

SCAPE LANDSCAPE ARCHITECTURE DPC

**HAYWARD SHORELINE MASTER PLAN
PROJECT OVERVIEW**

JULY 11, 2019

MASTER PLAN OBJECTIVES

A coastal scene featuring a wooden walkway with a railing, leading towards a body of water. In the foreground, there are large, light-colored rocks and some low-lying vegetation. Two people are walking away from the camera on the path. The sky is blue with scattered white clouds. A semi-transparent dark box is overlaid in the center, containing the title text in white.

ASSESS AND VISUALIZE RISK TO ECOLOGICAL AND RECREATIONAL ASSETS

A photograph of a coastal road with a semi-transparent text overlay. The road is paved and has white lane markings. To the left of the road is a grassy area with some low-lying vegetation. In the background, there are power lines and a cloudy sky. The text is white and bold, set against a dark, semi-transparent rectangular background.

ASSESS AND VISUALIZE RISK TO BUILT SHORELINE ASSETS

A photograph of a riverbank. In the foreground, a gravelly shore with some driftwood and debris. A person in a maroon shirt and khaki shorts stands on the right, looking towards the river. Another person in a dark shirt and blue pants stands further back on the shore. A concrete-lined channel of the river flows from the background towards the right. In the background, a fenced industrial area with large storage tanks and buildings is visible, surrounded by a line of trees. The sky is overcast.

**DEVELOP ADAPTATION
RESPONSES BASED ON BEST
AVAILABLE SCIENCE**



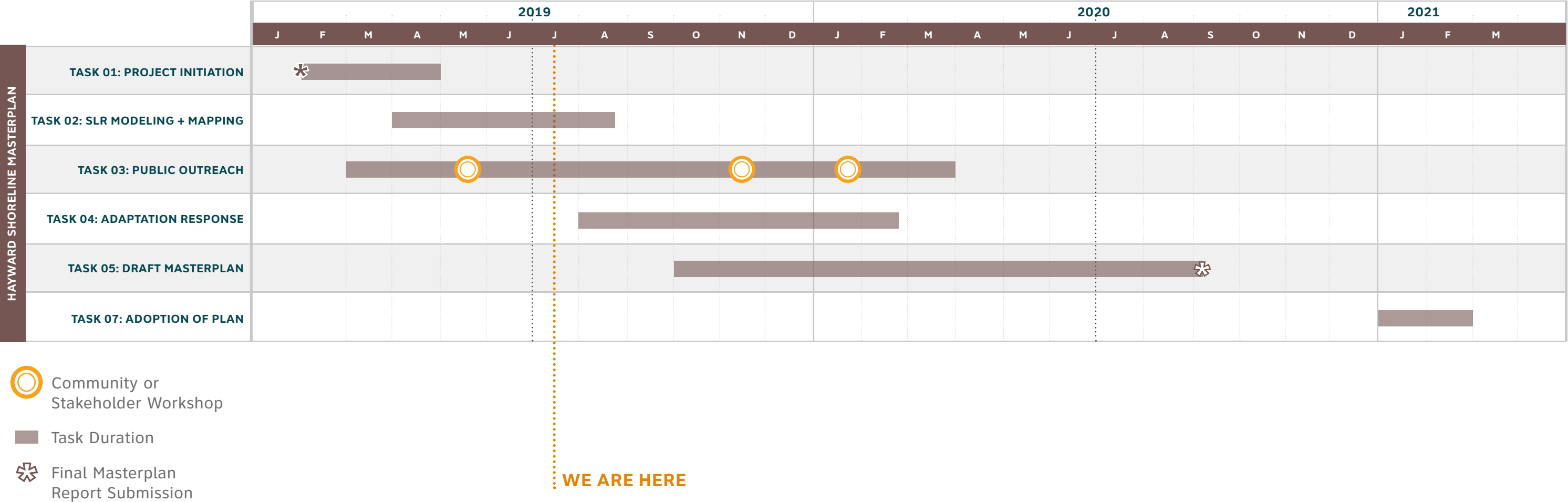
CREATE MEANINGFUL AND IMPLEMENTABLE ADAPTATION RESPONSES

A group of people, including a man in a straw hat and several children, are gathered outdoors near a body of water. The man in the straw hat is pointing towards the water, and the children are looking in the same direction. The scene is bright and sunny, suggesting a community engagement activity.

ENGAGE SHORELINE COMMUNITIES THROUGHOUT THE PLANNING PROCESS

PROJECT SCHEDULE

TIMELINE



HAYWARD MASTER PLAN PROJECT INITIATION

SCAPE
ARCADIS
CONVEY
RE:FOCUS
SFEI

HAYWARD REGIONAL SHORELINE MASTER PLAN

**FOR THE HAYWARD AREA SHORELINE PLANNING
AGENCY**

TASK 1 BACKGROUND REPORT & EXISTING CONDITIONS ANALYSIS

SUBMITTED 05/03/2019

TABLE OF CONTENTS

INTRODUCTION

Project overview

EXISTING CONDITIONS

Study Area

Project Area

ECOLOGICAL RESOURCES

Baylands Today

Historic Baylands

Watersheds

Water Connectivity

Bayland Profiles

Endangered Species

Sediment

Groundwater

Geology

INFRASTRUCTURE

Levee Types

Levees at Risk

Critical Infrastructure

FEMA Flood Hazard Zones

Inundation Depths

CULTURAL RESOURCES

Historical Resources

Social Infrastructure

Recreation

A Network of Parks

CONNECTIONS AND ACCESS

Land Use

Ownership

Transportation

DEMOGRAPHICS

Racial Distribution

Population Density

Median Age

Social Vulnerabilities

PAST PLANS AND STUDIES

ONLINE SURVEY AND INTERVIEW SUMMARIES

FINANCE CONSIDERATIONS

SUMMARY OF FINDINGS

HAYWARD REGIONAL SHORELINE HISTORY

US COASTAL SURVEY 1850-1860

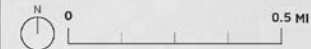


HAYWARD SHORELINE MASTER PLAN HISTORIC BAYLANDS

LEGEND

- TIDAL MUDFLAT
- TIDAL MARSH
- SALT PONDS
- PANNES
- CHANNEL

1% ANNUAL CHANCE FLOOD HAZARD EXTENT



SAN LORENZO ALLUVIAL PLAIN

The Hayward Shoreline had no connection to upland freshwater creeks. Baylands were built over time from the sediment filled floodwaters of San Lorenzo Creek.

HAYWARD'S LANDING

Navigating shallow waters of The Bay required landing structures to facilitate the transportation of goods. These landings leveraged natural features that were higher in elevation to cross into deeper water. Built structures such as jetties also facilitated crossing of shallow mudflats.

NARROW MARSHLAND

Most of the Hayward historic baylands were composed of naturally occurring salt ponds. Narrow portion of salt marsh contained tidal channels branching into smaller dead end sloughs.

BROAD TIDAL MUDFLATS

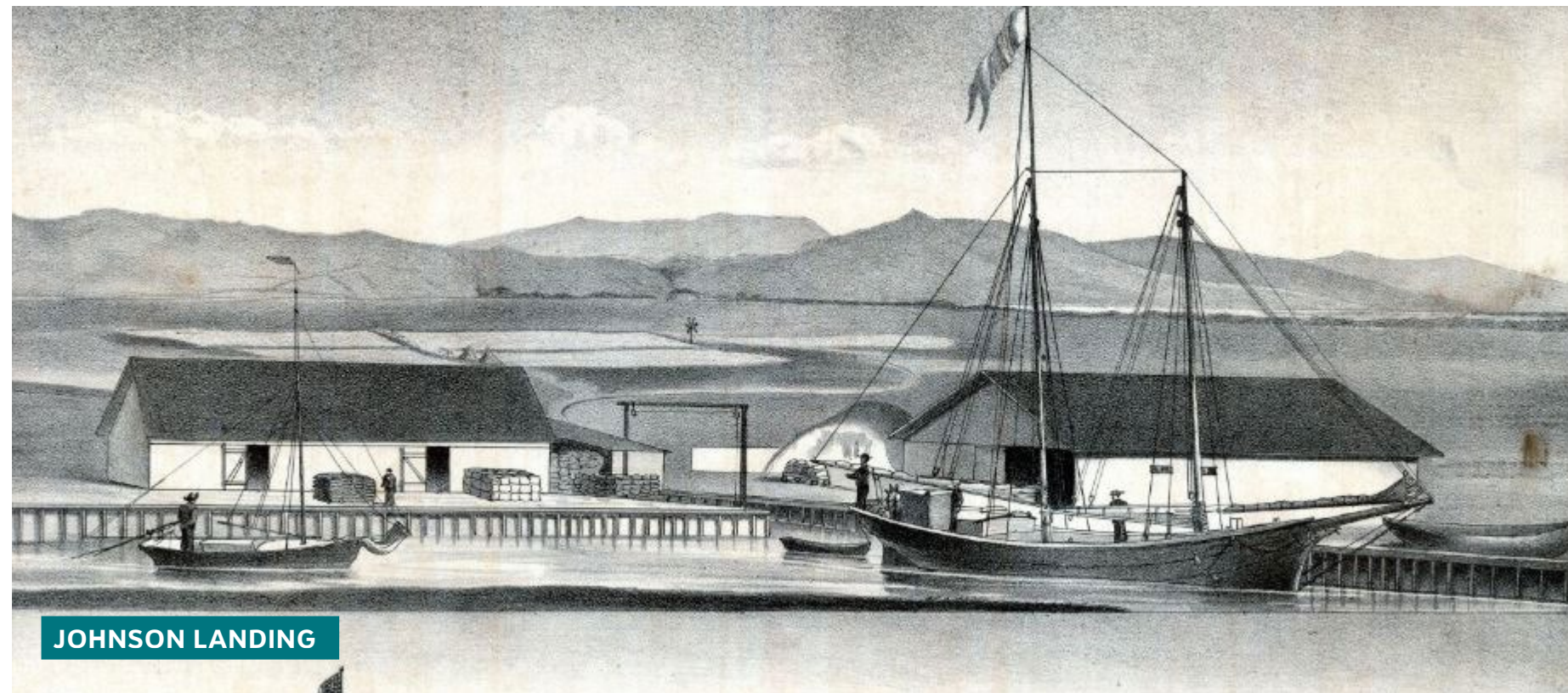
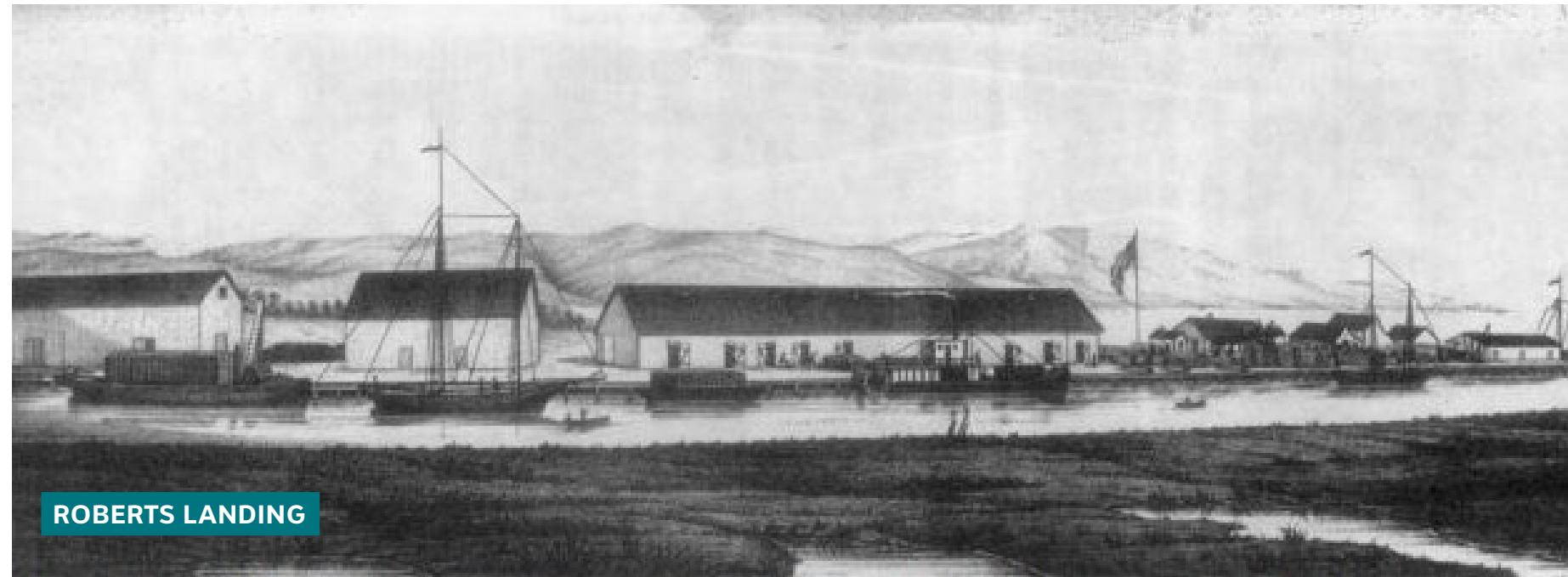
Continuous shallow mudflats extended miles out into the bay.

CRYSTAL SALT POND

One of the largest naturally occurring salinas in the South Bay.

