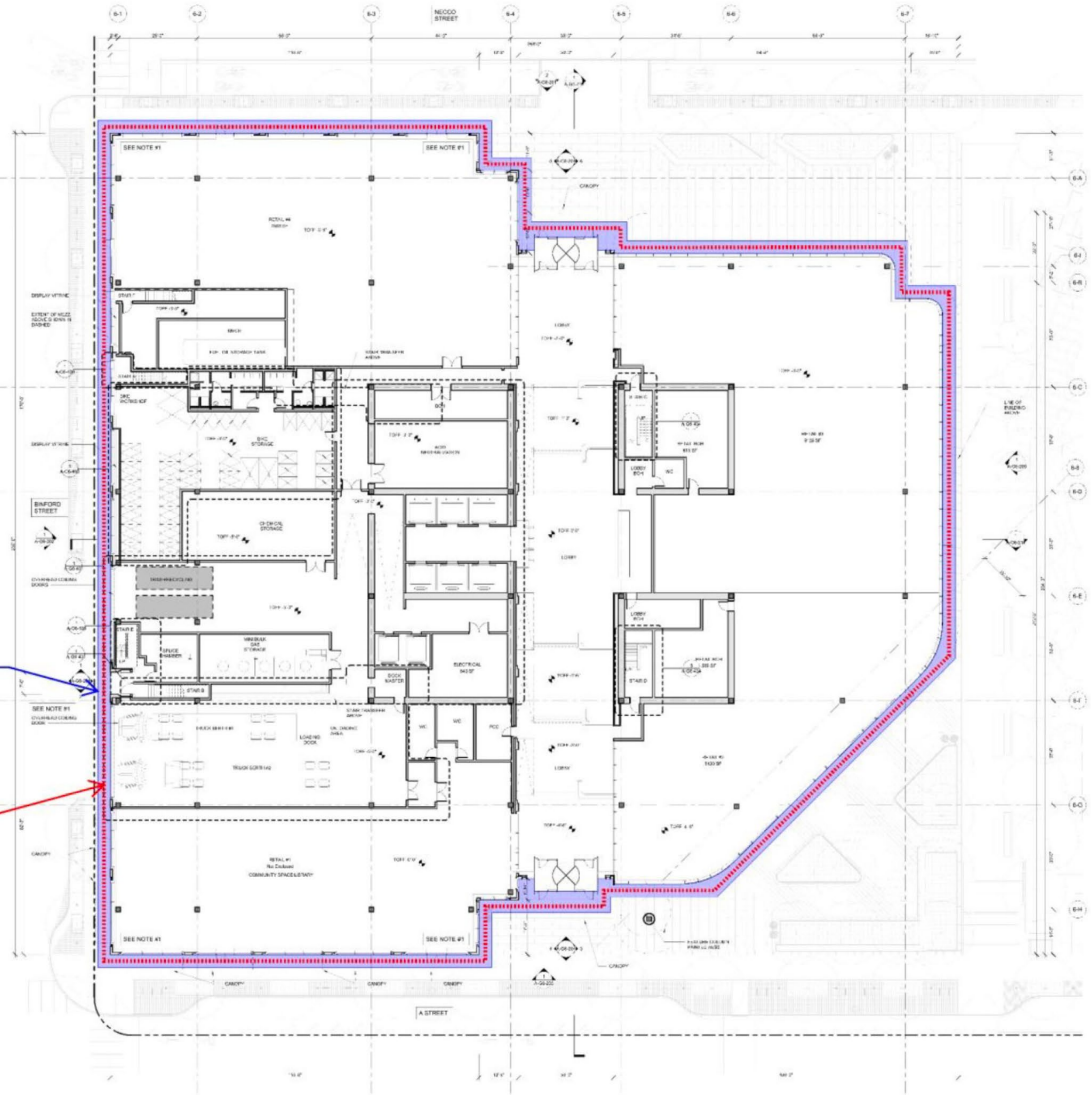
2021 Highest tide of all the monthly high tides (Highest Astronomical TIde) 13.38 BCB

