

SAUNDERS ARENA

21" SLR + 1% STORM

ADVENTURE PLAY

OLD HARBOR OVERLOOK

40" SLR + 1% STORM

COASTAL FLOOD ALIGNMENT

MULTIUSE FIELDS

BABE RUTH FIELD

# Moakley Park: iterative engineering for a climate-resilient waterfront

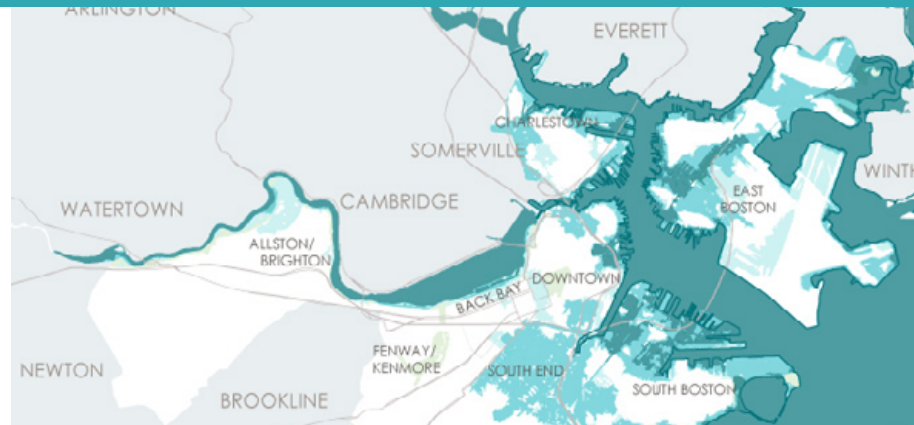
STOSS

Weston & Sampson

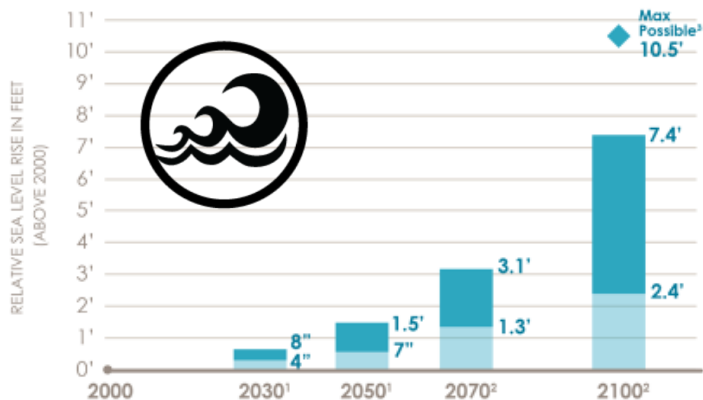


City of Boston  
Parks and Recreation  
Mayor Michelle Wu

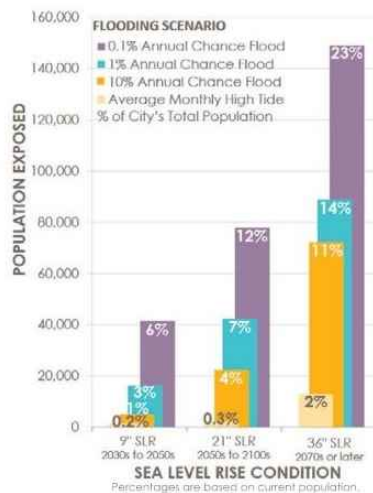
# SEA LEVEL RISE AND RISK IN BOSTON (2016)



SEA LEVELS IN BOSTON WILL CONTINUE TO RISE



CITYWIDE POPULATION EXPOSED



Boston is the world's **8<sup>th</sup>** most vulnerable city to financial loss from sea level rise, and **4<sup>th</sup>** in the US.