MT. EDEN CREEK

HISTORICAL LANDINGS



OLIVER SALT WORKS- CIRCA 1910



HAYWARD AREA SHORELINE PLANNING AGENCY- 1971

S or Rubble?

and both on the Hayward Shoreline. Much of the area has been built and discarded, dumped and in past years, remains have taken their toll on the Bay tides, and boat houses. Weather and windmills, and smaller remnants of man's capture and take home. Smaller remnants of man's to preserve the distinctive character of the Hayward Shoreline, visitors are asked to leave both relics and rubble undisturbed.

Public or Private?

At the present time, most of the Hayward Shoreline is still held by private parties. Gradually, it is being acquired by member agencies of HASPA, and the long-term plans for the area are being put into operation. Meanwhile, access to the Shoreline is limited. Educational training and study trips are being made available to members of the community so that as the Shoreline becomes publicly accessible, its care and use will be understood. Community workshops are being offered under the auspices of the Hayward Shoreline Environmental Education Project. Citizens interested in participating in the program may contact Project Coordinator Leo Bachle through the Hayward Unified School District.

Enjoy or Endanger?

As we begin to understand the fragile nature of the Hayward Shoreline, we will be more likely to enjoy its nuances and less likely to endanger its delicate balance. Each feather, each shell, each wildflower seems a tempting keepsake to the uninformed visitor. But every time such a treasure is removed from its natural setting, a part of the Shoreline is diminished. The Hayward Shoreline is being made to protect the area—protection for the millions of people who inhabit it year-round, and preservation for human and nonhuman visitors who will

BY CARING TODAY,
WE PRESERVE OUR YESTERDAYS
FOR TOMORROW



This publication has been developed by representatives of the Hayward Shoreline Environmental Education Project in cooperation with HASPA and the Alameda County School Department under the provisions of the Environmental Education Act, 1975.
OCTOBER 1971

Hayward Area Shoreline

district

HAYWARD

ECOLOGICAL RESTORATION



PUBLIC OPEN SPACE



SITE WALKTHROUGH



HAYWARD SHORELINE MASTER PLAN HISTORIC BAYLANDS

LEGEND

- TIDAL MUDFLAT
- TIDAL MARSH
- SALT PONDS
- PANNES
- CHANNEL
- 1% ANNUAL CHANCE FLOOD HAZARD EXTENT

HAYWARD'S LANDING
Navigating shallow waters of The Bay required landing structures to facilitate the transportation of goods. These landings leveraged natural features that were higher in elevation to cross into deeper water. Built structures such as jetties also facilitated crossing of shallow mudflats.

NARROW MARSHLAND
Most of the Hayward historic baylands were composed of naturally occurring salt ponds. Narrow portion of salt marsh contained tidal channels branching into smaller dead end sloughs.

BROAD TIDAL MUDFLATS
Continuous shallow mudflats extended miles out into the bay.

SAN LORENZO ALLUVIAL PLAIN
The Hayward Shoreline had no connection to upland freshwater creeks. Baylands were built over time from the sediment filled floodwaters of San Lorenzo Creek.

CRYSTAL SALT POND
One of the largest naturally occurring salinas in the South Bay.

MT. EDEN CREEK

HAYWARD SHORELINE MASTER PLAN BAYLANDS ECOLOGY

LEGEND

- TIDAL MUDFLAT
- TIDAL / MUTED TIDAL MARSH
- DIKED POND / WETLAND
- DIKED STORAGE AND TREATMENT PONDS
- INACTIVE SALT PONDS
- UPLAND LANDFILL



Sources:
1. San Francisco Estuary Institute and Aquatic Science Center 2015. California Aquatic Resource Inventory (April 18, 2019)

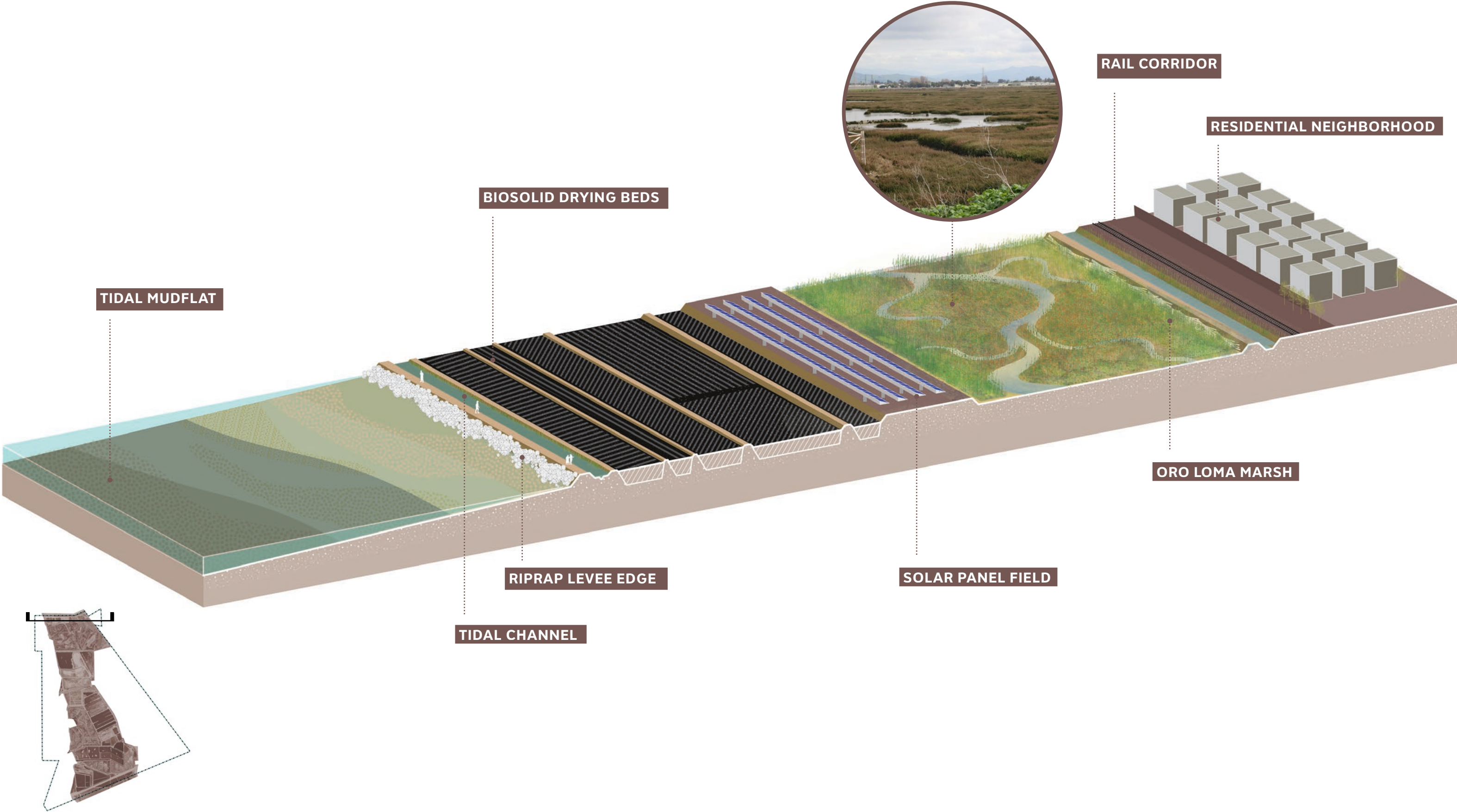
Sources:
1. San Francisco Estuary Institute 2016. Historical and Modern Baylands 1998. (April 18, 2019)