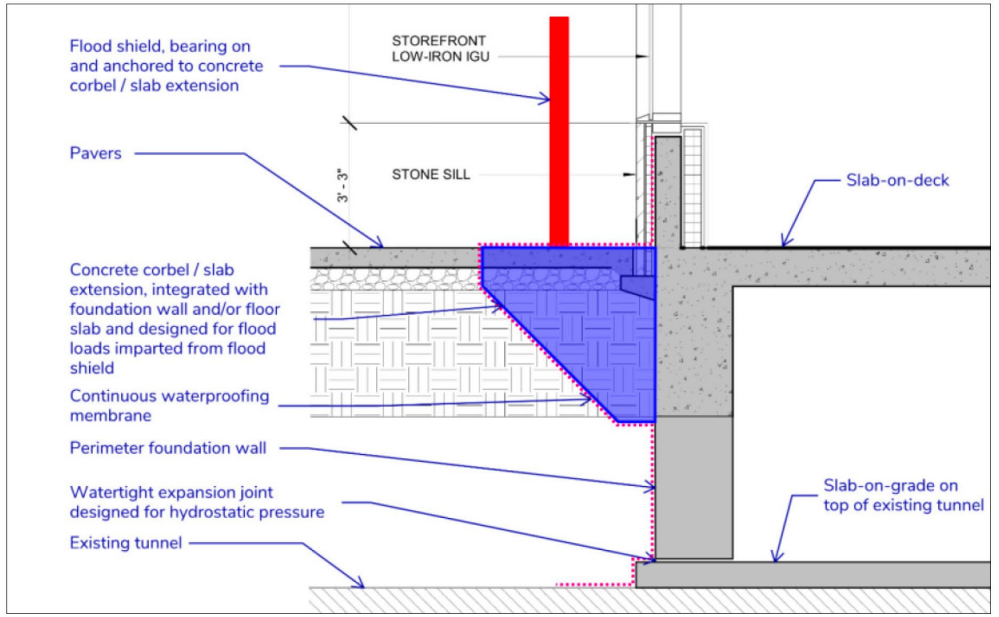
2070 Sea Level Rise projections are 3.3'

