

VISUALIZING HARBORWALK 2.0

DESIGNING A MORE RESILIENT
AND EQUITABLE WATERFRONT FOR
GREATER BOSTON





Unless otherwise noted, photos by Boston Harbor Now.

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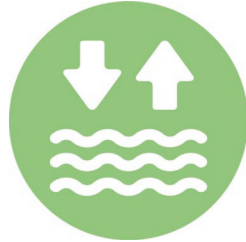
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GOALS OF HARBORWALK 2.0

Boston Harbor Now recognizes that nearly four decades of planning has created an extensive network of waterfront paths and parks on public and private property. In order to address the need for higher standards in the face of the climate crisis and decades of structural inequality, Boston Harbor Now is pushing for a bolder waterfront vision encapsulated by Harborwalk 2.0.

These principles are described in and guide the development of Boston Harbor Now's comment letters. This guide illustrates some of the ways the principles might be realized across a range of coastal conditions. Though written for Boston, these principles can be applied to other urban waterfronts in Massachusetts and beyond.

Harborwalk 2.0 is meant to highlight best practices Boston Harbor Now hopes to see incorporated along the waterfront, which may involve going above and beyond what is currently allowed by the existing regulatory framework. Although some of the coastal adaptation interventions depicted in the following sections are not permissible, we felt it important to show an aspirational vision for the waterfront.



RESILIENCE

The waterfront should be prepared for the impacts of climate change, including coastal and stormwater flooding and heat.



EQUITY

The waterfront should center equity and inclusion in the development of its design, construction practices, tenants, and programming.



ACCESS

The waterfront should be accessible and welcoming, reflected in its activation, connectivity to other waterfront paths and to the city's neighborhoods, and signage.



RESILIENCE

The waterfront should be prepared for the impacts of climate change, including coastal and stormwater flooding and heat.

The waterfront should include a variety of climate adaptation strategies to protect and serve Boston at a district scale.

The waterfront should adapt to address flooding as a result of sea level rise, storm surge, and extreme precipitation.

The waterfront should adapt to predicted rising temperatures, incorporating areas for respite as the number of very hot days continues to increase and to mitigate heat island effects.

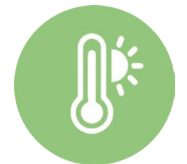
The waterfront should incorporate nature-based approaches and strategies to address the impacts of climate change wherever possible.



Nature-Based Approaches
 -Vegetated Berms
 -Living Seawall
 -Living Shorelines



Flood Mitigation
 -Sea Level Rise
 -Storm Surge
 -Stormwater Management



Heat Mitigation
 -Shade
 -Misters
 -Cooling Areas



EQUITY

The waterfront should center equity and inclusion in the development of its design, construction practices, tenants, and programming.

The waterfront should be designed with strategies that make the waterfront feel safe and inclusive to people with different backgrounds and abilities.

The waterfront should eliminate features that make visitors feel unwelcome or excluded.

The waterfront should offer entertainment and food at a range of price points.

The waterfront should have multilingual signage and ADA accommodations that help users navigate the waterfront.



Women and
Minority Owned
Businesses



Language Access



Affordable
Entertainment



Affordable Food



Accessibility



ACCESS

The waterfront should be accessible and welcoming, reflected in its activation, connectivity to other waterfront paths and to the city's neighborhoods, and signage.

The waterfront should include linear and lateral connections between the city and the water, including walking, biking, and connections to public transit.

The waterfront should have amenities that are clear and abundant, communicated with both wayfinding and interpretive signage.

The waterfront should include numerous activation strategies that invite people to explore and spend time along the harbor.

The waterfront should be visible from inland areas and the design should communicate that it is available and open to visitors.



DYNAMIC FLOOD VULNERABILITY

Boston has 49 miles of coastline with more than 40 miles of existing Harborwalk. Waterfront access is a public amenity, but low lying coastal areas are at risk of flooding. Severe storms, extreme precipitation, and rising sea levels each threaten to inundate these areas and pose different risks.

Harborwalk 2.0 addresses flood vulnerability along the waterfront. Sea level rise raises the regularly occurring cyclical high tides over time. Storm surge pushes water into the harbor and adds wave action along the shore. Increased precipitation adds rain and snow to storm water systems that drain to the harbor but can't always drain at high tide.

*

SPECTRUM OF FLOOD VULNERABILITY			
TIME FRAME	PROJECTED SEA LEVEL RISE (IN)*	10% ANNUAL EXCEEDANCE PROBABILITY** WATER SURFACE ELEVATION (FT, NAVD88***)	1% ANNUAL EXCEEDANCE PROBABILITY** WATER SURFACE ELEVATION (FT, NAVD88***)
2030	14.4" SLR	9.3'	10.7'
2050	28.8" SLR	10.7'	12.3'
2070	50.4" SLR	12.5'	14.0'

Source:
MA Coast Flood Risk Model

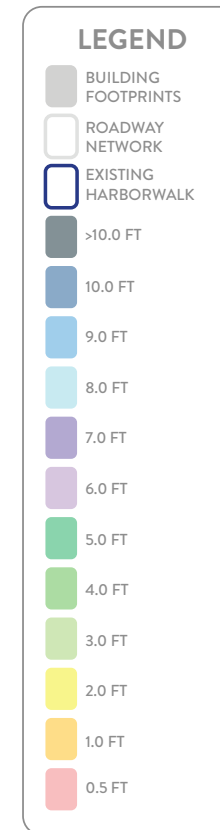
* From 2000 levels.