ORO LOMA MARSH



ORO LOMA BAYLAND COMPLEX

CONVERTED BAYLANDS FOR INDUSTRIAL USE AND RESTORATION





ORO LOMA MARSH

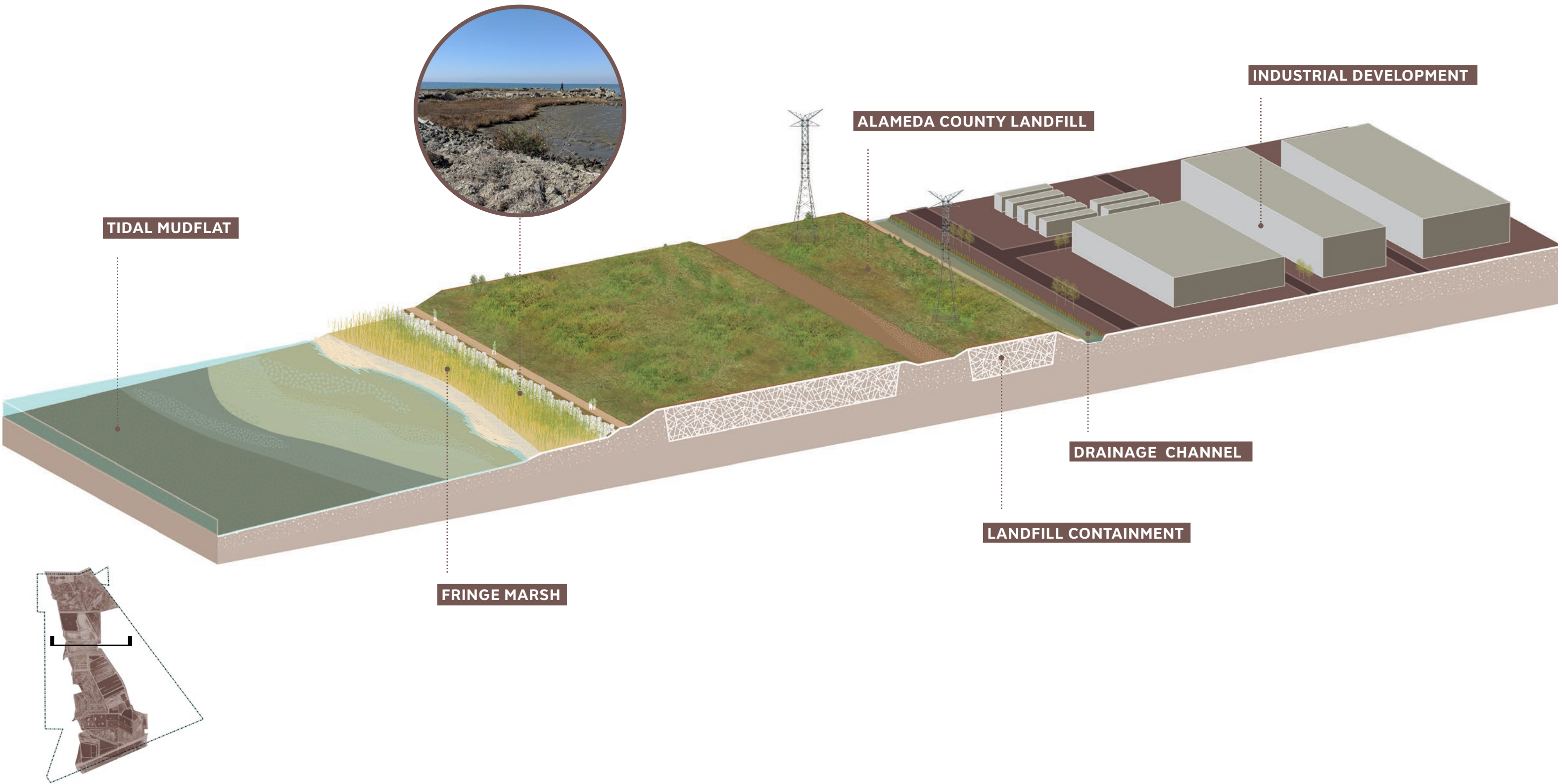
BIOSOLID DRYING BEDS

ALAMEDA COUNTY OWNED WEST WINTON LANDFILL



FILLED BAYLANDS

VULNERABLE LANDFILL INFRASTRUCTURE AT THE BAY'S EDGE





TRIANGLE MARSH

HAYWARD'S LANDING CANAL

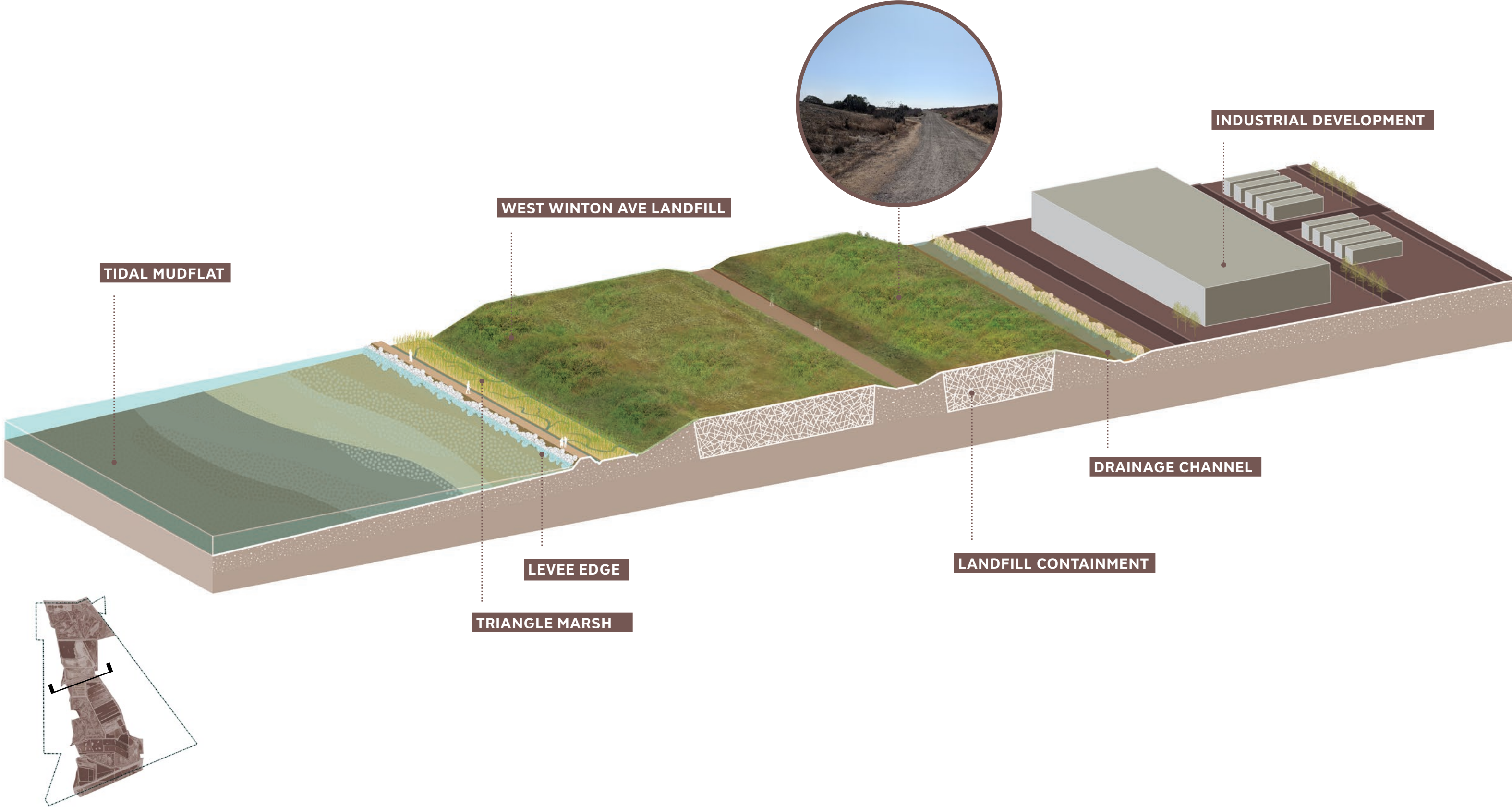
ALAMEDA COUNTY LANDFILL

CITY OWNED WEST WINTON LANDFILL + TRIANGLE MARSH



THE BAYLAND SQUEEZE

INFRASTRUCTURE PREVENTING MARSH MIGRATION

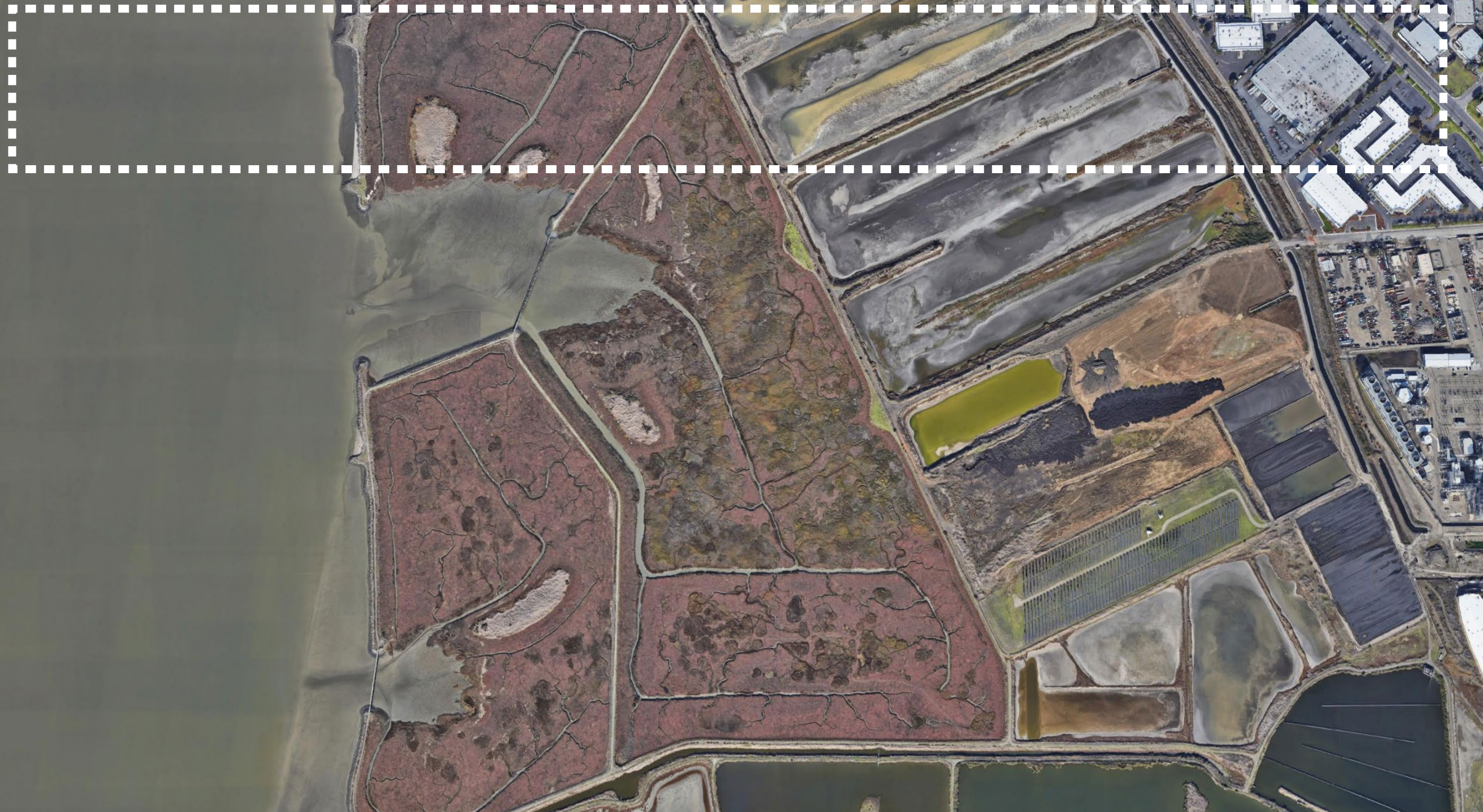


ALAMEDA COUNTY LANDFILL

WEST WINTON LANDFILL