2070 projected Highest Astronomical Tide 16.71 BCB

RELATED BEAL

Dry Floodproofing Deployables to Meet SLR-DFE





RELATED BEAL

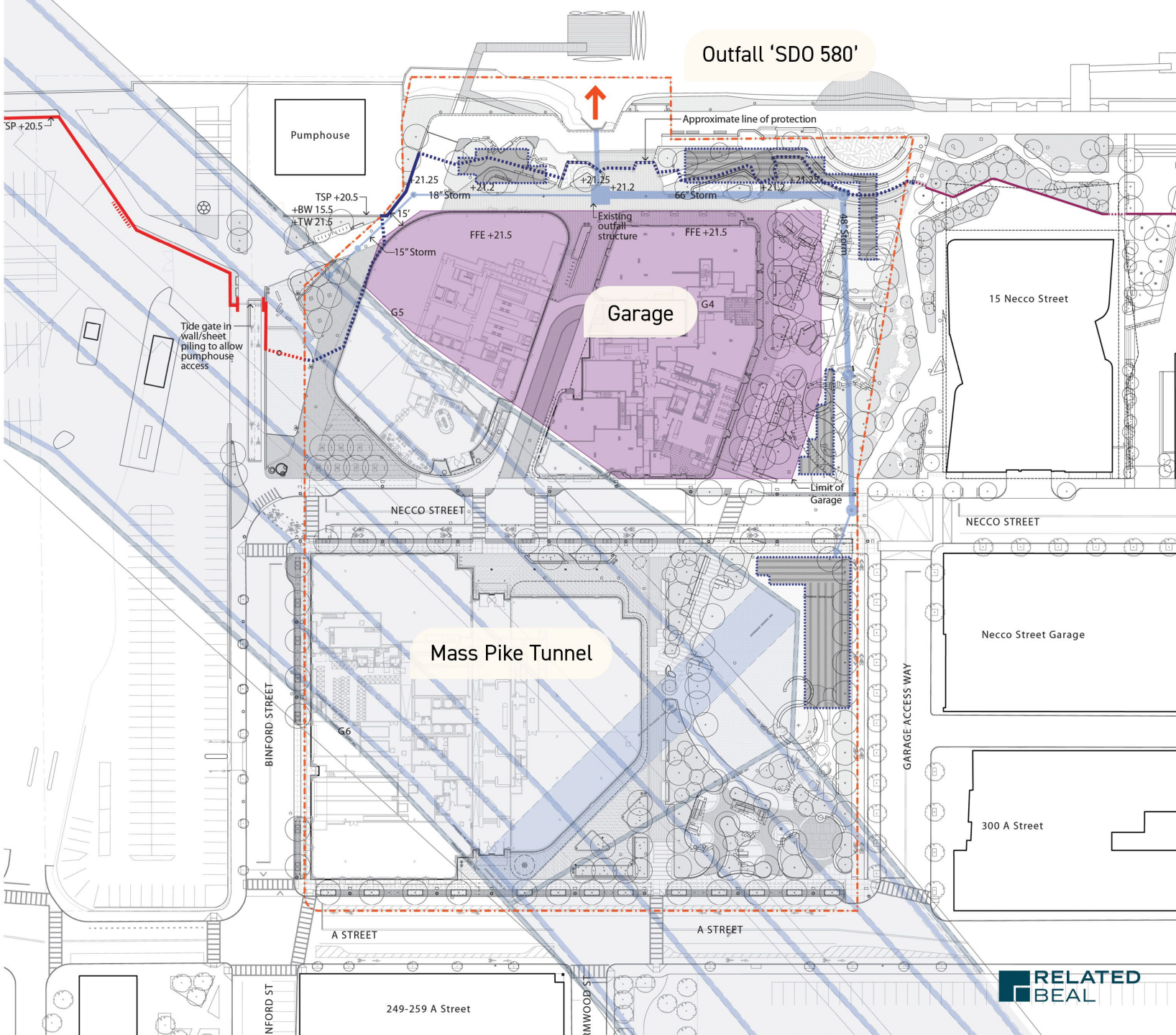
Storm Water Management

Significant reduction in storm water volume on site with ground water recharge systems that fulfill Article 32 Groundwater Conservation Overlay District (GCOD) requirements

93%
Reduction in discharge volume from the site

202k
Existing Site
Gallons of water discharged to the Fort Point Channel in a typical design storm (1.25")

14k
Improved Site
Gallons of water discharged to the Fort Point Channel in a typical design storm (1.25")



Tree Plan & Landscape Design

New landscape, lawns, and trees offer respite from heat island effect and significantly increased permeability

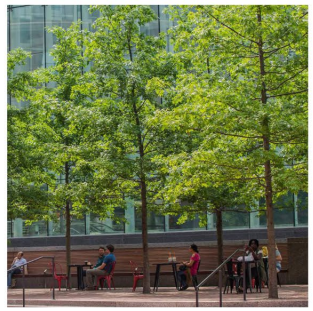
190+
New Trees added to the
Boston Tree Canopy