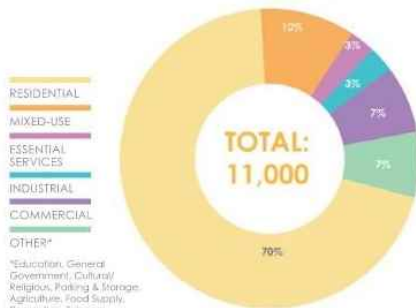


# EXTREME PRECIPITATION AND RISK IN BOSTON (2016)

Today's 100-year storm will be comparable to 2070's 25-year storm

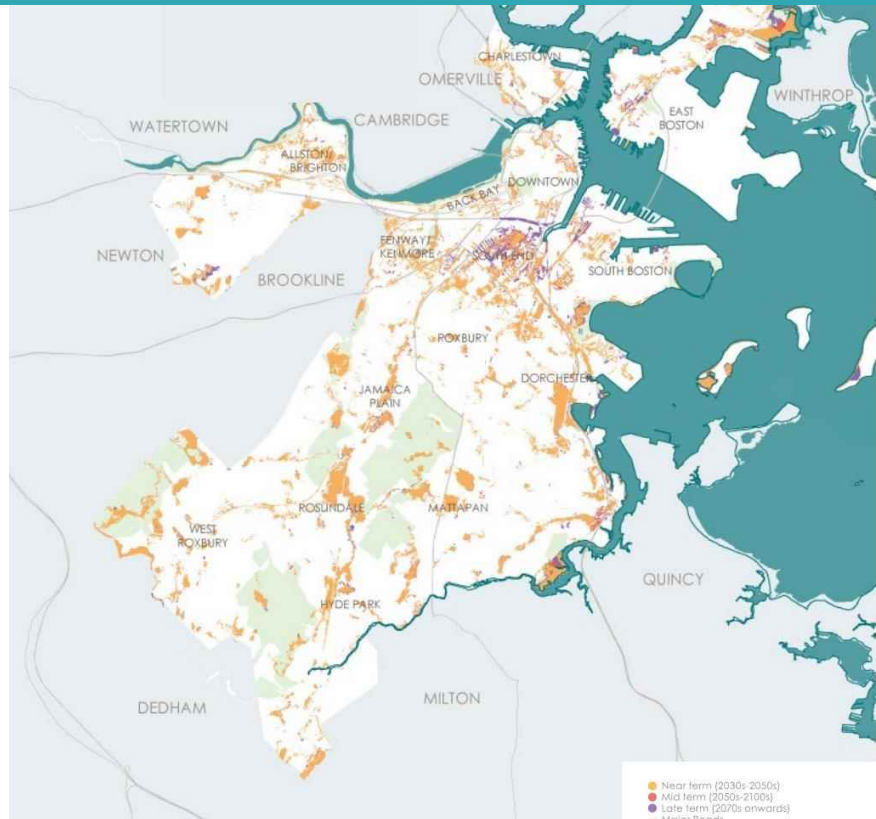
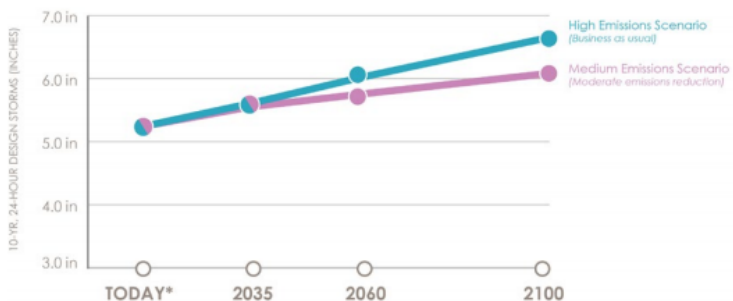
Today's 25-year storm will be comparable to 2070's 10-year storm

**BUILDINGS EXPOSED TO FREQUENT STORMWATER FLOODING TYPE (2070S-2100S)**



\*Education, General Government, Cultural/Religious, Parking & Storage, Agriculture, Food Supply, Recreational, Telecom, Transport, & Utilities

**RAINFALL FROM STORMS WILL INCREASE**



● Near term (2030s-2050s)  
● Mid term (2050s-2100s)  
● Late term (2070s onwards)  
— Major Roads

**Without improvements to the stormwater system, over 11,000 structures and 85,000 people will be directly exposed to frequent stormwater flooding as soon as the 2070s.<sup>4</sup>**

**STORMWATER FLOODING FROM 10-YEAR, 24-HOUR STORM WITH VARYING CLIMATE CONDITIONS**

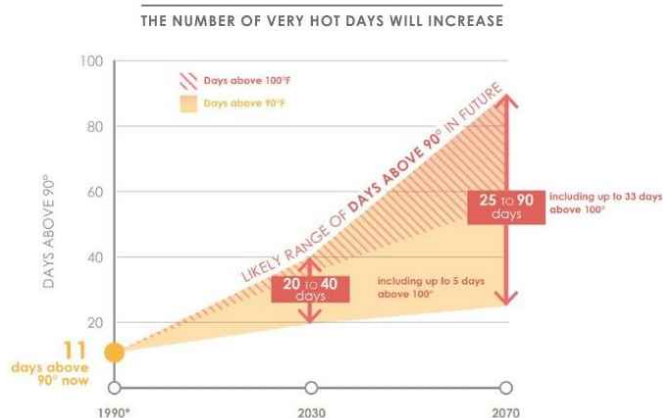
\* "Today" baseline represents historical average from 1948-2012. Confidence intervals are not available for these projections but are likely large, so these numbers should be considered as the middle of a large range.

Data Source: Boston Water & Sewer Commission

<sup>4</sup> Current building stock and population in areas expected to be exposed. The building stock and population have not been projected.

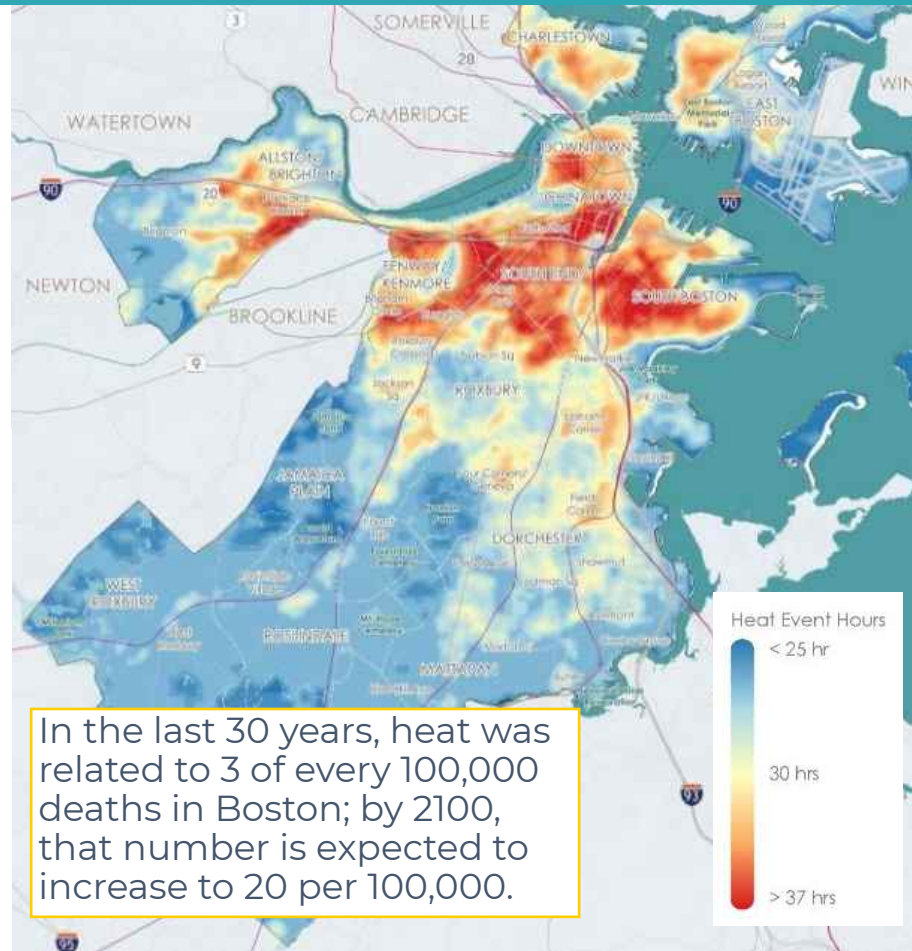
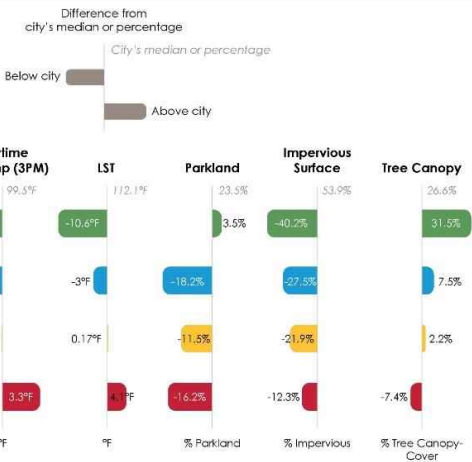