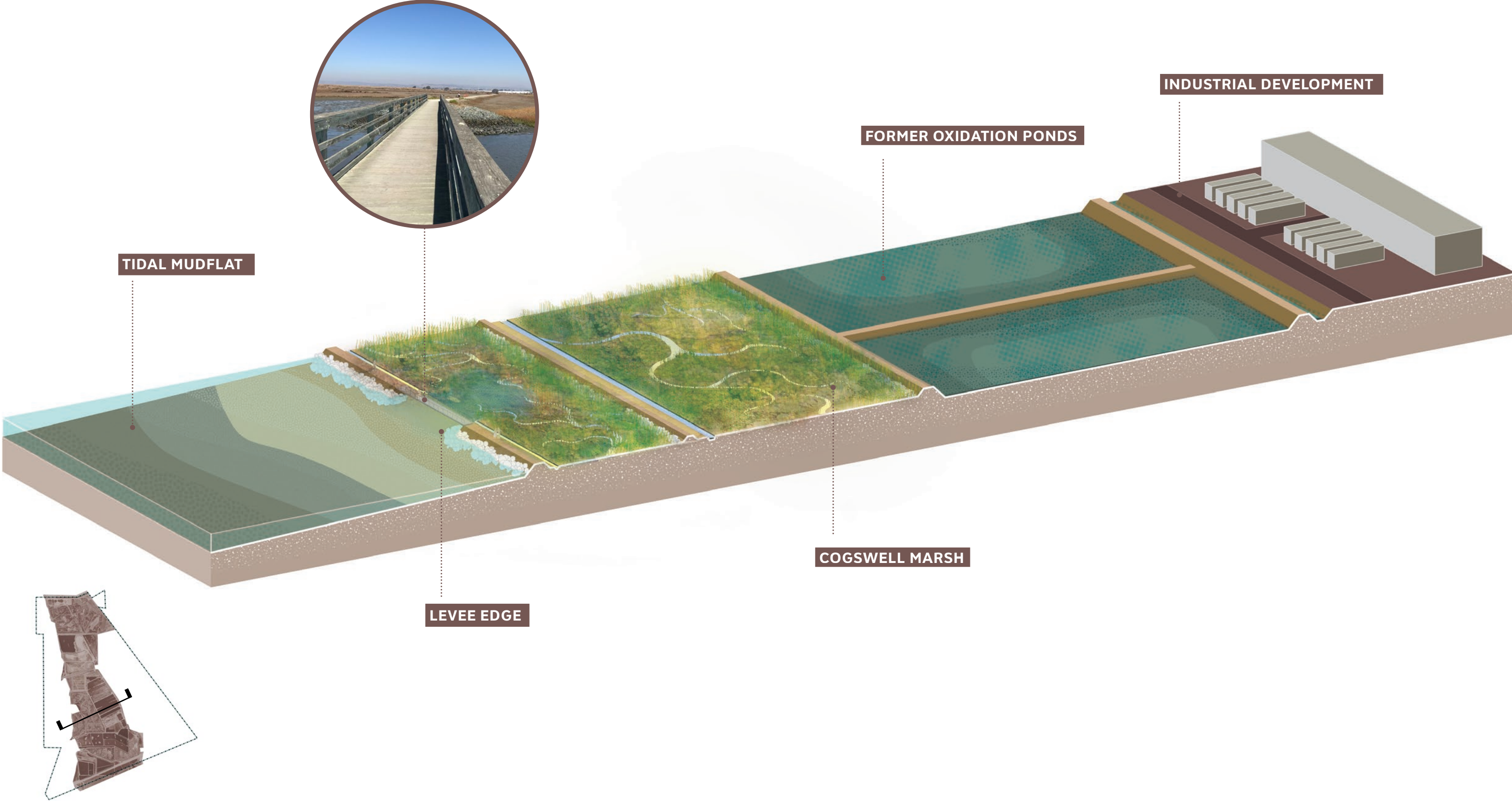
TRIANGLE MARSH

COGSWELL MARSH



BREACHED AND CONTAINED BAYLANDS

BAYLANDS FOR WATER ABSORPTION AND STORAGE





COGSWELL MARSH

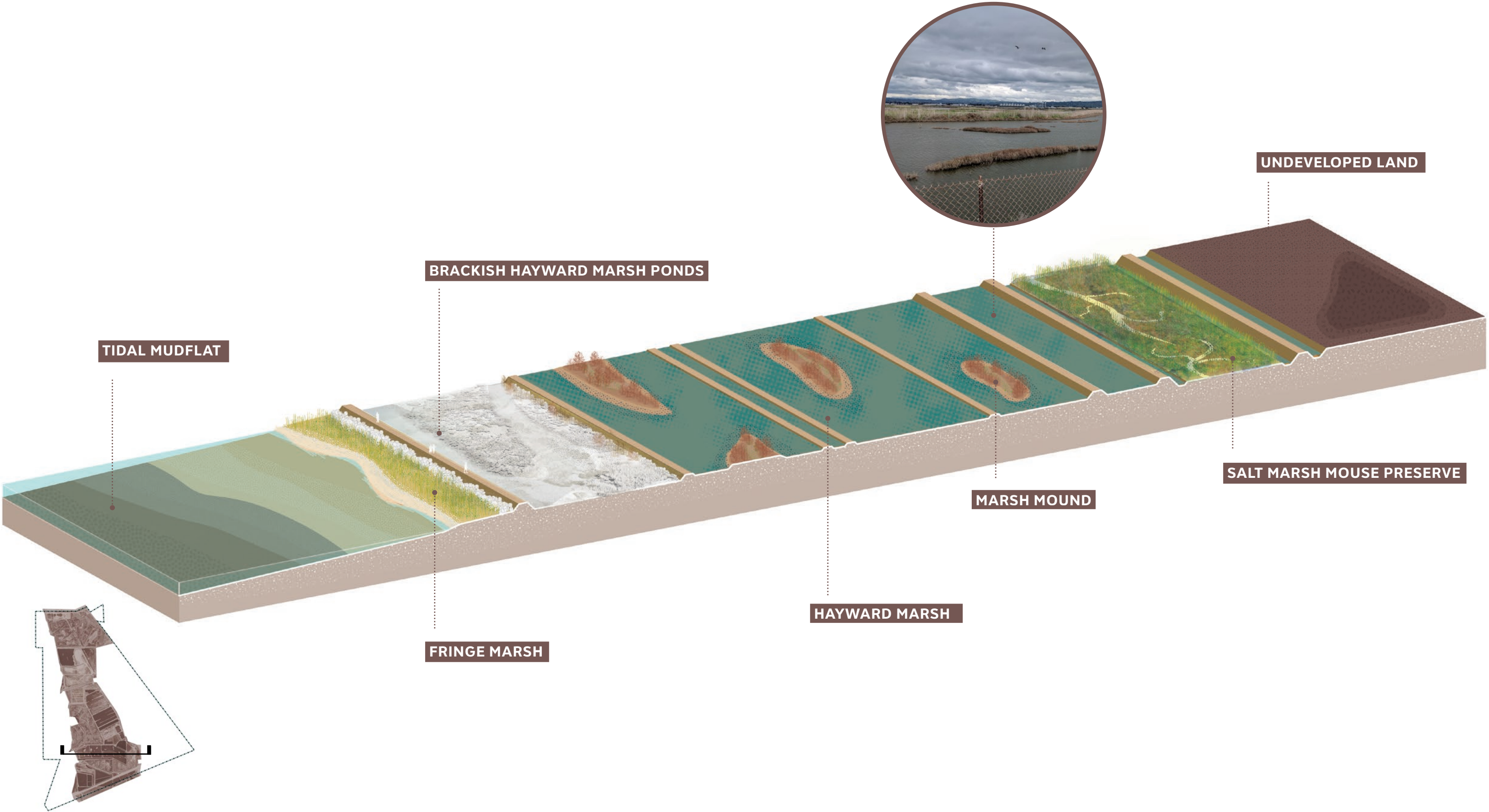
CALPINE ENERGY FACILITY

HAYWARD MARSH



TREATMENT MARSH MOSAIC

BAYLANDS SUPPORTING WASTEWATER FILTRATION AND ENDANGERED SPECIES





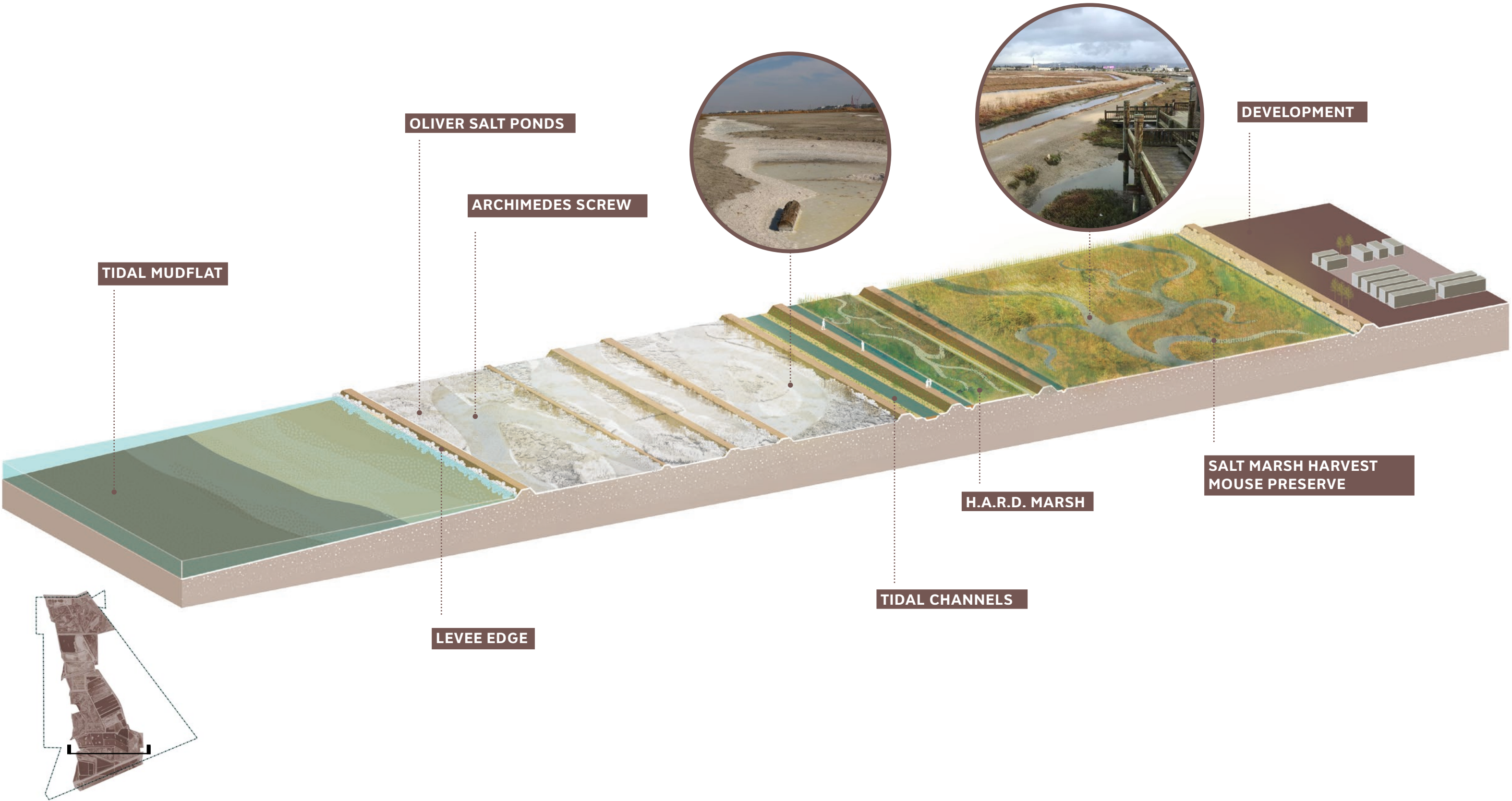
HAYWARD MARSH

OLIVER SALT PONDS + HARD MARSH



BAYLAND HABITAT GRADIENTS

DIVERSE ECOSYSTEMS AS EDUCATIONAL TOOLS



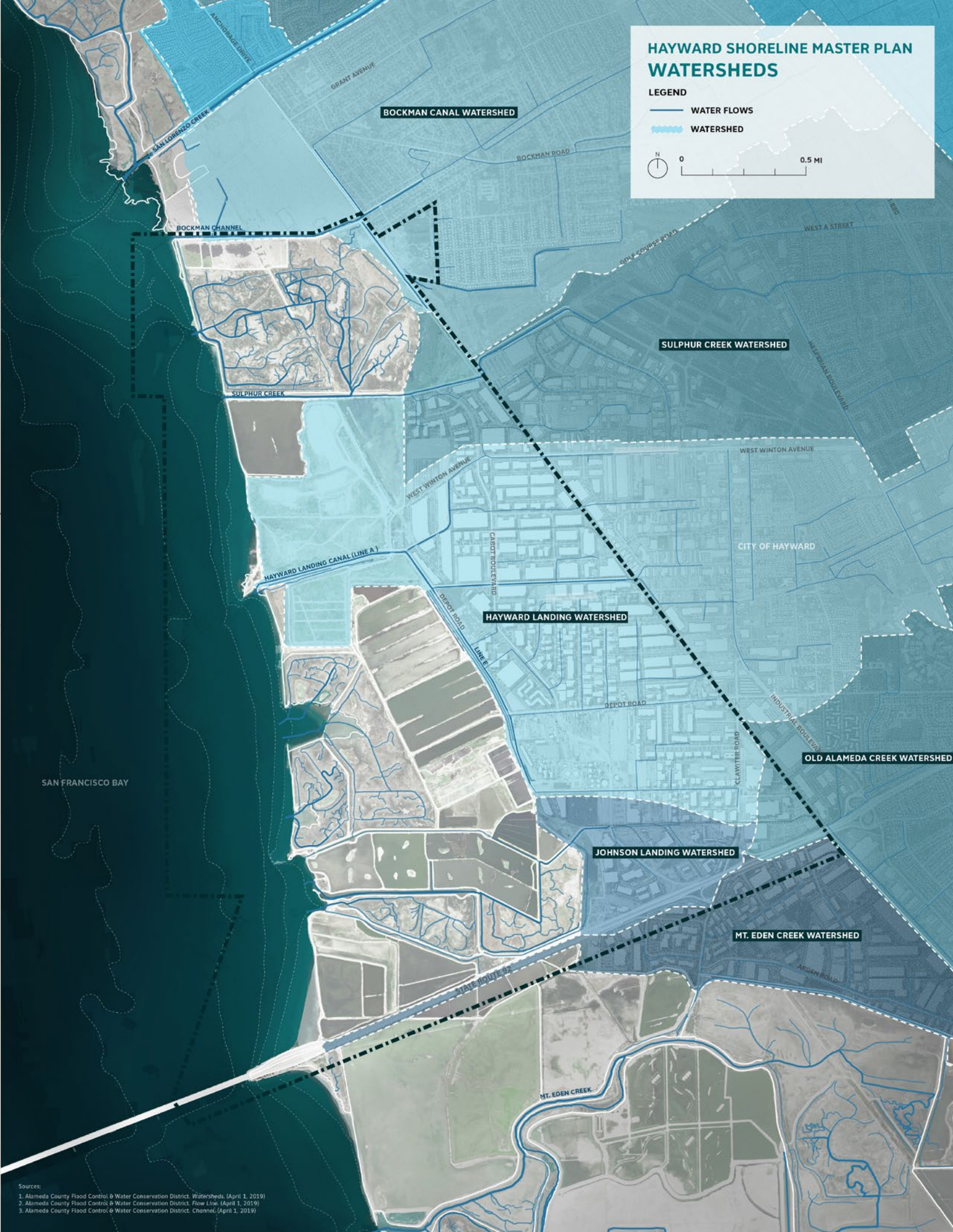
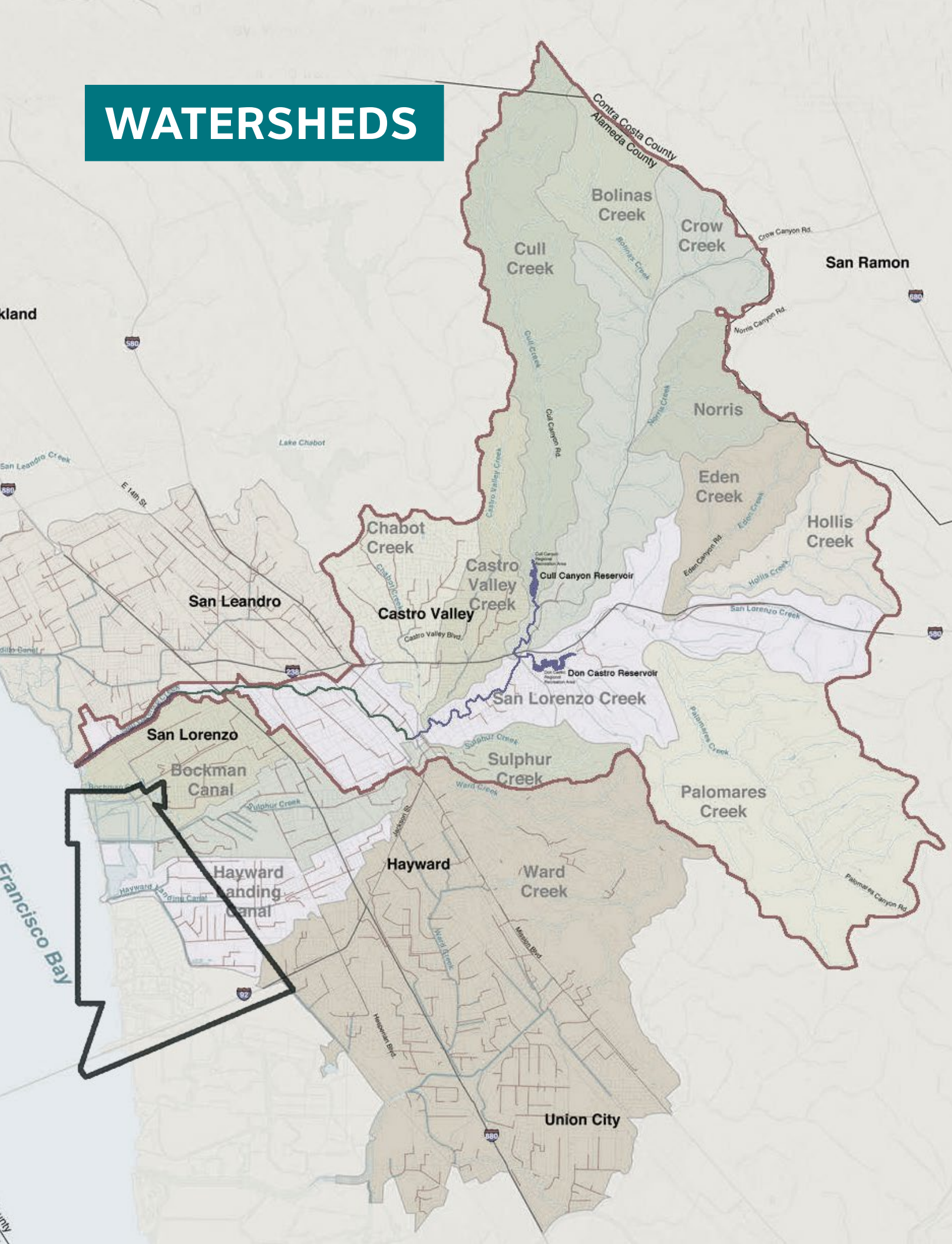
STATE ROUTE 92