** Annual Exceedance Probability - probability of flood water inundating the land surface at a particular location.

*** NAVD88 - a vertical elevation datum used across North America.



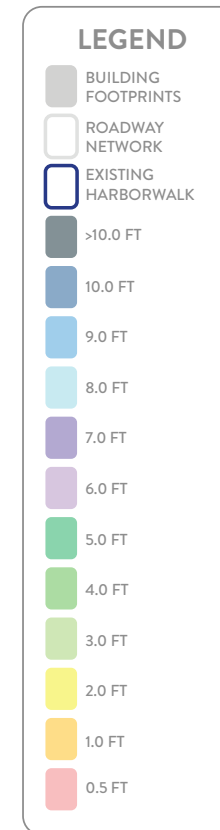
2030 - FLOOD DEPTH FOR 1% ANNUAL COASTAL FLOOD EXCEEDENCE PROBABILITY



Source:
MA Coast Flood Risk Model, May 30, 2023



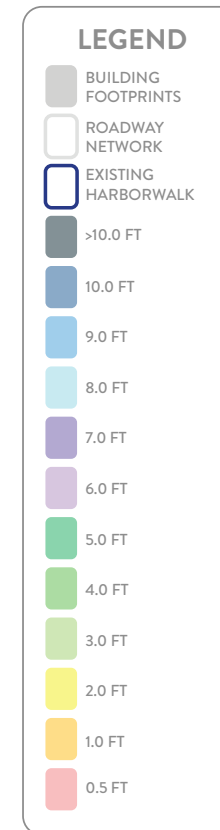
**2050 -
FLOOD DEPTH FOR 1% ANNUAL
COASTAL FLOOD
EXCEEDENCE PROBABILITY**



Source:
MA Coast Flood Risk Model, May 30, 2023



**2070 -
FLOOD DEPTH FOR 1% ANNUAL
COASTAL FLOOD
EXCEEDENCE PROBABILITY**



Source:
MA Coast Flood Risk Model, May 30, 2023

HEAT VULNERABILITY

As a result of a changing climate, the number of days when Boston’s temperatures reach extreme heat levels are projected to increase, amplifying the already existing threats of heat island effect, putting the health of vulnerable populations at risk.

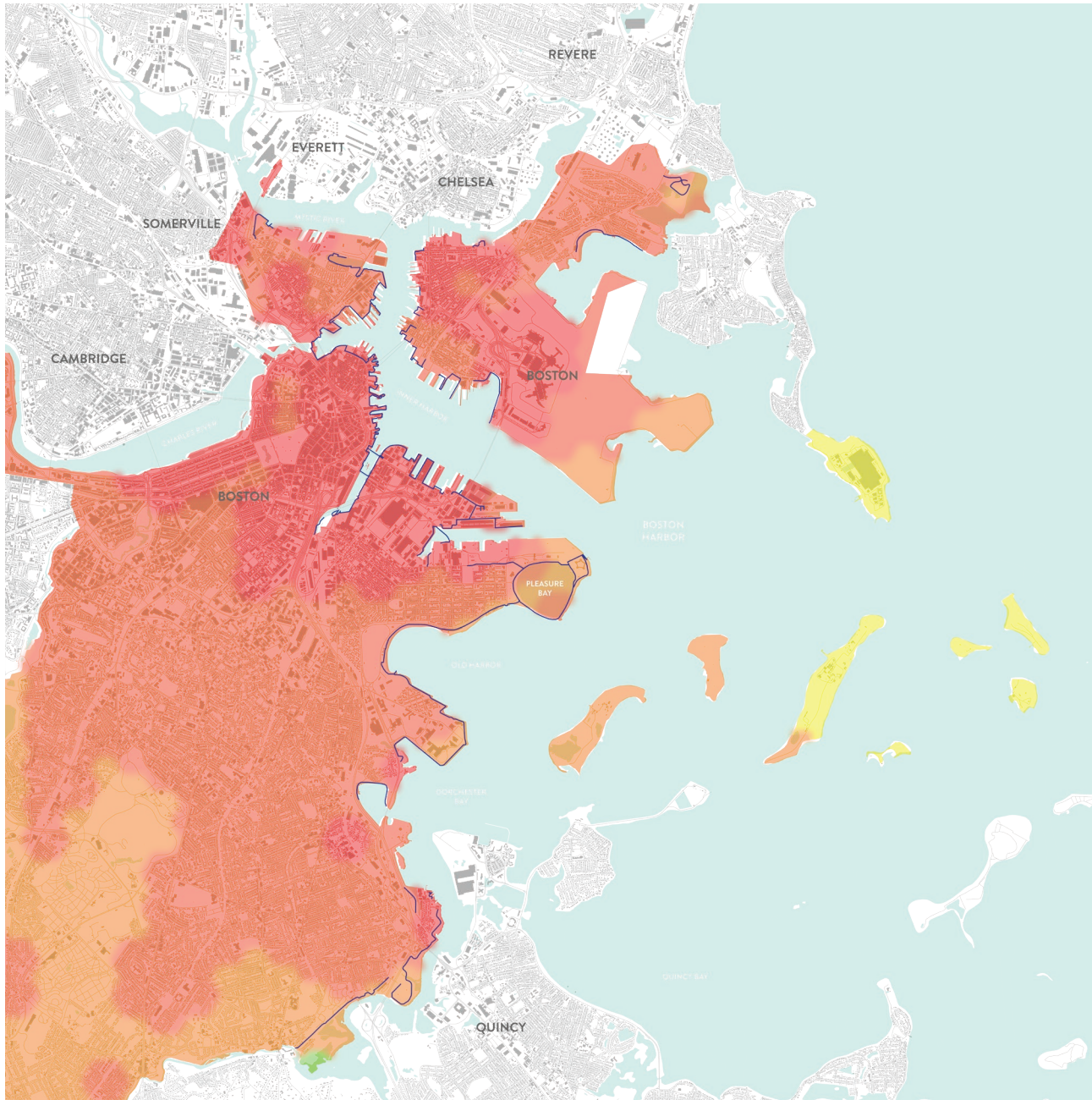
The waterfront can be naturally cooling with breezes off the water as well as beaches, pools, and splash pads for people to cool down in, but much of the coastline is also paved and lacks shade.

Harborwalk 2.0 addresses heat vulnerability along the waterfront, by recommending new surface materials and permeability, canopy cover, and shade structures.

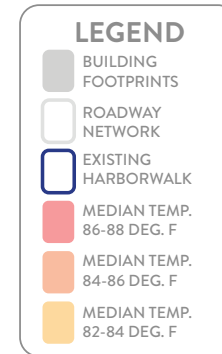
SPECTRUM OF TEMPERATURE VULNERABILITY			
TIME FRAME	AVERAGE SUMMER TEMPERATURES	DAYS ABOVE 90 DEGREES F*	DAYS BELOW 32 DEGREES F *
2030	69 - 73° F	17 TO ~ 26	86 TO ~ 120
2050	70 - 76° F	25 TO ~ 42	68 TO ~ 120
2070	69 - 84° F	33 TO ~ 62	34 TO ~ 120

Source:
 Climate Ready Boston’s “Heat Resilience Solutions for Boston” (2022)
 Greater Boston Research Advisory Group (GBRAG) Climate Projections Report (2022)

* Projections for emissions scenario RCP 8.5.