# EXTREME HEAT AND RISK IN BOSTON (2016 & 2021)



## Redlining Analysis

Neighborhoods deemed "Best" in 1938 have cooler summer air temperatures (nighttime and daytime), more parkland, less impervious surfaces, and more tree canopy today compared to neighborhoods that received lower gradings.



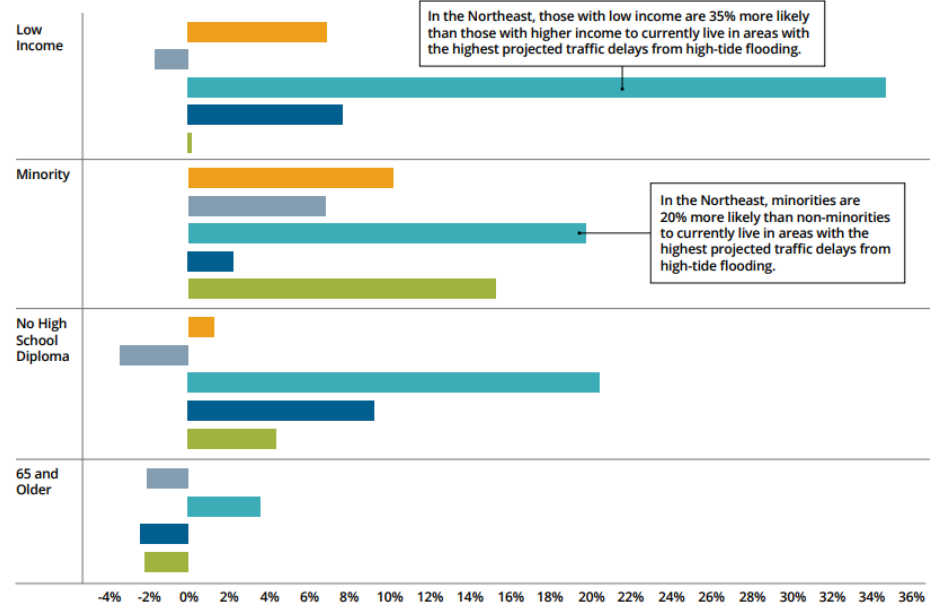
In the last 30 years, heat was related to 3 of every 100,000 deaths in Boston; by 2100, that number is expected to increase to 20 per 100,000.



# Climate change affects us all, but disproportionately impacts underserved, vulnerable, and marginalized communities



Figure 10.6 – Differences in Risks to Socially Vulnerable Groups in the Northeast Relative to Reference Populations with 2°C of Global Warming or 50 cm of Global Sea Level Rise



**AIR QUALITY AND HEALTH\***

New asthma diagnoses in children due to particulate air pollution.



**EXTREME TEMPERATURE AND LABOR**

Lost labor hours for weather-exposed workers.



**COASTAL FLOODING AND TRAFFIC**

Traffic delays from high-tide flooding.



**COASTAL FLOODING AND PROPERTY**

Property inundation due to sea level rise.



**INLAND FLOODING AND PROPERTY**

Property damage or loss due to inland flooding.

\*Impacts not estimated for 65 and Older.

<https://www.epa.gov/newsreleases/epa-report-shows-disproportionate-impacts-climate-change-socially-vulnerable>

# WITH 40" OF SEA LEVEL RISE, RESIDENTS AND INFRASTRUCTURE ARE SIGNIFICANTLY IMPACTED IN A 1% STORM EVENT (~2070)





# 2018 RESILIENT HARBOR VISION



LIENT BOSTON HARBOR · SOUTH BOSTON

- FLOOD ADAPTED BUILDINGS
- ELEVATED LANDSCAPES
- CONNECTIONS AND ACCESS



# MOAKLEY PARK IS: ONE OF BOSTON'S LARGEST PARKS



THE  
ESPLANADE

BOSTON  
COMMON

BACK BAY  
FENS

MOAKLEY  
PARK

JAMAICA  
POND

FRANKLIN  
PARK





- Minority
- Income
- Minority + Income
- Minority + English Isolation
- Minority, Income + English Isolation