OLIVER SALT PONDS

HARD MARSH

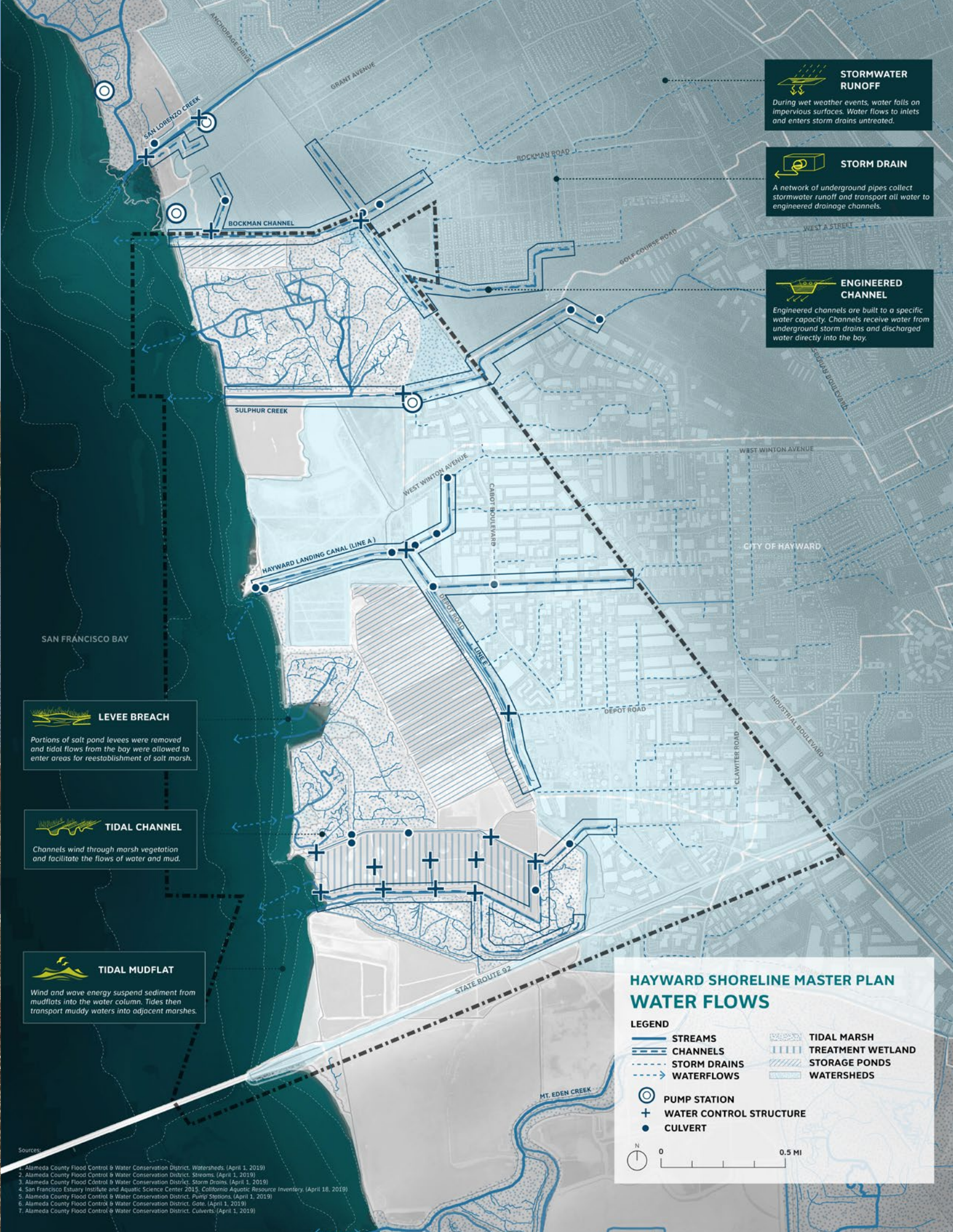
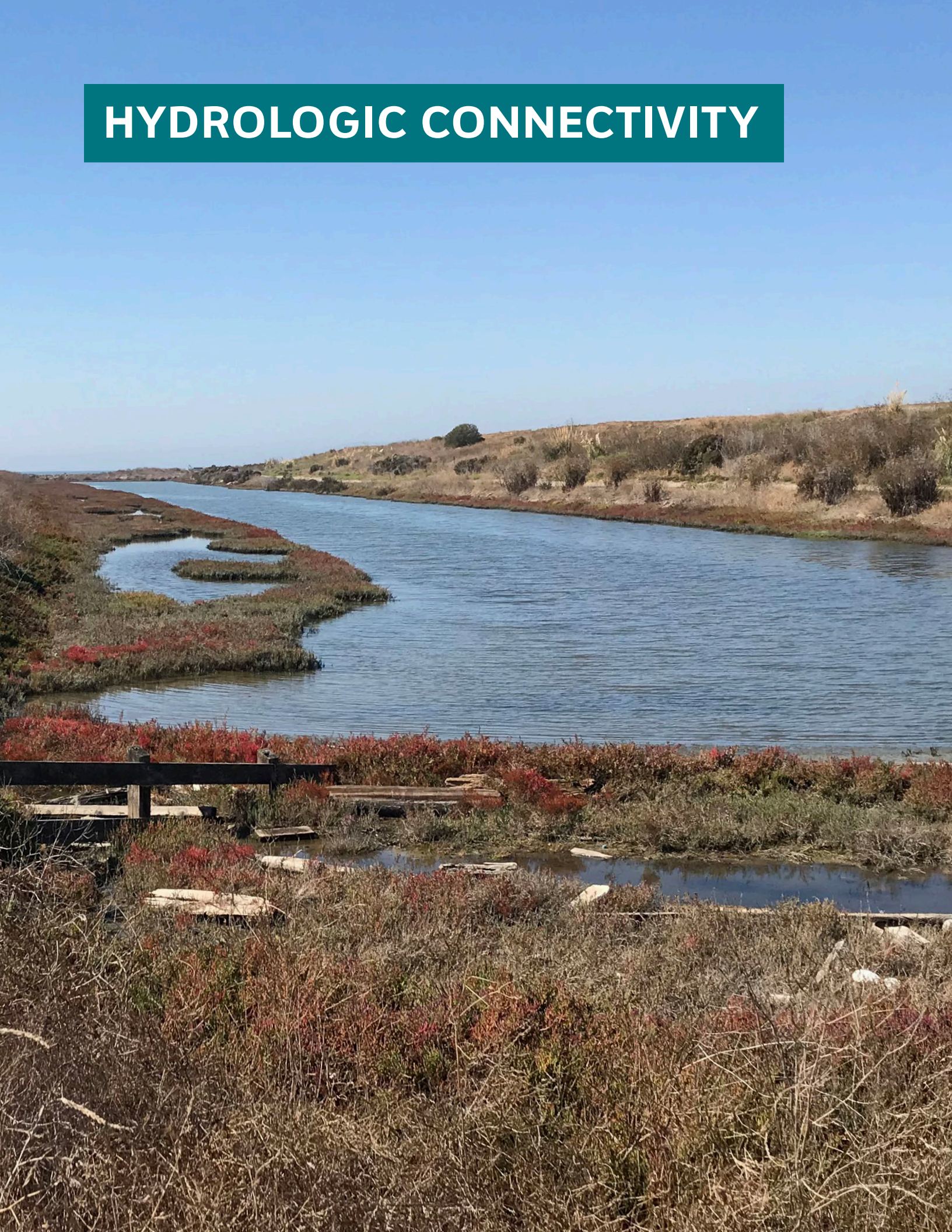
HAYWARD REGIONAL SHORELINE ECOLOGY

WATERSHEDS



Sources:
1. Alameda County Flood Control & Water Conservation District. Watersheds. (April 1, 2019)
2. Alameda County Flood Control & Water Conservation District. Flow Line. (April 1, 2019)
3. Alameda County Flood Control & Water Conservation District. Channel. (April 2, 2019)

HYDROLOGIC CONNECTIVITY



STORMWATER RUNOFF
During wet weather events, water falls on impervious surfaces. Water flows to inlets and enters storm drains untreated.

STORM DRAIN
A network of underground pipes collect stormwater runoff and transport all water to engineered drainage channels.

ENGINEERED CHANNEL
Engineered channels are built to a specific water capacity. Channels receive water from underground storm drains and discharged water directly into the bay.

LEVEE BREACH
Portions of salt pond levees were removed and tidal flows from the bay were allowed to enter areas for reestablishment of salt marsh.

TIDAL CHANNEL
Channels wind through marsh vegetation and facilitate the flows of water and mud.

TIDAL MUDFLAT
Wind and wave energy suspend sediment from mudflats into the water column. Tides then transport muddy waters into adjacent marshes.

**HAYWARD SHORELINE MASTER PLAN
WATER FLOWS**

LEGEND

STREAMS	TIDAL MARSH
CHANNELS	TREATMENT WETLAND
STORM DRAINS	STORAGE PONDS
WATERFLOWS	WATERSHEDS
PUMP STATION	
WATER CONTROL STRUCTURE	
CULVERT	

0 0.5 MI

Sources:
1. Alameda County Flood Control & Water Conservation District. Watersheds (April 1, 2019)
2. Alameda County Flood Control & Water Conservation District. Streams (April 1, 2019)
3. Alameda County Flood Control & Water Conservation District. Storm Drains (April 1, 2019)
4. San Francisco Estuary Institute and Aquatic Science Center 2015. California Aquatic Resource Inventory (April 18, 2019)
5. Alameda County Flood Control & Water Conservation District. Pump Stations (April 1, 2019)
6. Alameda County Flood Control & Water Conservation District. Gate (April 1, 2019)
7. Alameda County Flood Control & Water Conservation District. Culverts (April 1, 2019)

CONTRASTING WATER FLOWS



ENDANGERED SPECIES HABITAT

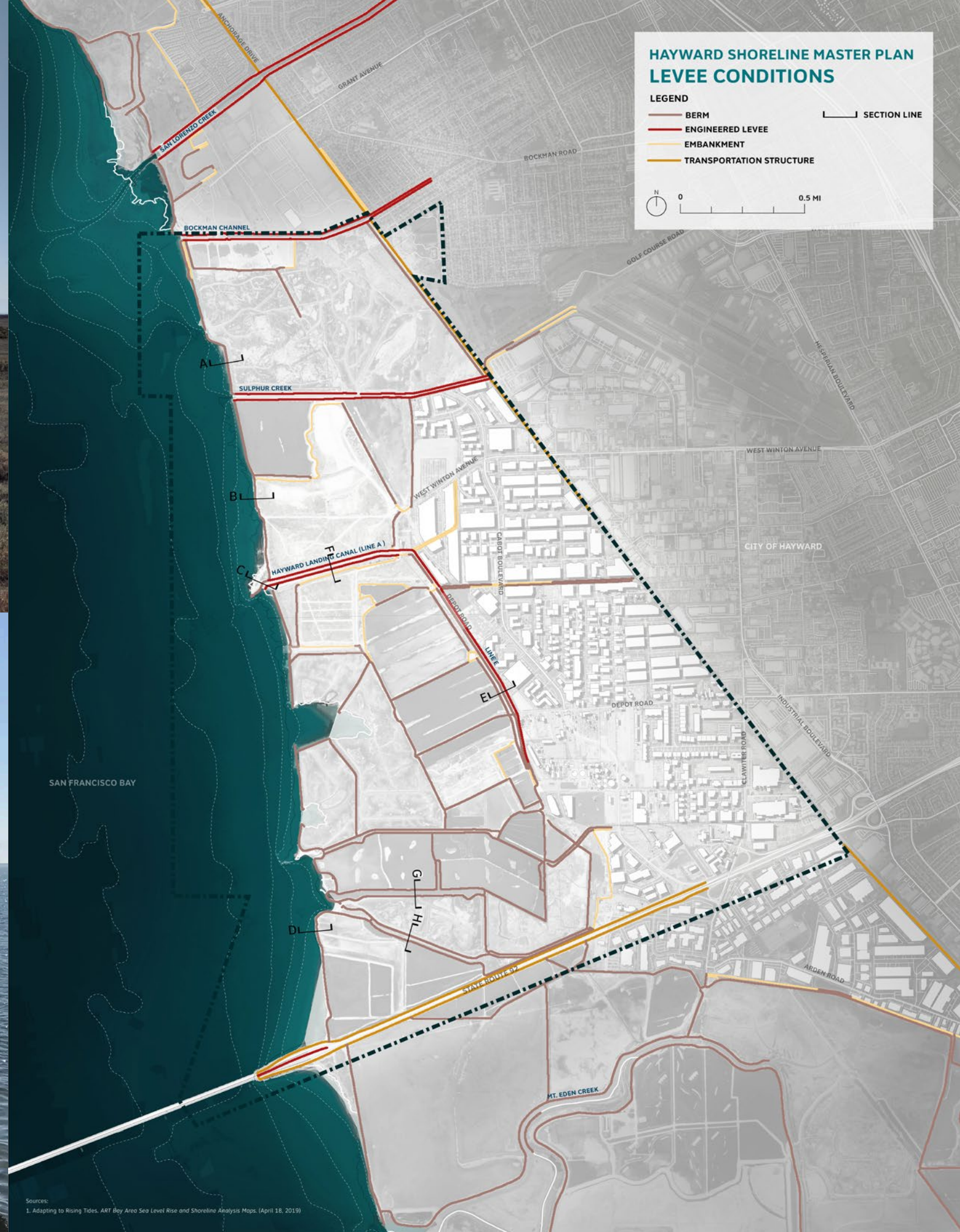


LEAST TERN NESTING AT HAYWARD MARSH



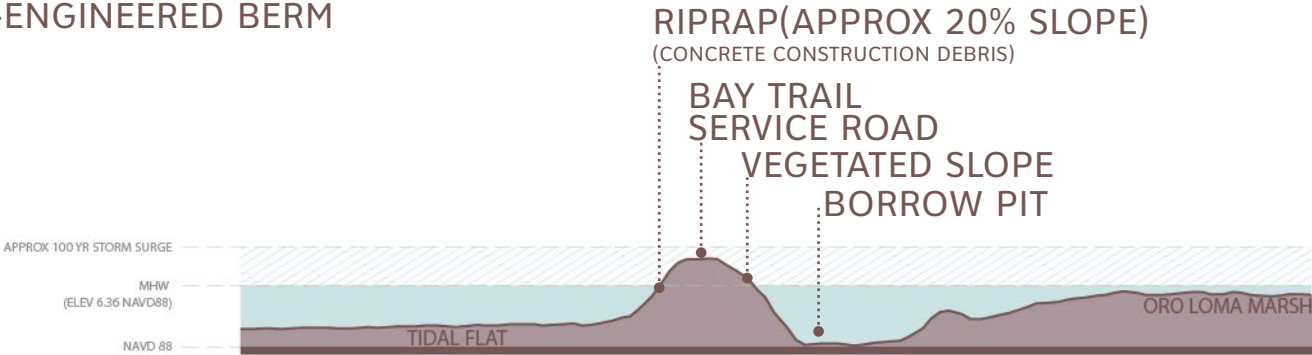
HAYWARD REGIONAL SHORELINE INFRASTRUCTURE