2022- MEDIAN DAILY DAYTIME TEMPERATURE



Source:
Climate Ready Boston's "Heat Resilience Solutions for Boston" (2022)

HARBORWALK 2.0 TOOLKIT

How can the Harborwalk 2.0 Toolkit be implemented in three different scenarios?

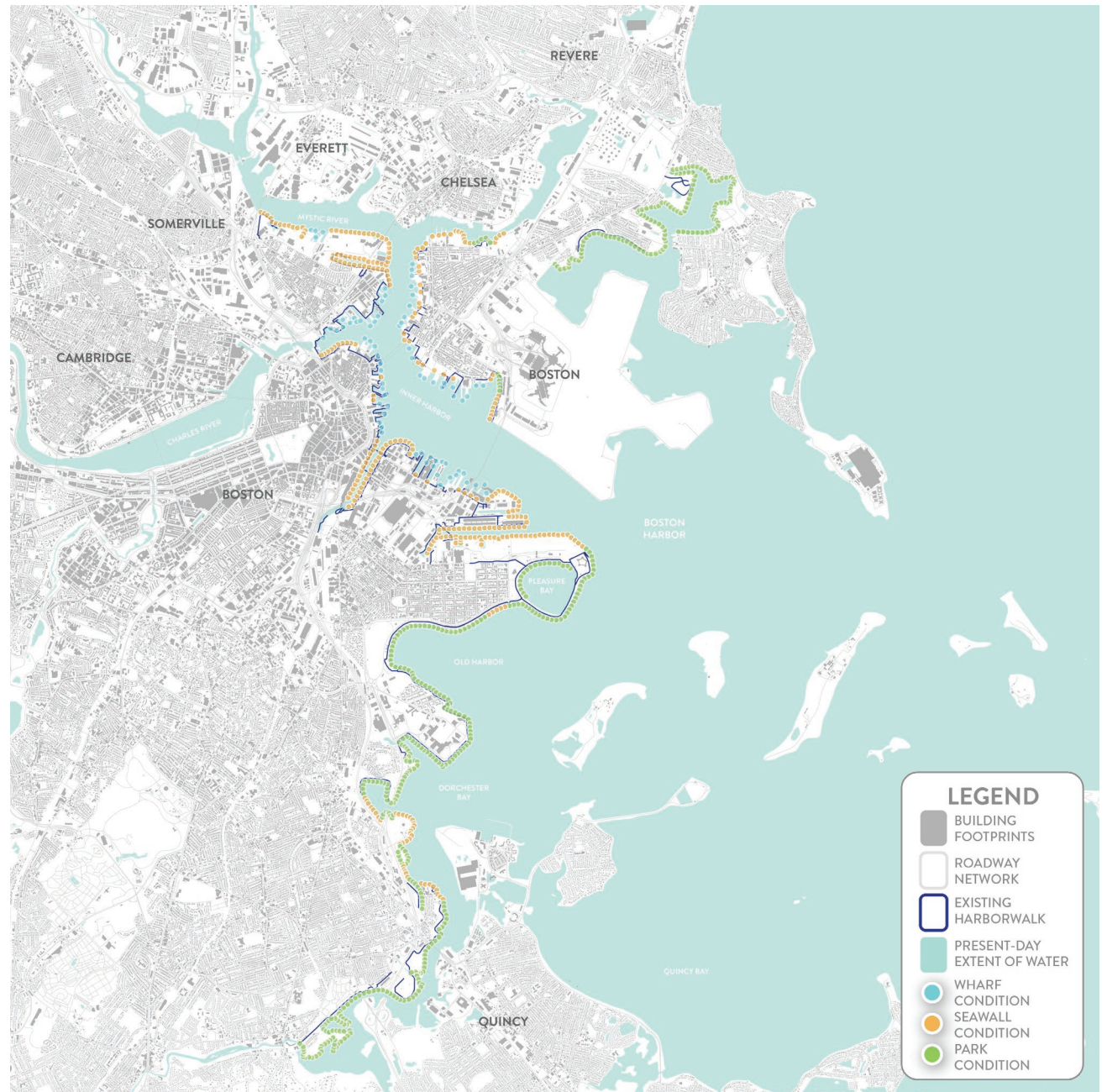
The following visualizes improvements that can be implemented as part of Harborwalk 2.0 at three commonly found conditions.

Scenario 1:
Wharf Condition

Scenario 2:
Seawall Condition

Scenario 3:
Park Condition

Note that the subsequent cross sections and collages have been created for illustrative purposes. Some elements of the collages have been taken from existing places in Boston, but they are designed to inspire and should not be considered directives for any particular site.