MOAKLEY PARK

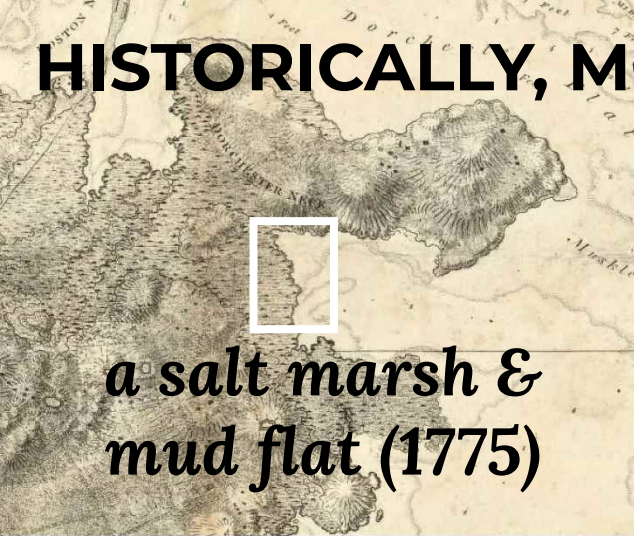
1/4 mile

1/2 mile

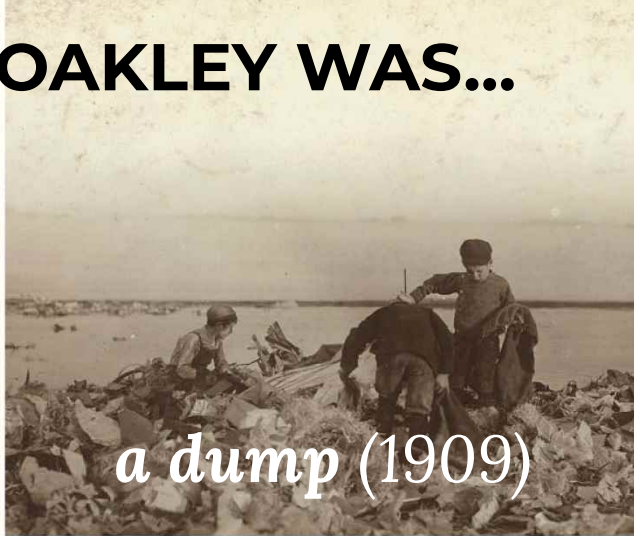
1 mile

STOSS

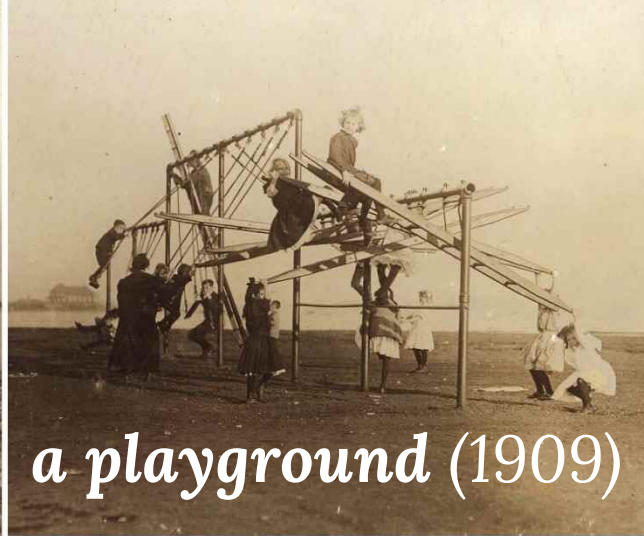
# HISTORICALLY, MOAKLEY WAS...