NON ENGINEERED BERMS

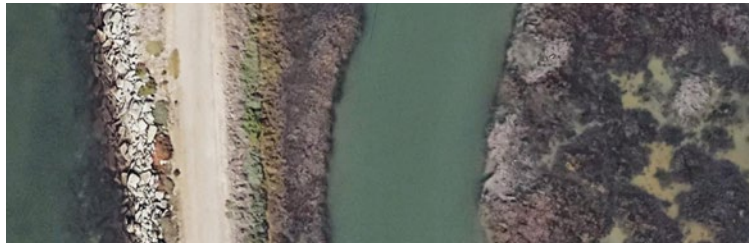


OUTBOARD LEVEE CONDITIONS

MARSH NON-ENGINEERED BERM

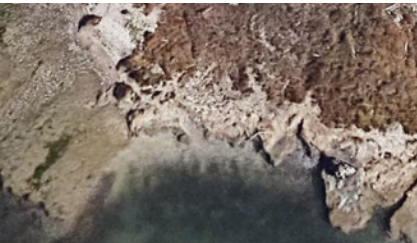
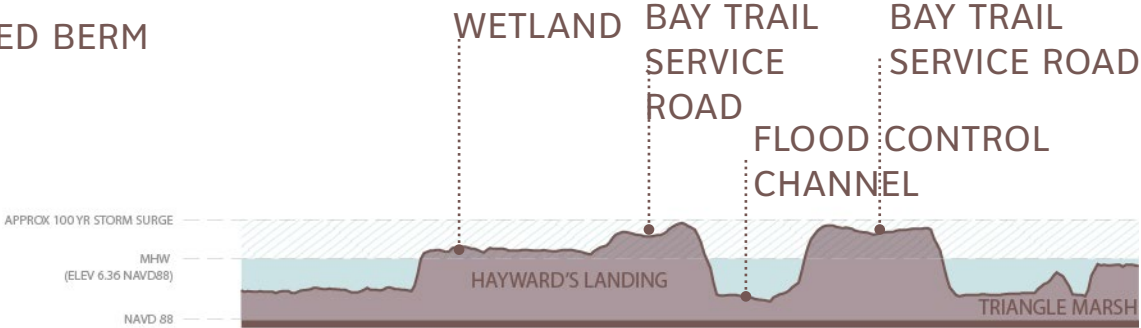