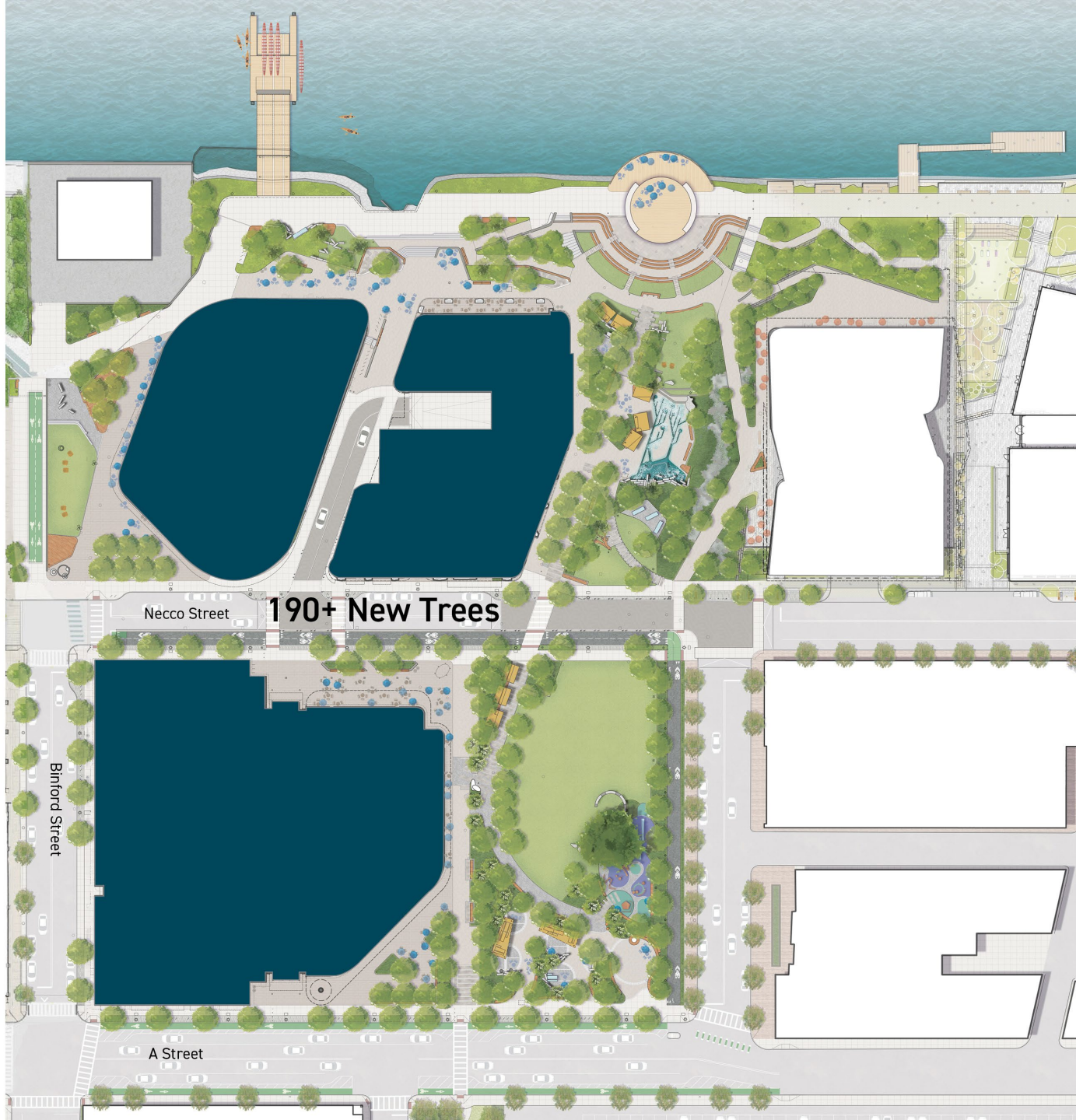
Potential Shade Trees Species

- Elm
- Ginkgo
- Honeylocust
- Red Maple & Red/Silver Maple
- Oaks (Swamp, White, Pin)
- Sweetgum
- Tuliptree
- Multi-Stem Birch

Potential Understory Tree Species

- Dogwood
- Hawthorn
- Serviceberry
- Witchhazel
- Hornbeam






Learn More
www.channelsideboston.com
www.relatedbeal.com
@channelsidebos
CHANNELSIDE
RELATED
BEAL


Q&A


THANK YOU!


A BETTER CITY
BUILT TO LEAD:
LESSONS IN BUILDING RESILIENCE
LEARN MORE HERE