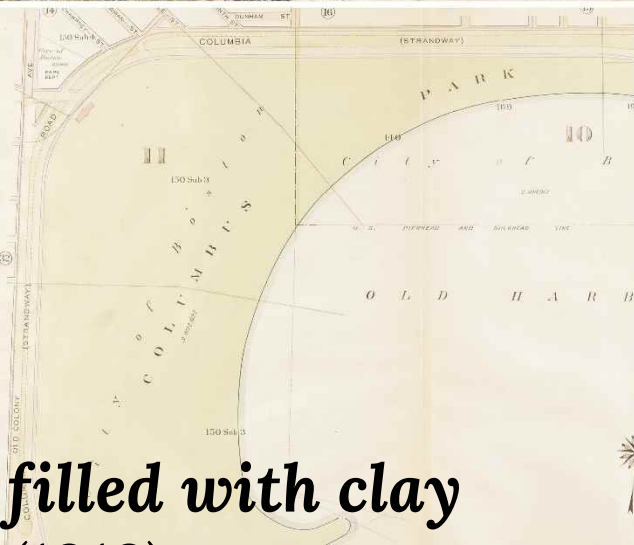
*a salt marsh & mud flat (1775)*



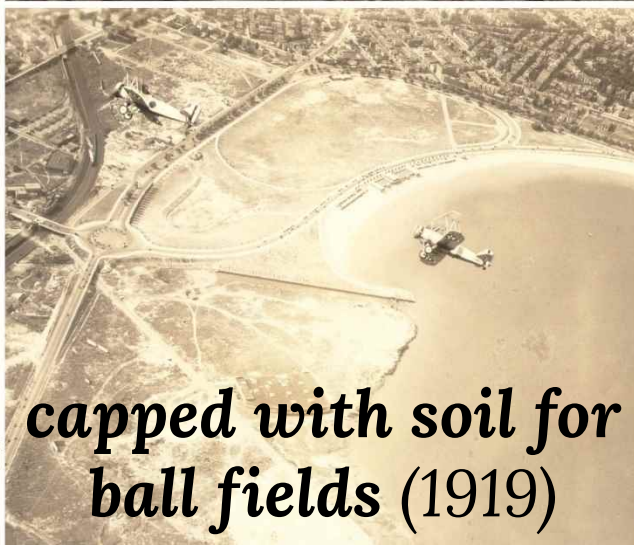
*a dump (1909)*



*a playground (1909)*



*filled with clay*



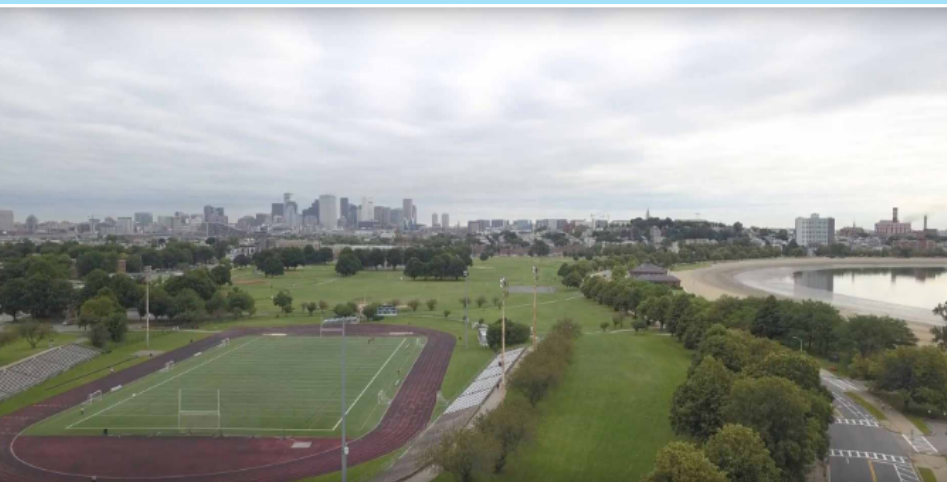
*capped with soil for ball fields (1919)*