WAVE-EXPOSED
SECTION



SURFACE CONDITION

LANDING WETLAND NON-ENGINEERED BERM

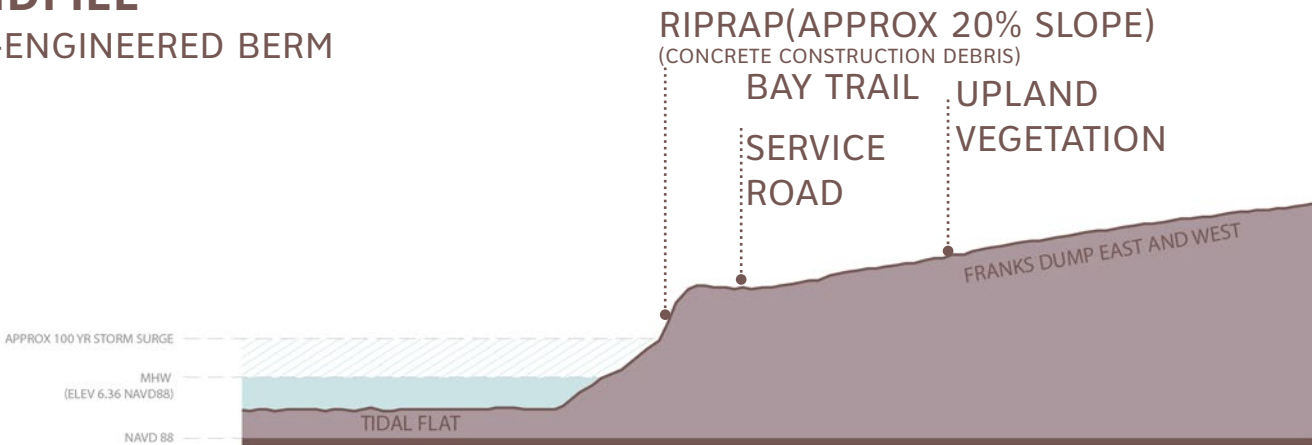


WAVE-EXPOSED
SECTION



SURFACE CONDITION

LANDFILL NON-ENGINEERED BERM

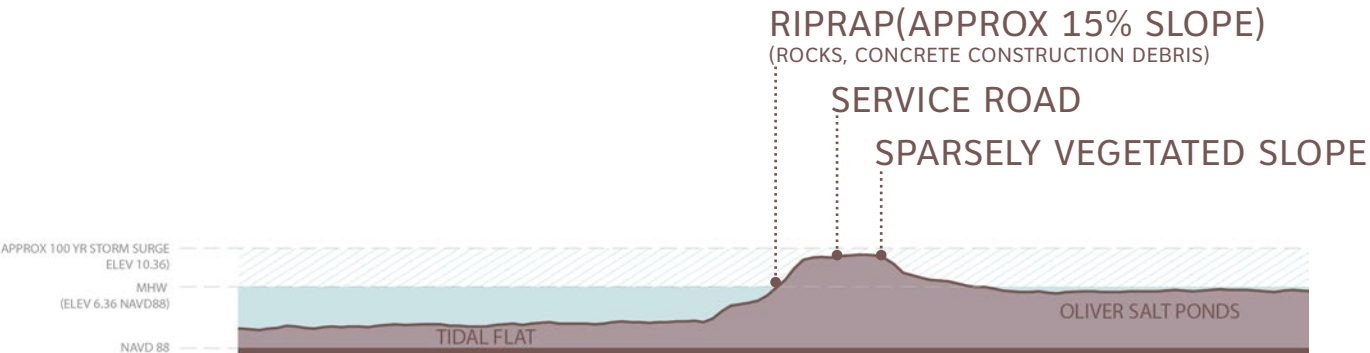


WAVE-EXPOSED
SECTION



SURFACE CONDITION

SALT POND NON-ENGINEERED BERM

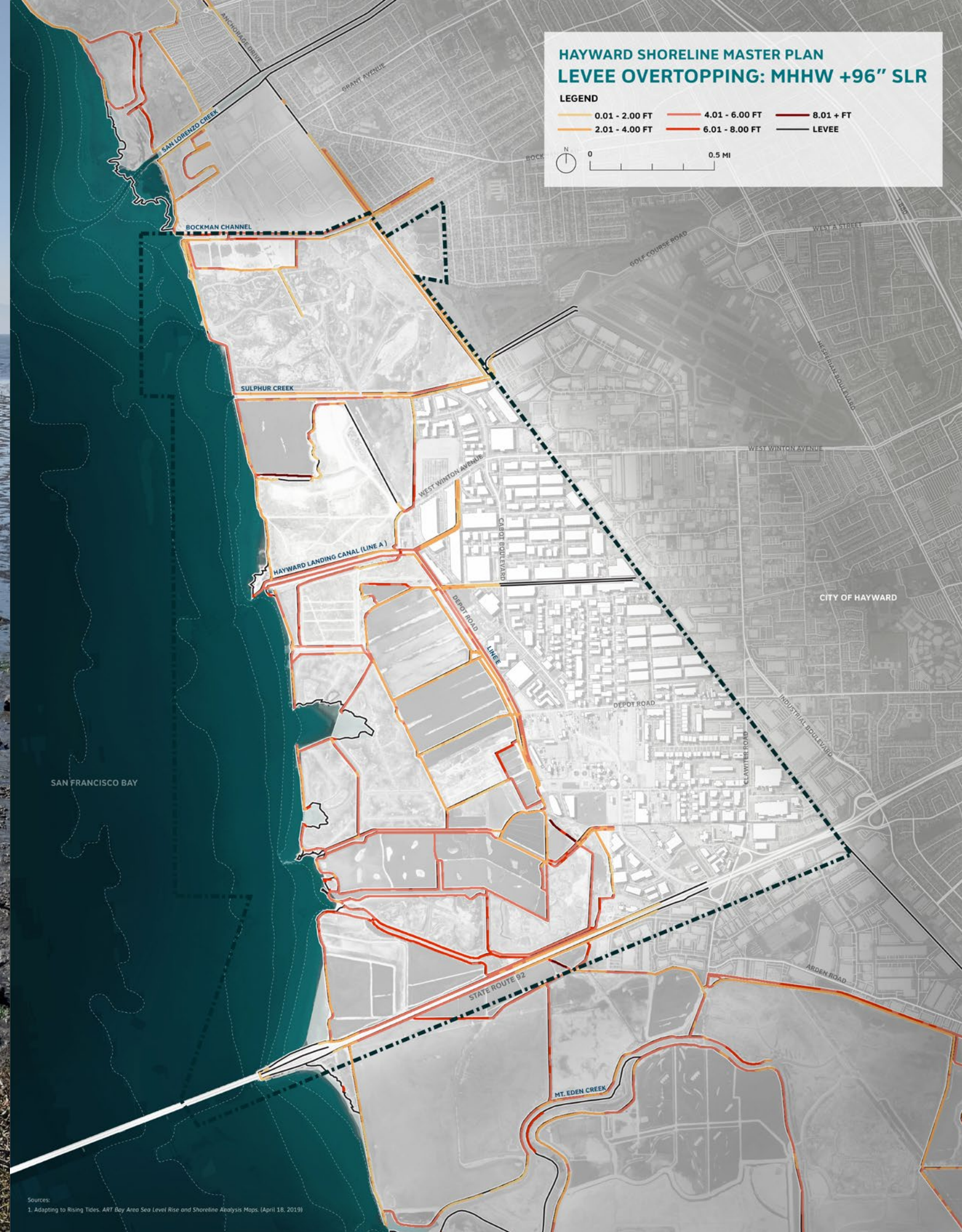


WAVE-EXPOSED
SECTION



SURFACE CONDITION

LEVEE FAILURE



SHORELINE EROSION



CRITICAL INFRASTRUCTURE

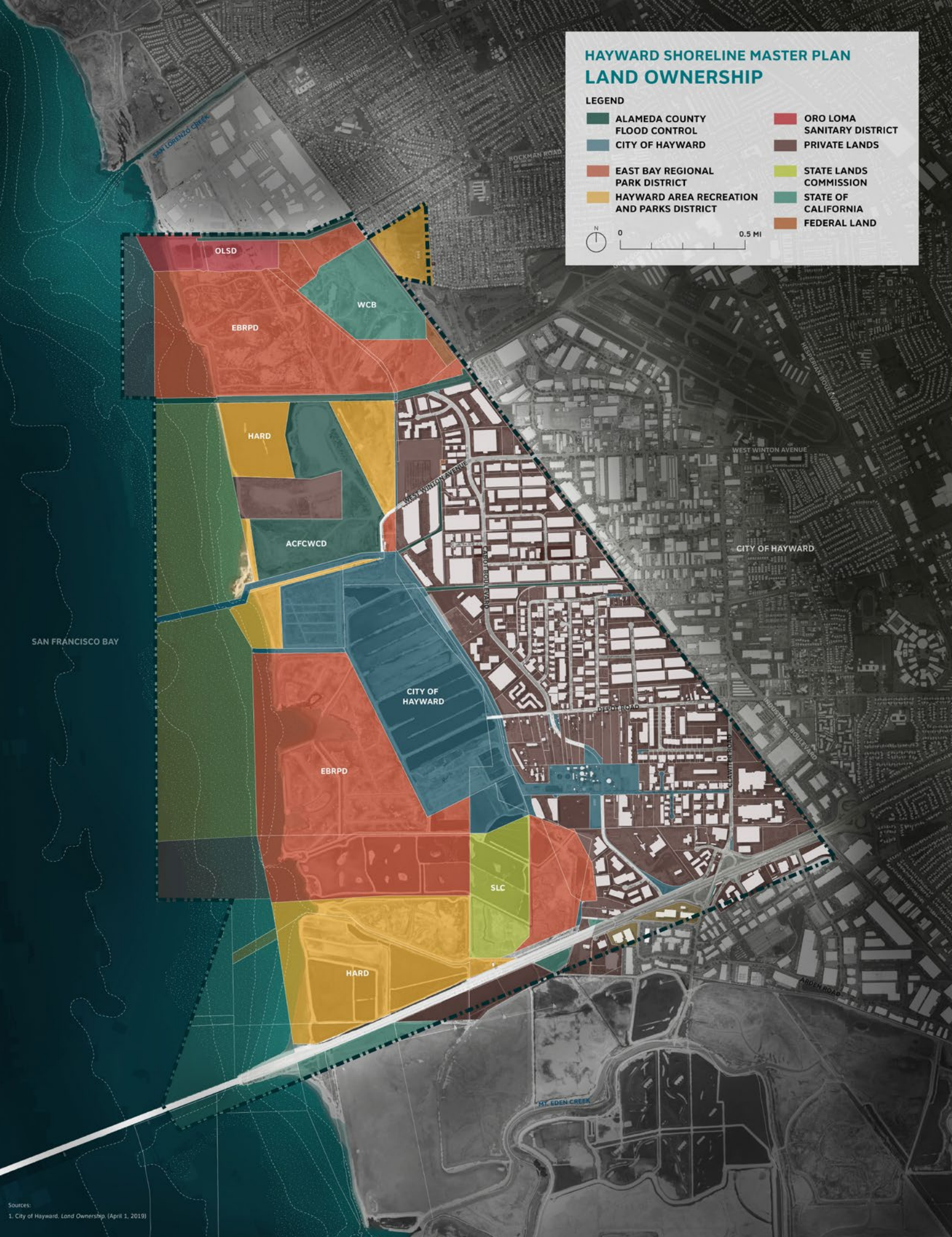




**HAYWARD SHORELINE MASTER PLAN
LAND OWNERSHIP**

LEGEND

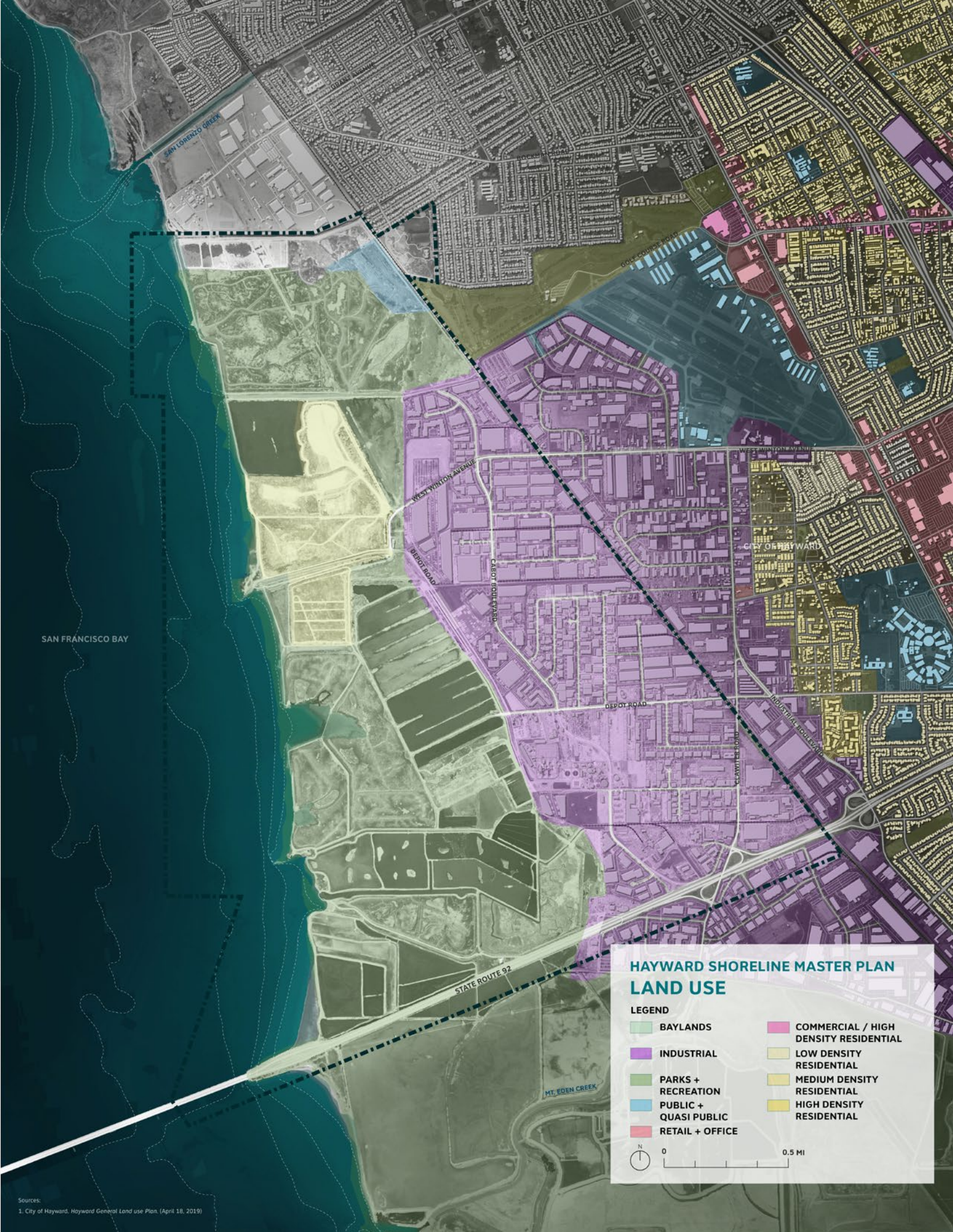
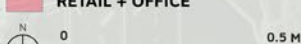
- | | |
|---|-------------------------------|
| ALAMEDA COUNTY
FLOOD CONTROL | ORO LOMA
SANITARY DISTRICT |
| CITY OF HAYWARD | PRIVATE LANDS |
| EAST BAY REGIONAL
PARK DISTRICT | STATE LANDS
COMMISSION |
| HAYWARD AREA RECREATION
AND PARKS DISTRICT | STATE OF
CALIFORNIA |
| | FEDERAL LAND |



**HAYWARD SHORELINE MASTER PLAN
LAND USE**

LEGEND

- | | |
|--------------------------|--|
| BAYLANDS | COMMERCIAL / HIGH
DENSITY RESIDENTIAL |
| INDUSTRIAL | LOW DENSITY
RESIDENTIAL |
| PARKS +
RECREATION | MEDIUM DENSITY
RESIDENTIAL |
| PUBLIC +
QUASI PUBLIC | HIGH DENSITY
RESIDENTIAL |
| RETAIL + OFFICE | |



RECREATIONAL INFRASTRUCTURE

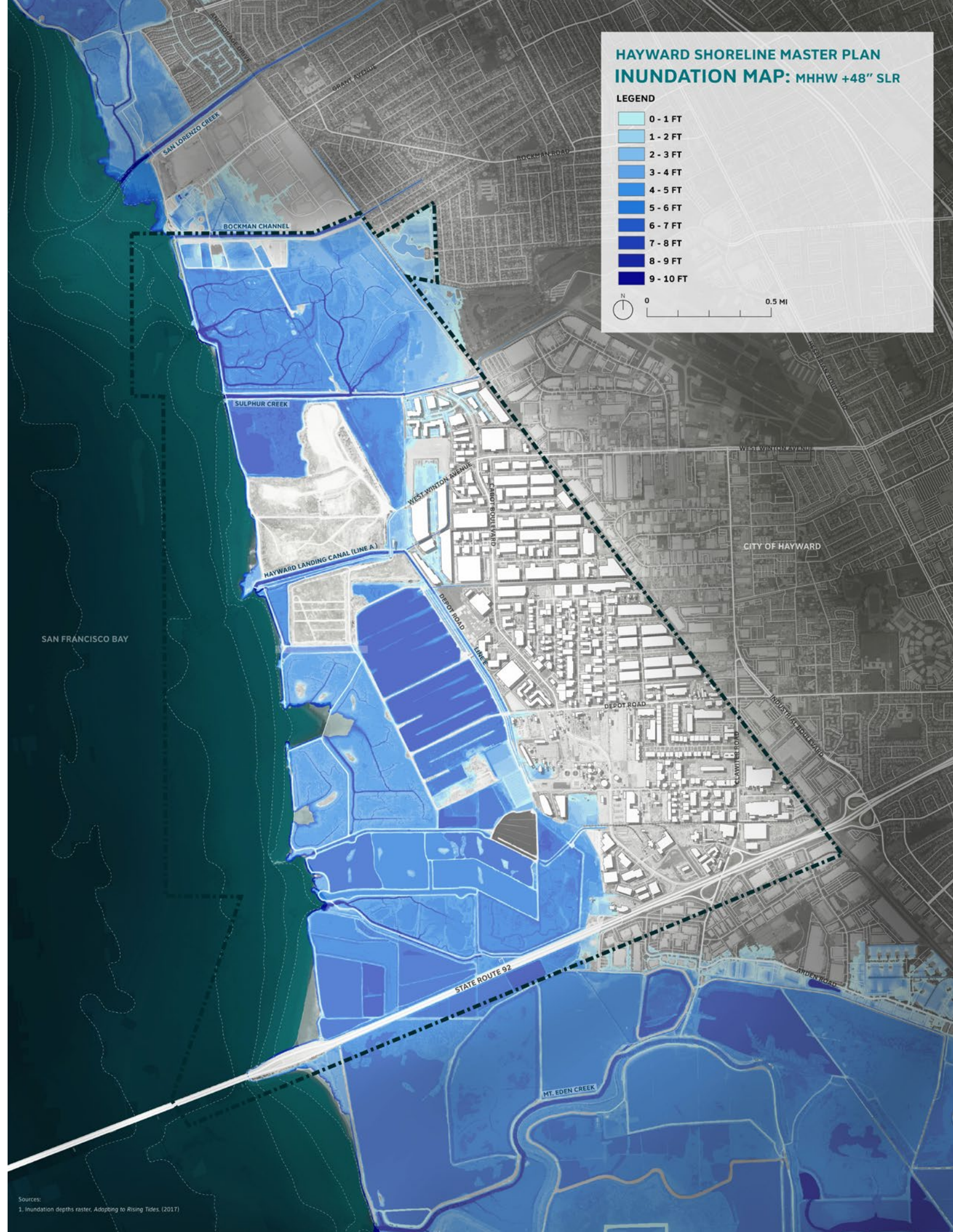
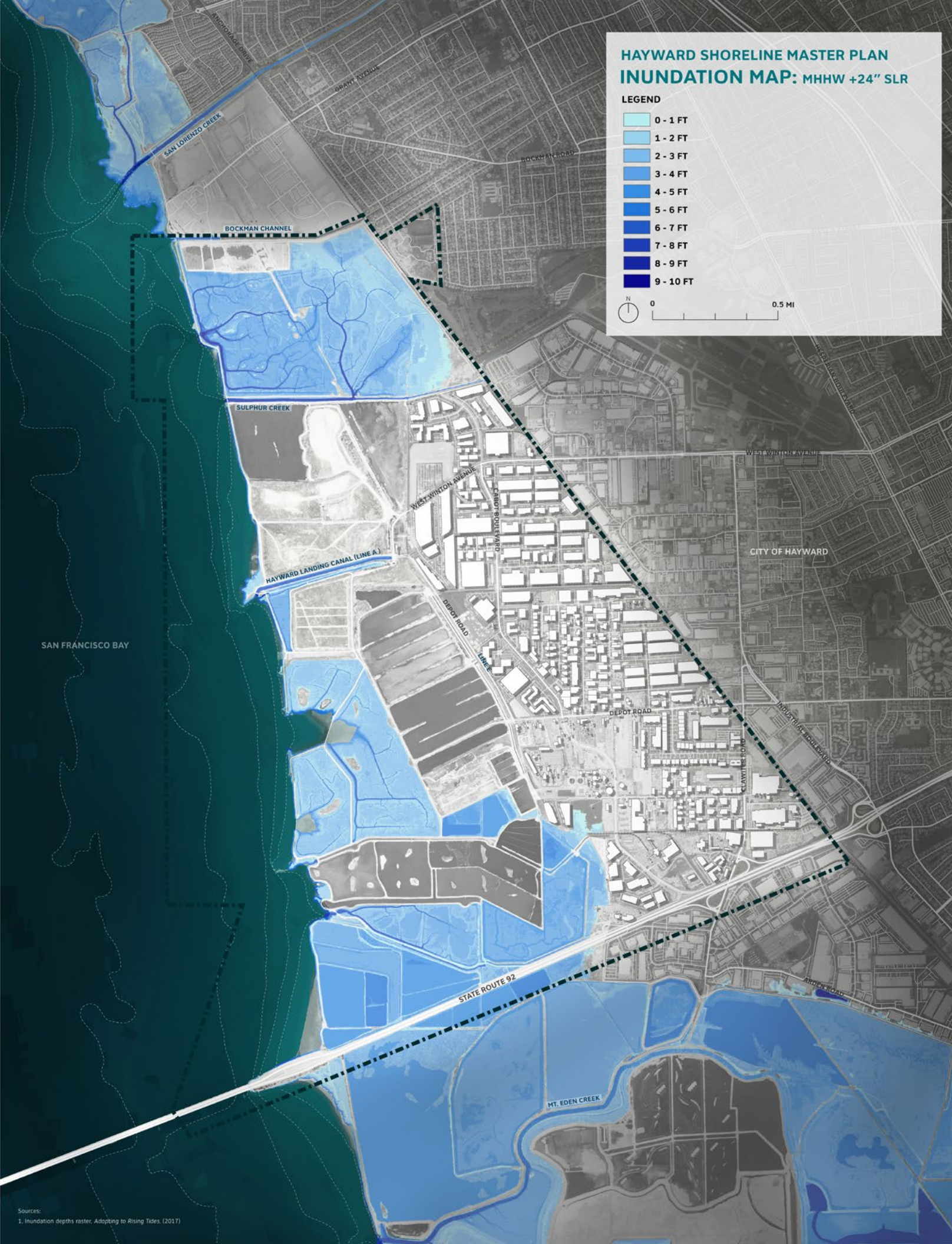