SCENARIO 1 WHARF

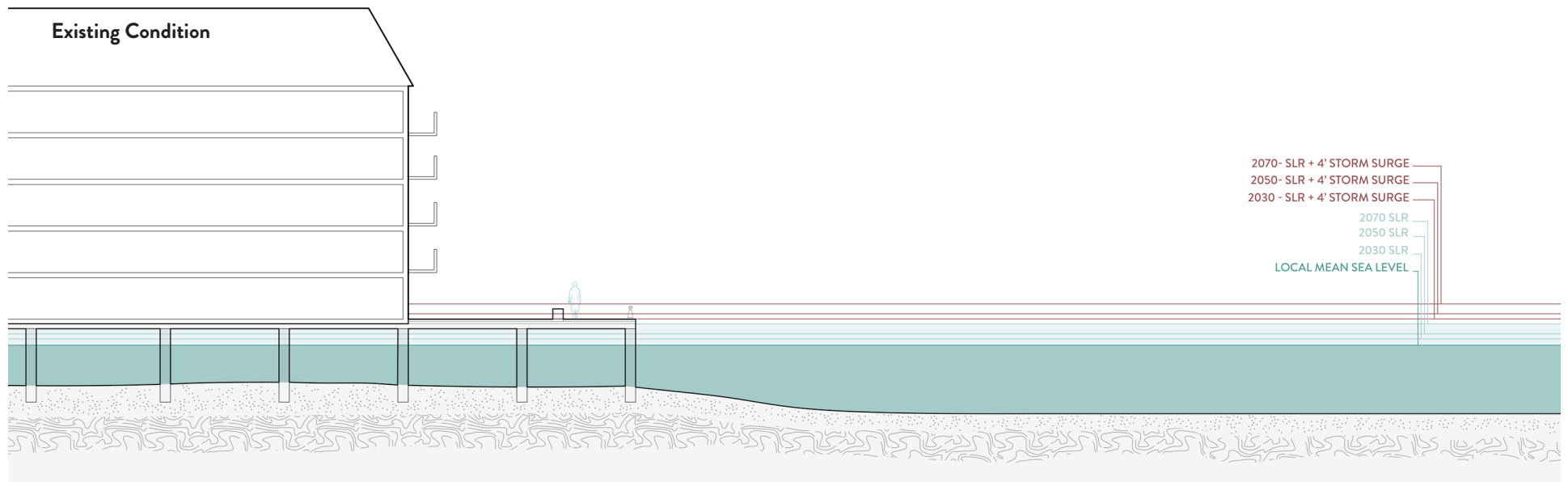
Boston's waterfront first began to change as the early maritime industry built wharves for docking ships and unloading goods and passengers. Even outside of designated port areas, Boston's waterfront still has many wharves projecting into the harbor. Some of them have never been surrounded by sea walls, while others still have water flowing under them as they balance on wood, steel, or concrete pilings. Examples of this condition are visible along Constitution Wharf, Battery Wharf, Constellation Wharf, and Fish Pier among others.

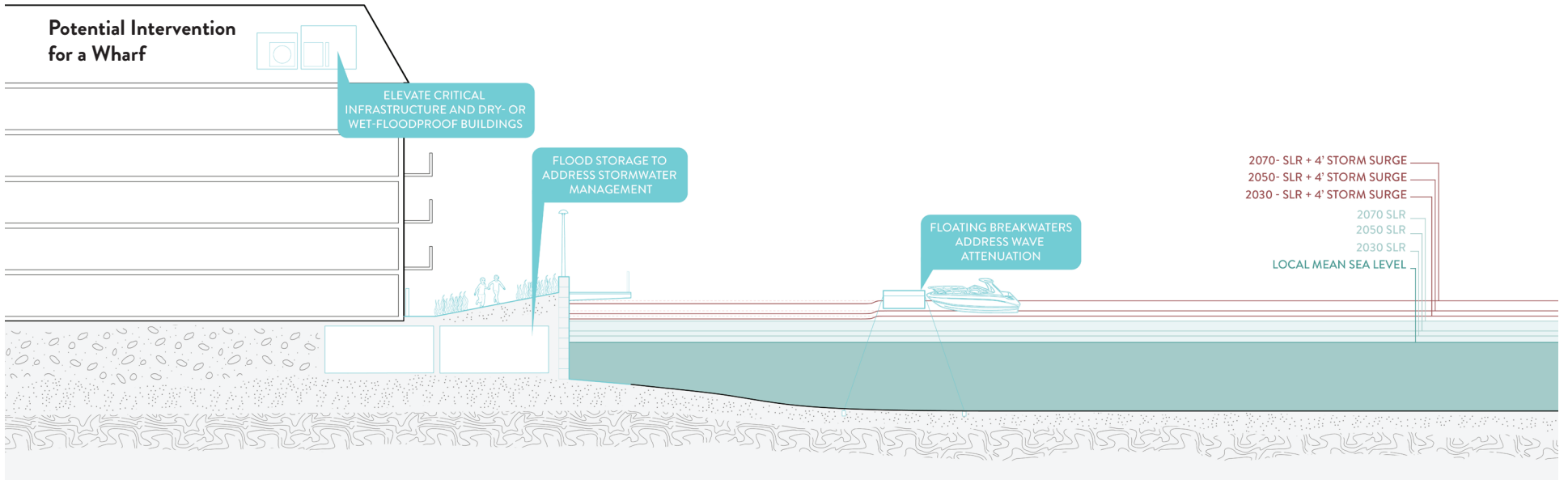
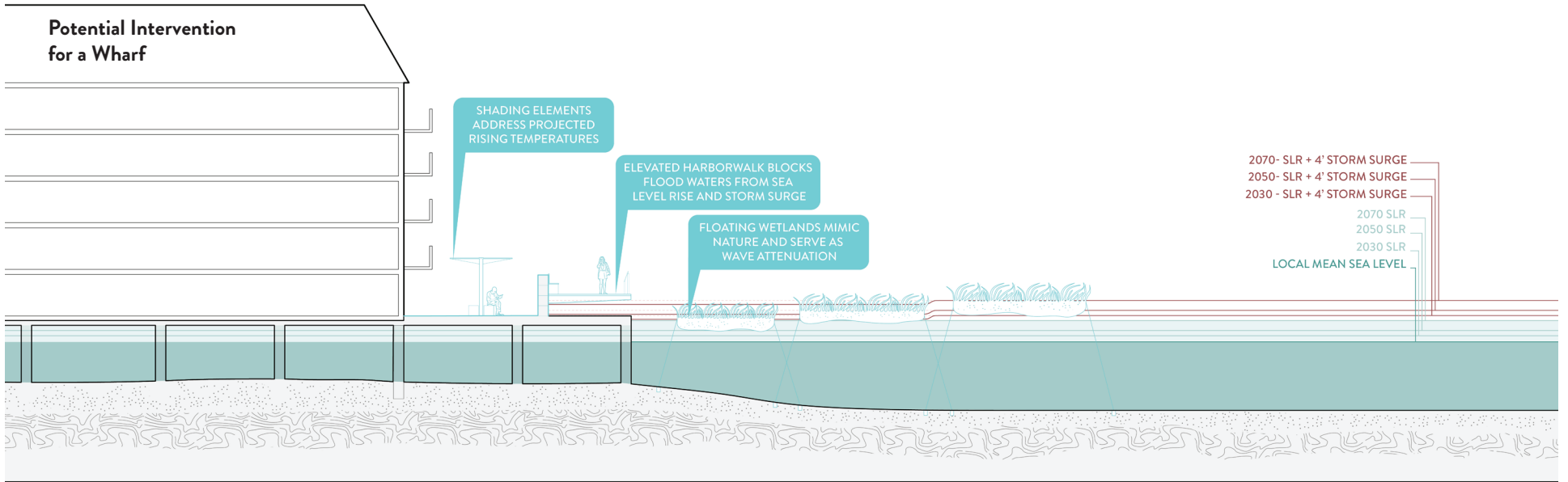
Resilient interventions for wharves include floating wetlands, offshore wave attenuation including floating breakwaters, and elevated harborwalk boardwalks or paths. Floating wetlands and other in-water nature-based approaches offer creative