*capped with sand for the beach (1919)*



# MOAKLEY PARK TODAY

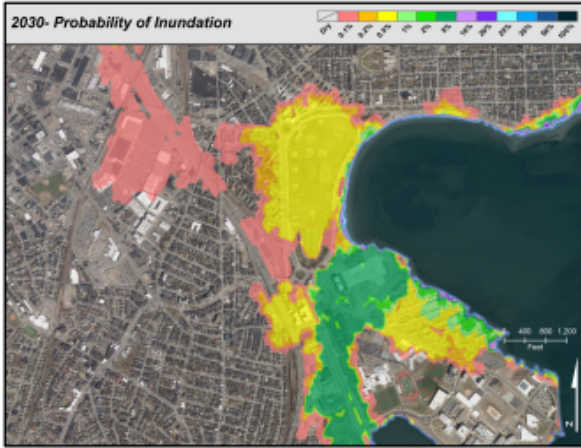


Moakley Park, March 2018

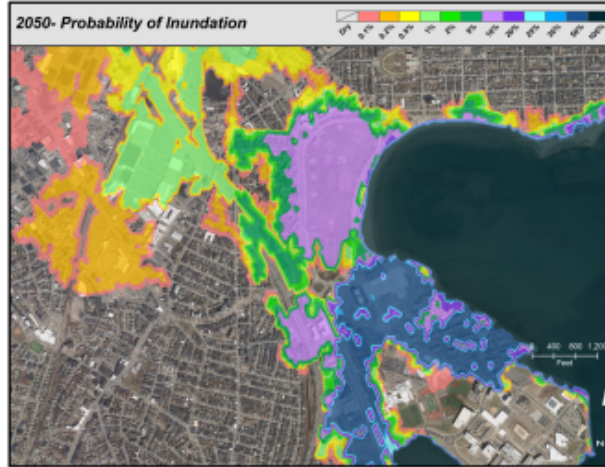


IMAGES COURTESY OF: City of Boston

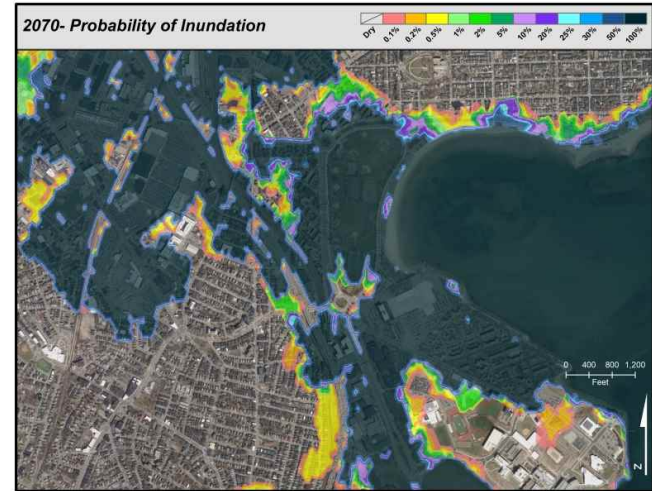
# SITE-SPECIFIC CLIMATE PROJECTIONS FOR MOAKLEY PARK SEA LEVEL RISE/STORM SURGE



**2030 SLR = 1.29 ft**



**2050 SLR = 2.49 ft**

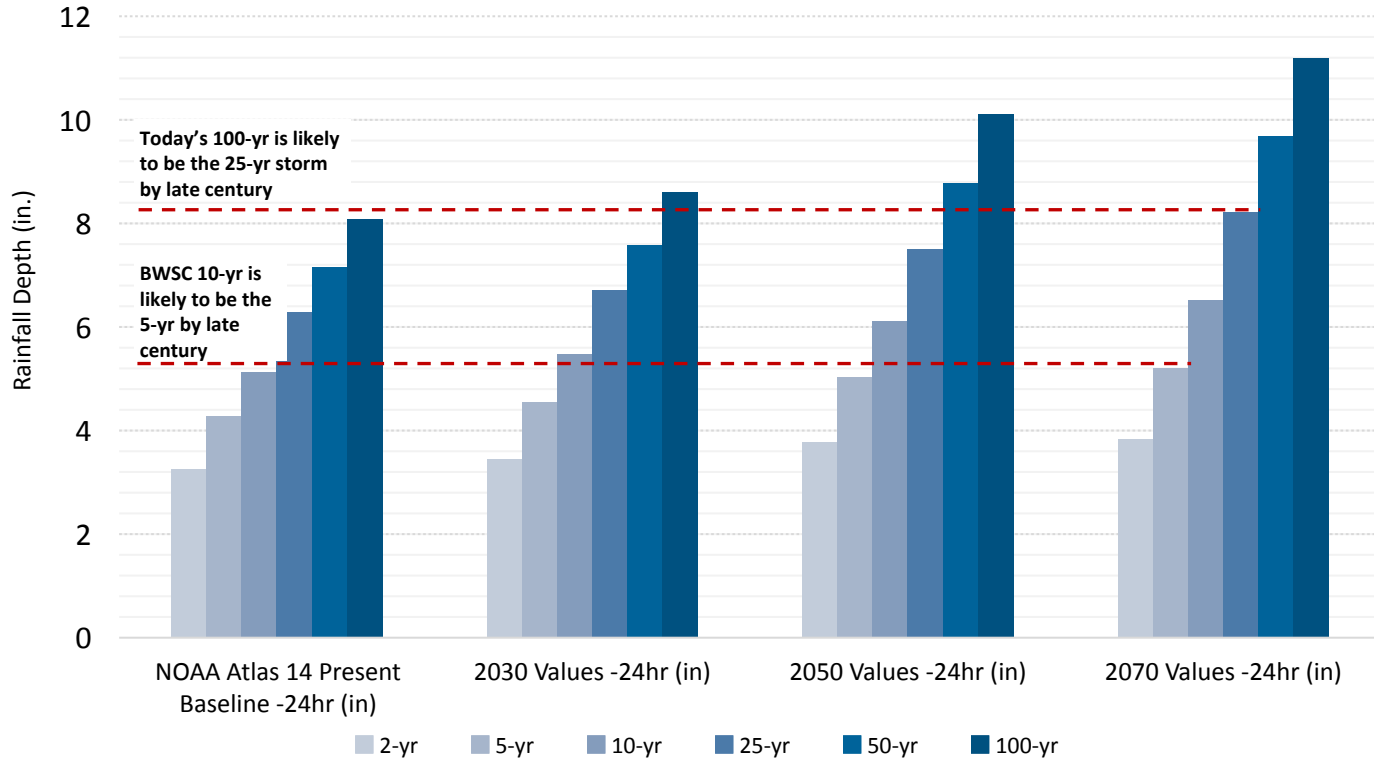


**2070 SLR = 4.29 ft**





# SITE-SPECIFIC CLIMATE PROJECTIONS FOR MOAKLEY PARK EXTREME PRECIPITATION



*SOURCE: Projections represent LOCA data estimating following recommended Tier 3 (NCHRP 15-61) methodologies from the RMAT Climate Resilience Design Standards Tool*

# SITE-SPECIFIC CLIMATE PROJECTIONS FOR MOAKLEY PARK EXTREME HEAT

HISTORIC						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

2030s						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

2070s						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

*SOURCE: Projections represent median percentile values estimated using MACA data and recommended Tier 3 methodologies from the RMAI Climate Resilience Design Standards Tool*





# MOAKLEY PARK

## OVERVIEW



FLOOD MANAGEMENT ALIGNMENT (22' BCB)

IMPROVED RECREATIONAL FIELDS

OLD HARBOR OVERLOOK  
PICNIC / BBQ

WATERFRONT PLAZA AND AMPHITHEATER  
EVENTS / FOOD TRUCKS / FARMERS MARKET / ICE SKATING

OPERATIONS &  
MAINTENANCE

GREEN INFRASTRUCTURE

DOUBLED TREE CANOPY

SPECIES BIODIVERSITY

LOWER BARRIER (19.5' BCB)