forms of wave attenuation that Boston Harbor Now hopes will be explored in the future. The grade change may be significant and designs should try not to "wall off" the harbor. Activation of the water sheet may include docks for water transportation or recreational boating, water sculptures, and other floating community uses like a floating performance space. On ground floors and in facilities of public accommodation, there should be food and entertainment options, civic uses like museums, and interpretive signage.

Depending on the location a wharf may be subject to different wind and wave conditions that impact the storm surge elevations. For illustrative purposes, storm surge is shown as 4 feet, the highest current and anticipated level in Boston Harbor. For more information about projected storm surge

around the Boston Harbor, see the [Massachusetts Sea Level Rise and Coastal Flooding Viewer](#).





Ideas for a Wharf

CONNECTIVITY

Incorporate access to public transit and water transportation.

RESILIENCE

Incorporate nature-based approaches to flood and heat risks along the Harborwalk where possible.

LIGHTING

Integrated lighting to improve visibility along the Harborwalk.

PUBLIC USE

Ground floor building uses incorporate public access.

FOOD

Offer food of different types and at a range of prices.

ACTIVATION

Activities along the Harborwalk for a range of ages, abilities, and cultures.

SEATING

Accessible and varied seating options along the Harborwalk.

ACCESS

Improved accessibility for a range of users--pedestrians, wheelchair, strollers, etc.



VISUALIZING HARBORWALK 2.0 BOSTON HARBOR NOW

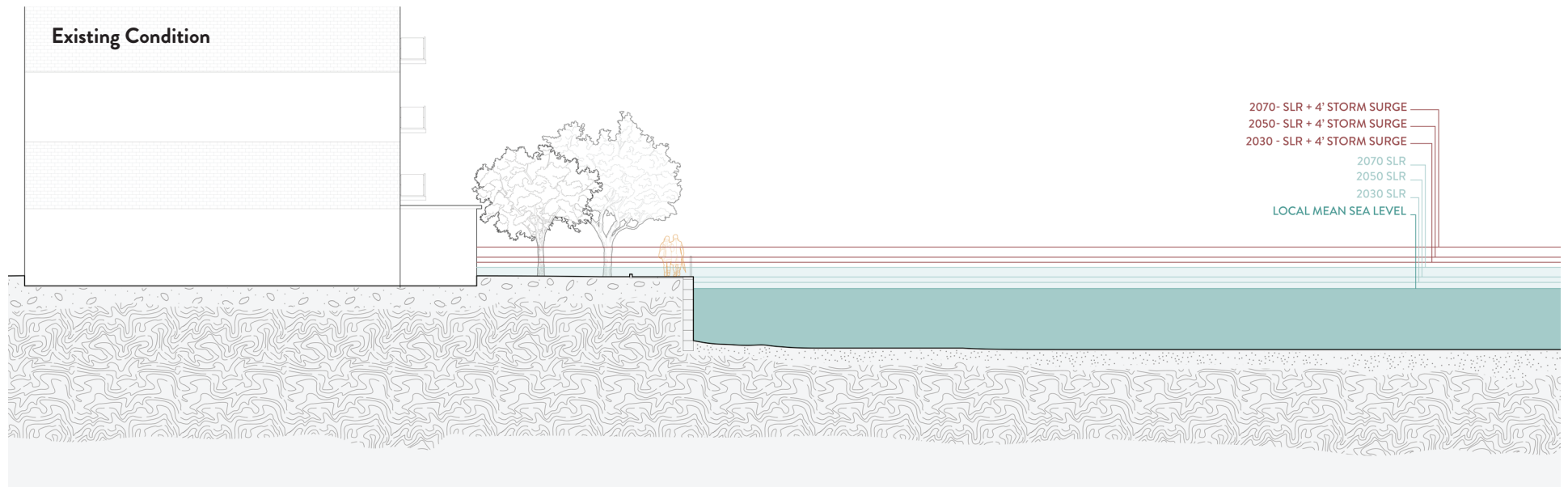
SCENARIO 2 SEAWALL

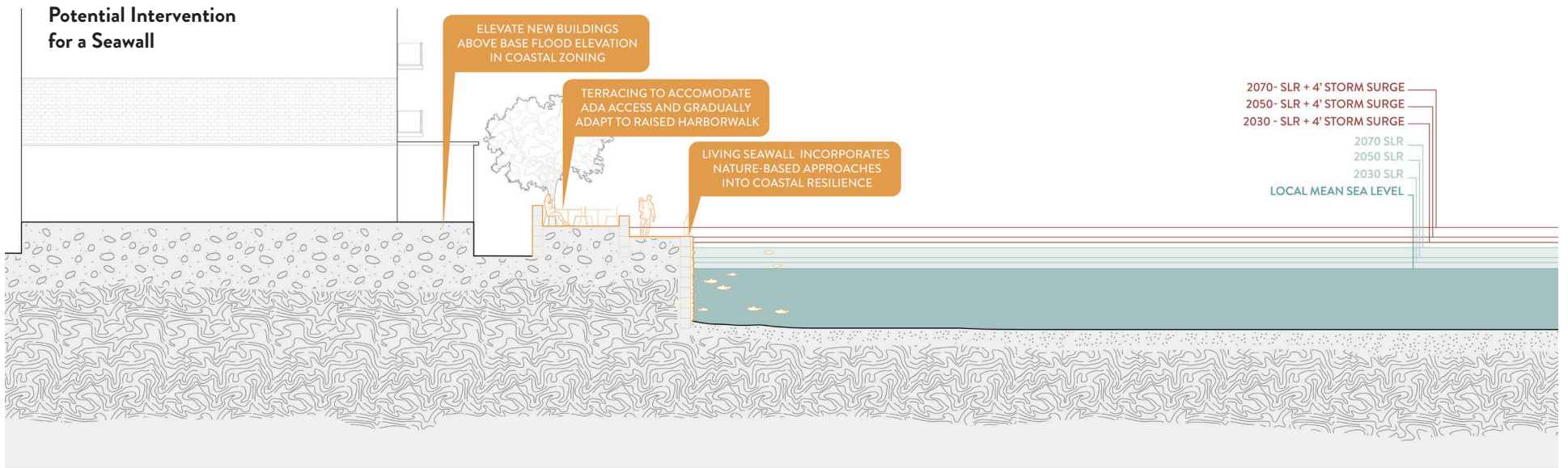
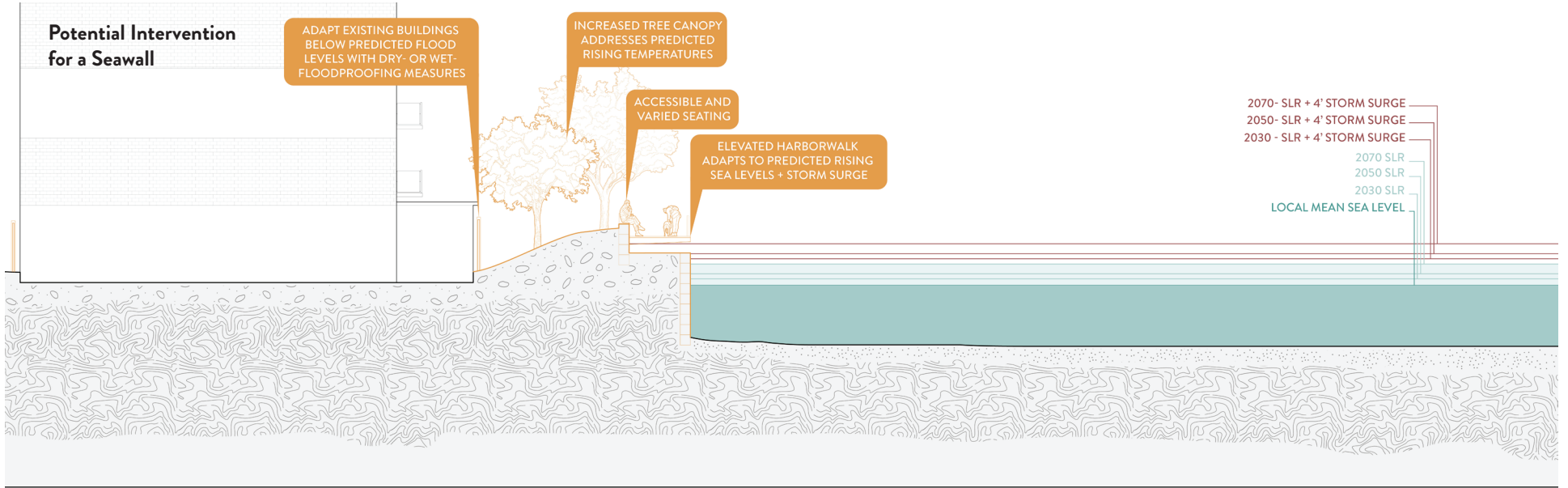
As Boston's waterfront was filled in, seawalls became increasingly prevalent, vertical structures made of stone or concrete provide a fixed edge to the coastline. Most waterfront properties with seawalls offer space between the water's edge and the building, allowing for improvements in the public realm to make the waterfront more welcoming and more resilient. Examples of this condition are visible along the Fort Point Channel, Christopher Columbus Park, Chelsea Creek, and Fan Pier, among others.

Resilience interventions for areas with seawalls may include higher walls or a terraced approach. The wall can be treated with surfaces that invite aquatic ecosystems to thrive. Activation of the Harborwalk might look like expanded seating options, additional signage, shade and indoor facilities

that support visitation to the waterfront. Nearby buildings should provide affordable entertainment and food options, like a coffee shop, as well as public restrooms.

Depending on the location a seawall may be subject to different wind and wave conditions that impact the storm surge elevations. For illustrative purposes, storm surge is shown as 4 feet, the highest current and anticipated level in Boston Harbor. For more information about projected storm surge around the Boston Harbor, see the [Massachusetts Sea Level Rise and Coastal Flooding Viewer](#).





Ideas for a Seawall

FOOD

Offer outdoor seating to activate the waterfront. Don't require a purchase to use tables.

SIGNAGE

Clear and continuous signage along the Harborwalk helps with wayfinding and explains public rights.

VEGETATION

Incorporate native, salt-tolerant, and flood-tolerant plantings along the Harborwalk to foster biodiversity, and plant trees for shade.

RESILIENCE

Terraced levels provide flood protection for inland areas.

SEATING

Expanded availability and types of seating along the Harborwalk. Embed seating in resilience infrastructure.

ACTIVATION

Activities along the Harborwalk for a range of ages, abilities, and cultures.

ACCESS

Improved accessibility for a range of users—pedestrians, wheelchair, strollers, etc.