IMPROVED PLAY AREAS

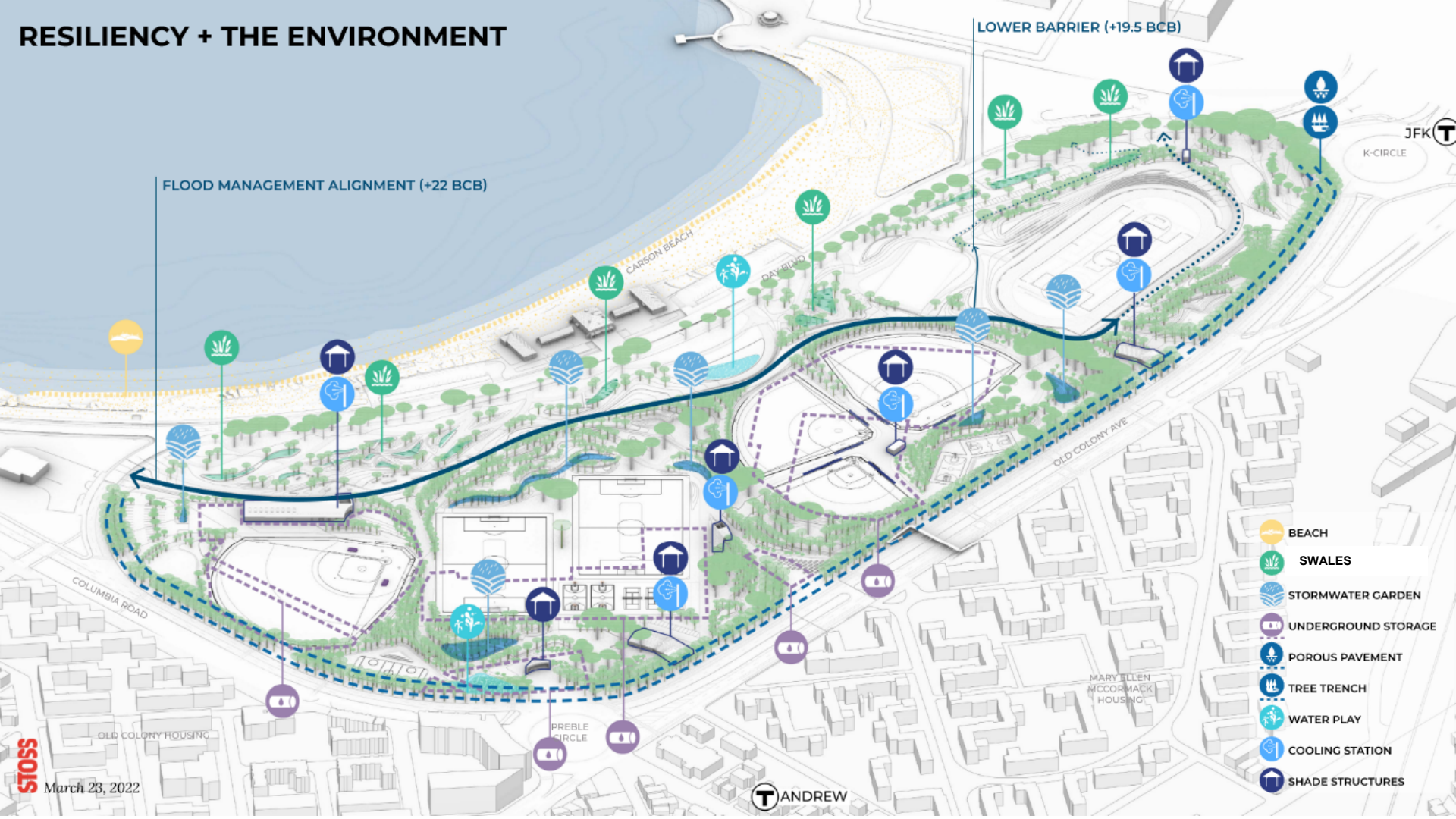
GARDEN GATEWAY  
COMMUNITY GARDEN

COMMUNITY HUB

ENTRY PLAZA  
EVENTS / FOOD TRUCKS /  
FARMERS MARKET



# RESILIENCY + THE ENVIRONMENT



- BEACH
- SWALES
- STORMWATER GARDEN
- UNDERGROUND STORAGE
- POROUS PAVEMENT
- TREE TRENCH
- WATER PLAY
- COOLING STATION
- SHADE STRUCTURES



# RESILIENCY + THE ENVIRONMENT

WATERFRONT PLAZA + AMPHITHEATER SECTION: 40" SLR + 1% STORM

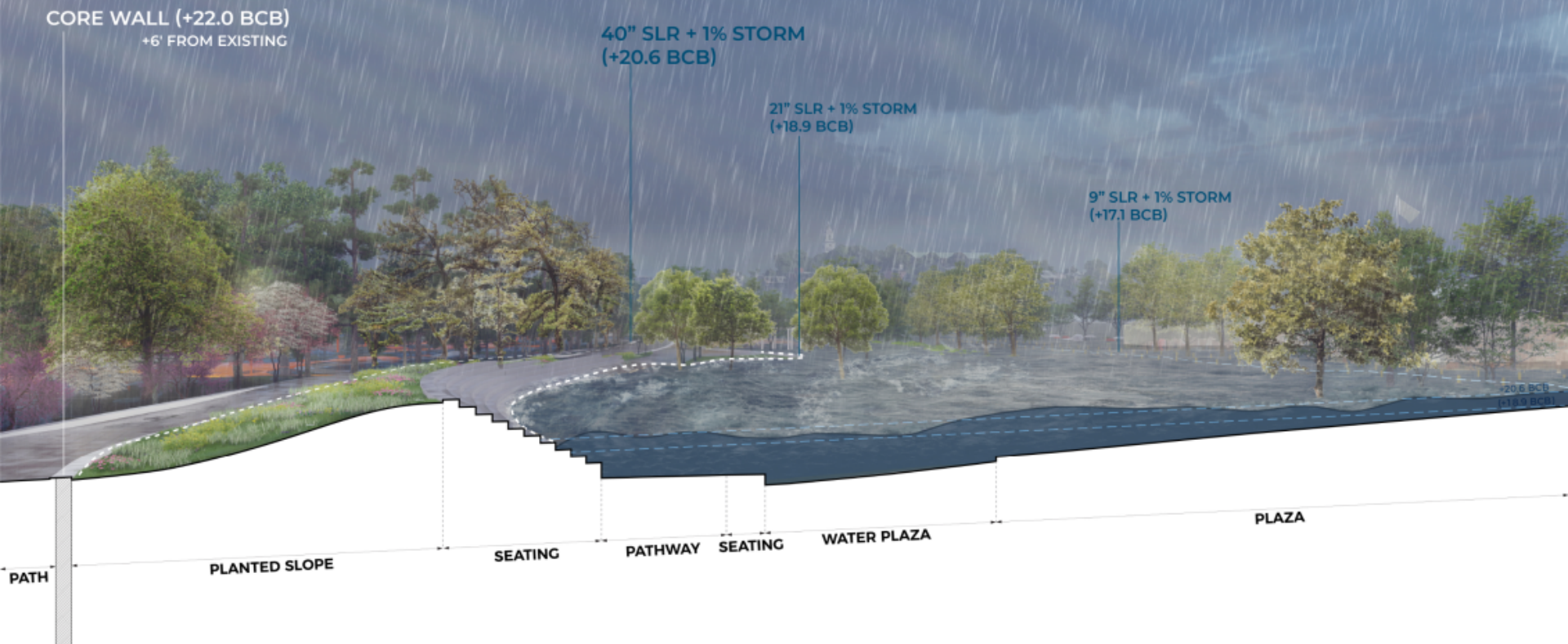
CORE WALL (+22.0 BCB)  
+6' FROM EXISTING