VISUALIZING HARBORWALK 2.0 BOSTON HARBOR NOW

SCENARIO 3 PARK

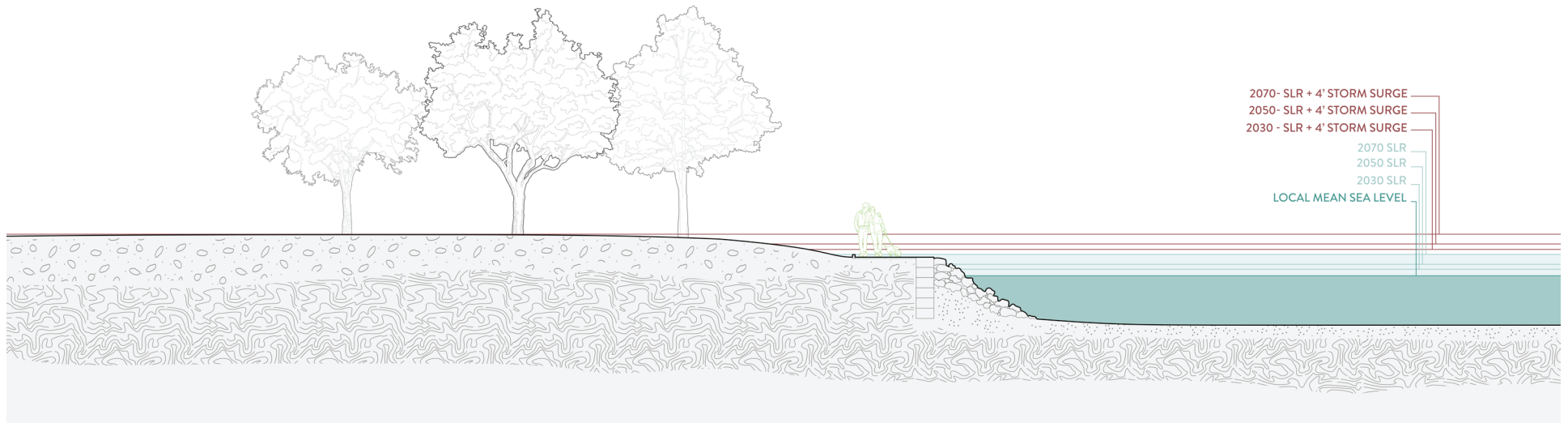
The Boston waterfront in parts of East Boston and much of Dorchester is owned by the Massachusetts Department of Conservation and Recreation (DCR) and is in a more natural condition with a combination of beaches and marshes as well as sloped rocky shorelines. With more room to develop adaptation strategies, implement nature-based approaches, and offer inclusive waterfront access, parks offer the greatest opportunity to create a multi benefit waterfront with “Harborwalk 2.0.” Some of these strategies are also applicable to the Boston Harbor Islands. Examples of this condition are visible along Castle Island, Carson Beach, Constitution Beach, and Pope John Paul II Park.

Resilience interventions in parks (both DCR parks and other publicly owned waterfronts) may include nature-

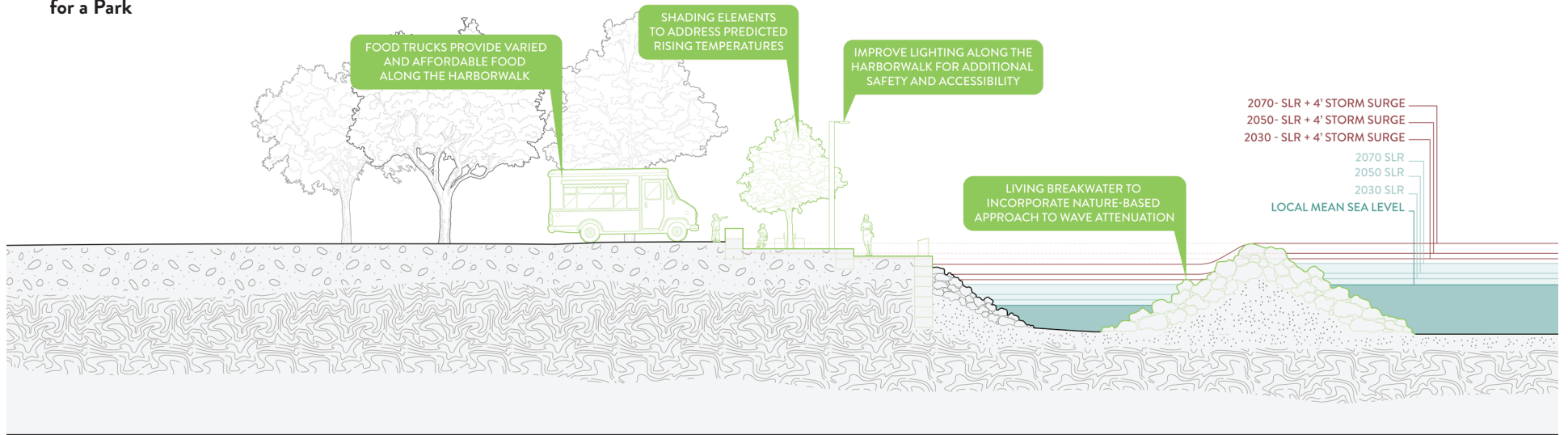
based approaches, like vegetated berms or integrated living breakwaters. Living breakwaters and other in-water nature-based approaches offer creative forms of wave attenuation that Boston Harbor Now hopes will be explored in the future. If elevation for flood protection is placed further inland, an alternative higher elevated Harborwalk path should be provided. Parks along the waterfront should include shading elements, like trees as well as gazebos and other structures that support community gatherings. Parks should also feature recreational and social infrastructure that supports the desire of diverse communities with a range of athletic uses, grills and picnic tables, and space to relax and enjoy the views of the water. Waterfront path lighting is especially important in winter months in areas without buildings.

Depending on the location a park may be subject to different wind and wave conditions that impact the storm surge elevations. For illustrative purposes, storm surge is shown as 4 feet, the highest current and anticipated level in Boston Harbor. For more information about projected storm surge around the Boston Harbor, see the [Massachusetts Sea Level Rise and Coastal Flooding Viewer](#).