40" SLR + 1% STORM  
(+20.6 BCB)

21" SLR + 1% STORM  
(+18.9 BCB)

9" SLR + 1% STORM  
(+17.1 BCB)

+20.6 BCB  
(+18.9 BCB)



PATH

PLANTED SLOPE

SEATING

PATHWAY

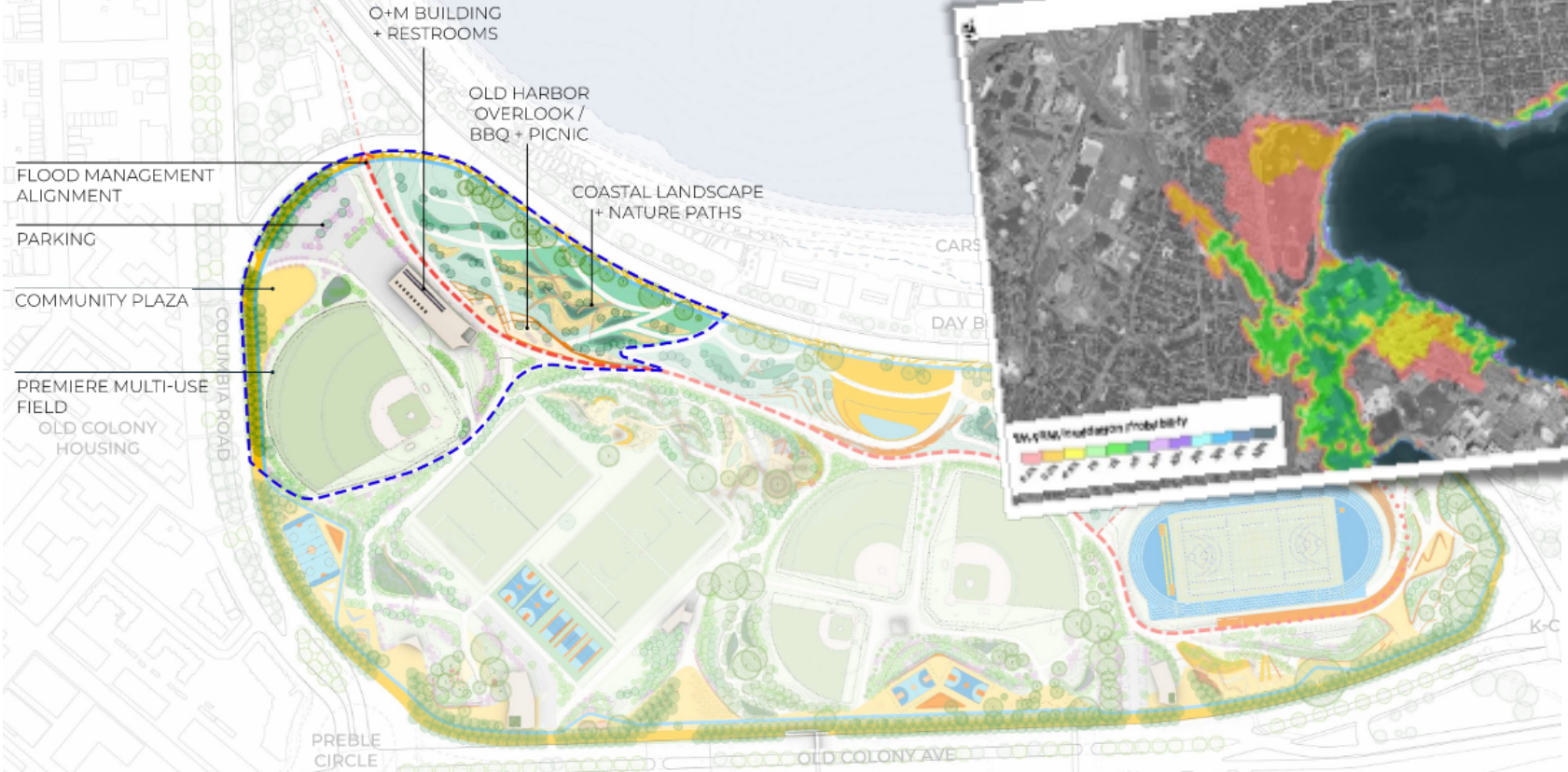
SEATING

WATER PLAZA

PLAZA

# PHASE 1 DESIGN

OVERALL SITE





# PHASE 1 SITE

COLUMBIA ROAD

PARKING

O+M BUILDING  
+ RESTROOMS

UNDERGROUND  
STORMWATER  
STRUCTURE

COASTAL LANDSCAPE +  
NATURE PATHS

DAY BOULEVARD

CARSON BEACH



PREMIERE  
MULTI-USE FIELD



COMMUNITY PATH +  
RUNNING TRACK



OLD HARBOR OVERLOOK /  
BBQ + PICNIC