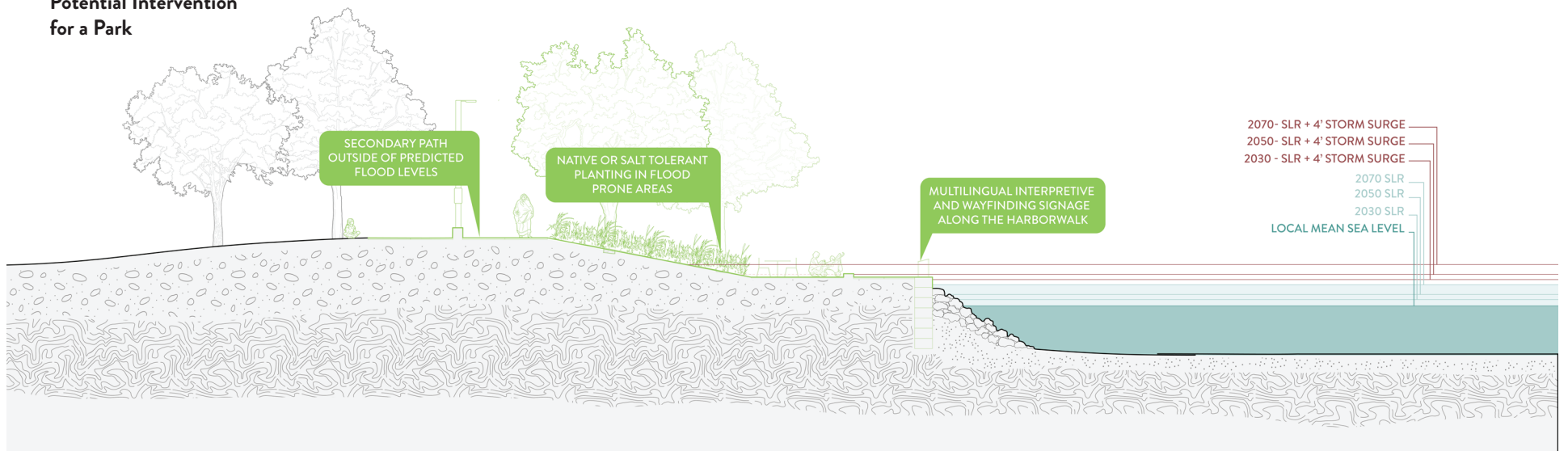
Existing Condition



**Potential Intervention
for a Park**



**Potential Intervention
for a Park**



Ideas for a Park

LIGHTING

Integrated lighting to improve visibility along the Harborwalk.

FOOD

Offer food in parks with food trucks or make outdoor cooking easier to permit.

SEATING

Expanded availability and types of seating along the Harborwalk.

ACCESS

Improved accessibility for all users—pedestrians, wheelchair, strollers, etc.

SIGNAGE

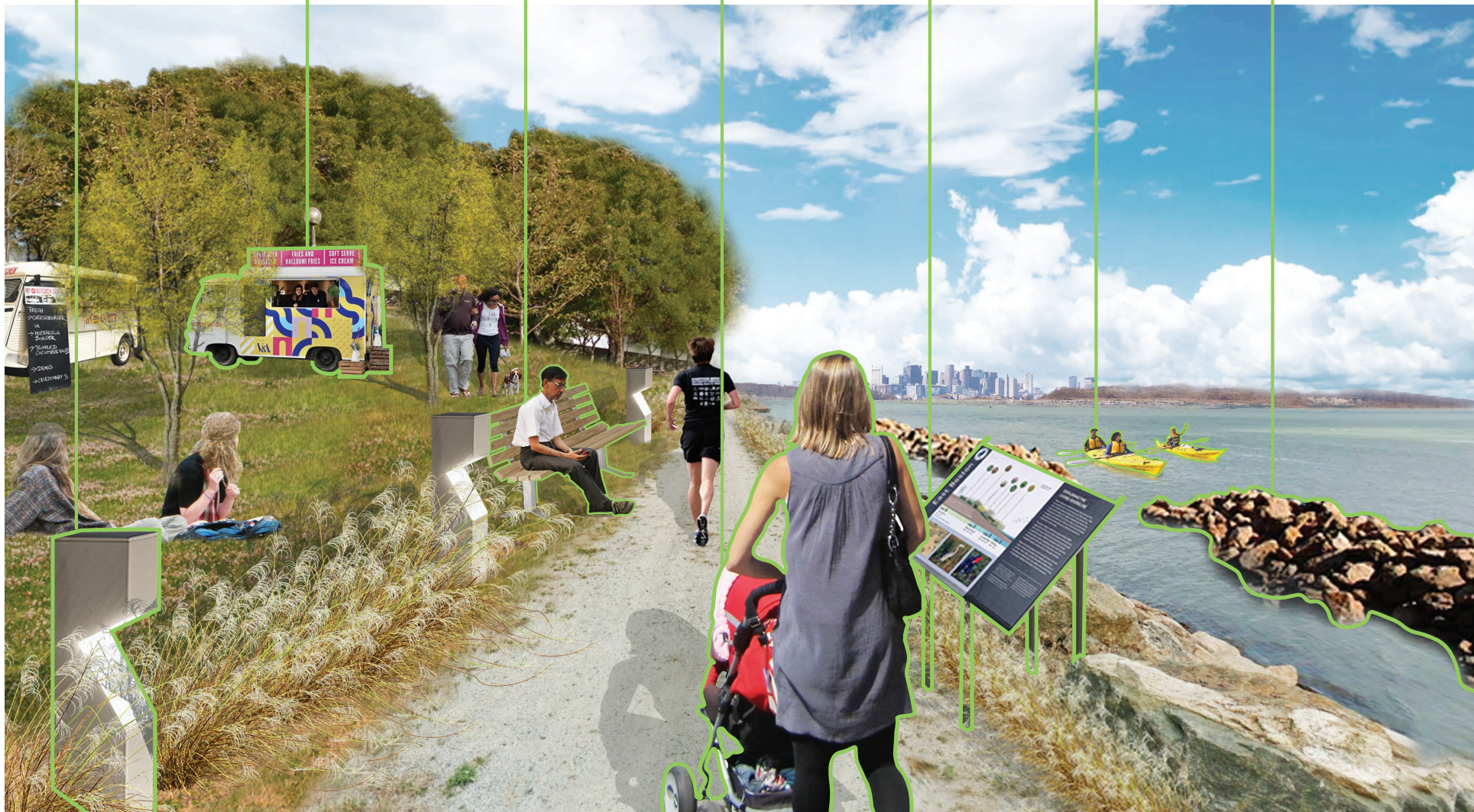
Interpretive signage along the Harborwalk, in multiple languages.

ACTIVATION

Access to boat launches and boat rentals along the shoreline.

RESILIENCE

Incorporate nature-based approaches to flood risks along the waterfront where possible.



REFERENCES

Reports

Climate Ready Boston Report, 2016

Climate Resilient Design Standards & Guidelines, 2018

Coastal Resilience Solutions Plans for East Boston, Charlestown, South Boston, Dorchester, and Downtown/North End, 2017-2022

Heat Resilience Solutions For Boston, 2022

Wharf District Council Climate Resilience Plan, 2023

GIS Data

Climate Ready Boston Map Explorer

MassGIS Data

Massachusetts Coast Flood Risk Model (MC-FRM)