Sources:
1. Metropolitan Transportation Commission, Regional Bike Facilities, (April 18, 2019)
2. Metropolitan Transportation Commission, San Francisco Bay Trail, (April 18, 2019)
3. AC Transit, Bus Route GIS shapefiles, (April 18, 2019)
4. City of Hayward, Hayward Bicycle Network, (April 18, 2019)

HAYWARD REGIONAL SHORELINE CLIMATE CHANGE RISKS

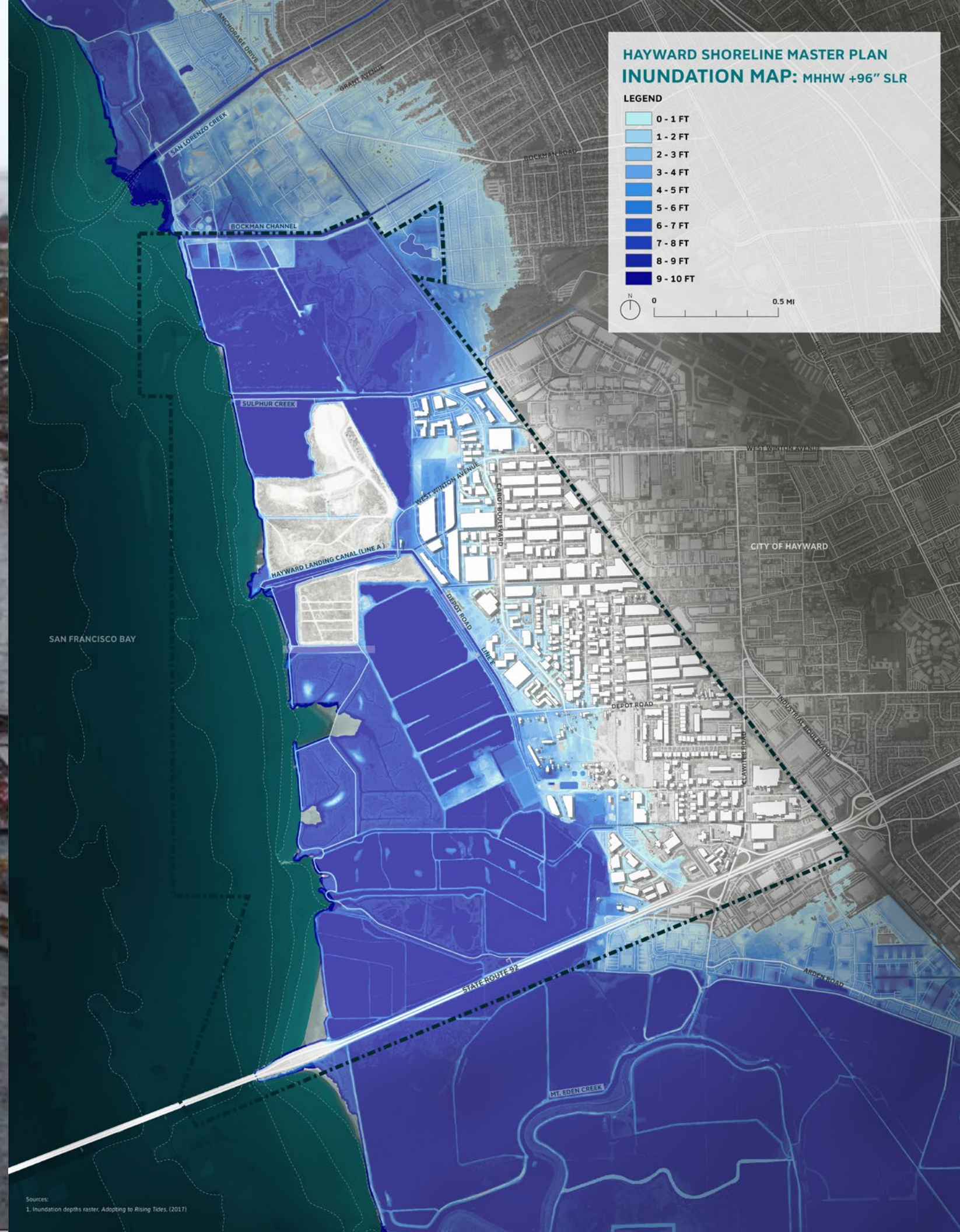
SEA LEVEL RISE





Sources:
1. Inundation depths raster. Adopting to Rising Tides. (2017)

Sources:
1. Inundation depths raster. Adopting to Rising Tides. (2017)



SEDIMENT/ EROSION

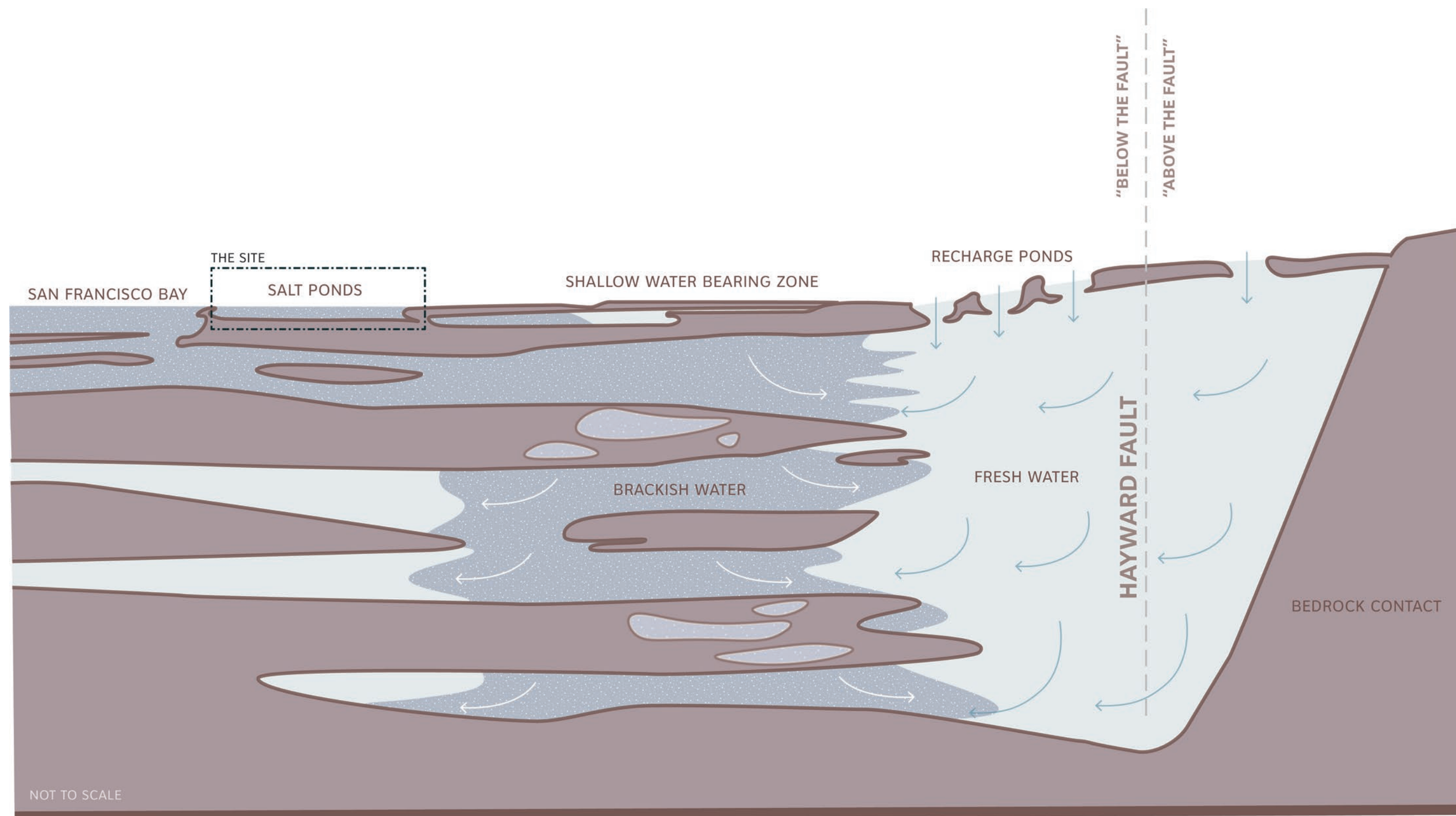


GROUNDWATER

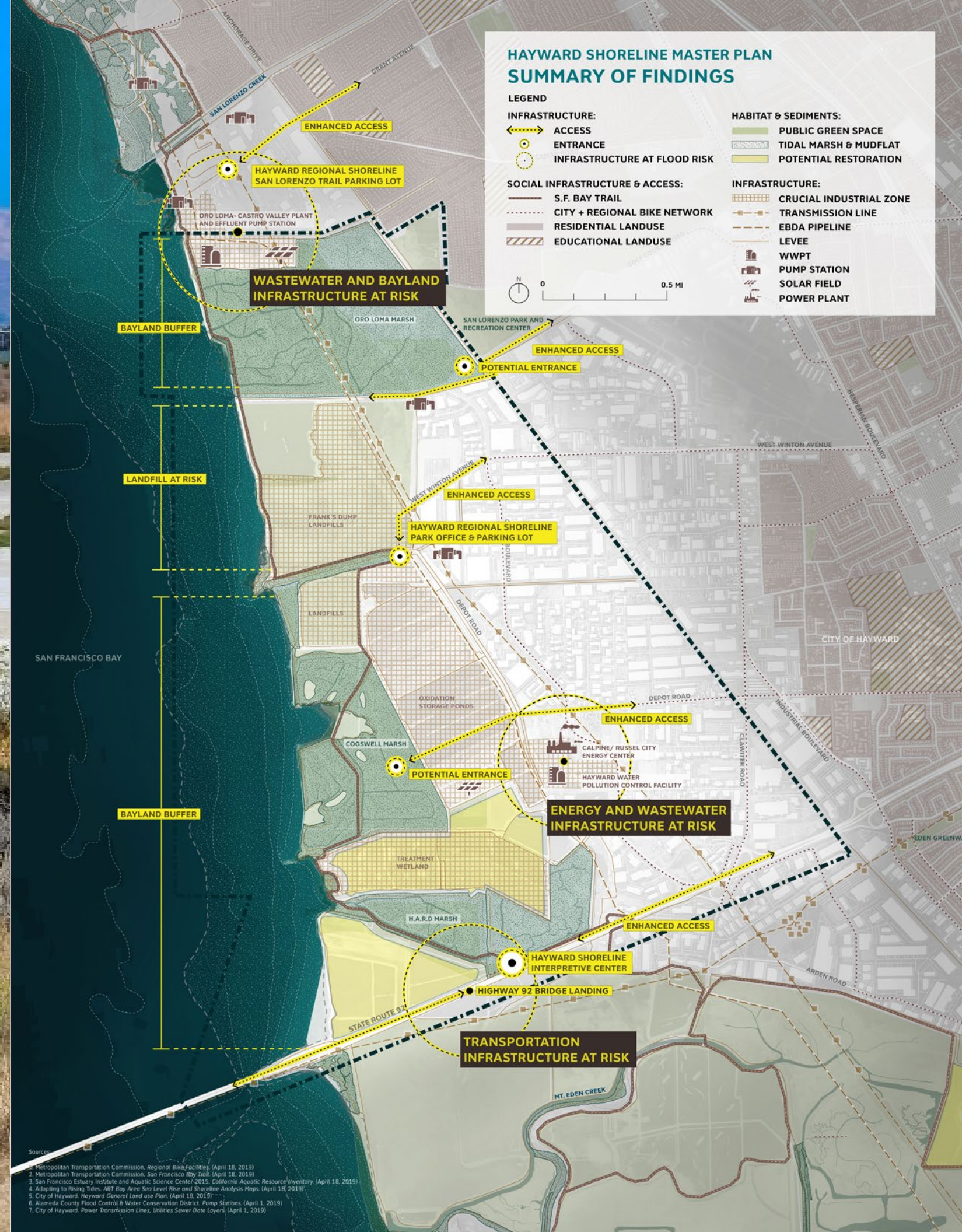


Sources:
1. United States Department of Agriculture. Web Soil Survey. (April 27, 2019)
2. California Department of Water Resources. Alluvial Groundwater Basins and Subbasins within the San Francisco Bay Hydrologic Region. 2013 (April 25, 2019)
3. United States Geological Survey. Hydrology and Geochemistry of Aquifers Underlying the San Lorenzo and San Leandro Areas of the East Bay Plain, Alameda County, California. (April 25, 2019)

GROUNDWATER AQUIFER CROSS SECTION



SUMMARY OF FINDINGS



STAKEHOLDER WORKSHOP



Stakeholder Workshop #1: Presentation



Stakeholder Workshop #1: Ecology Table

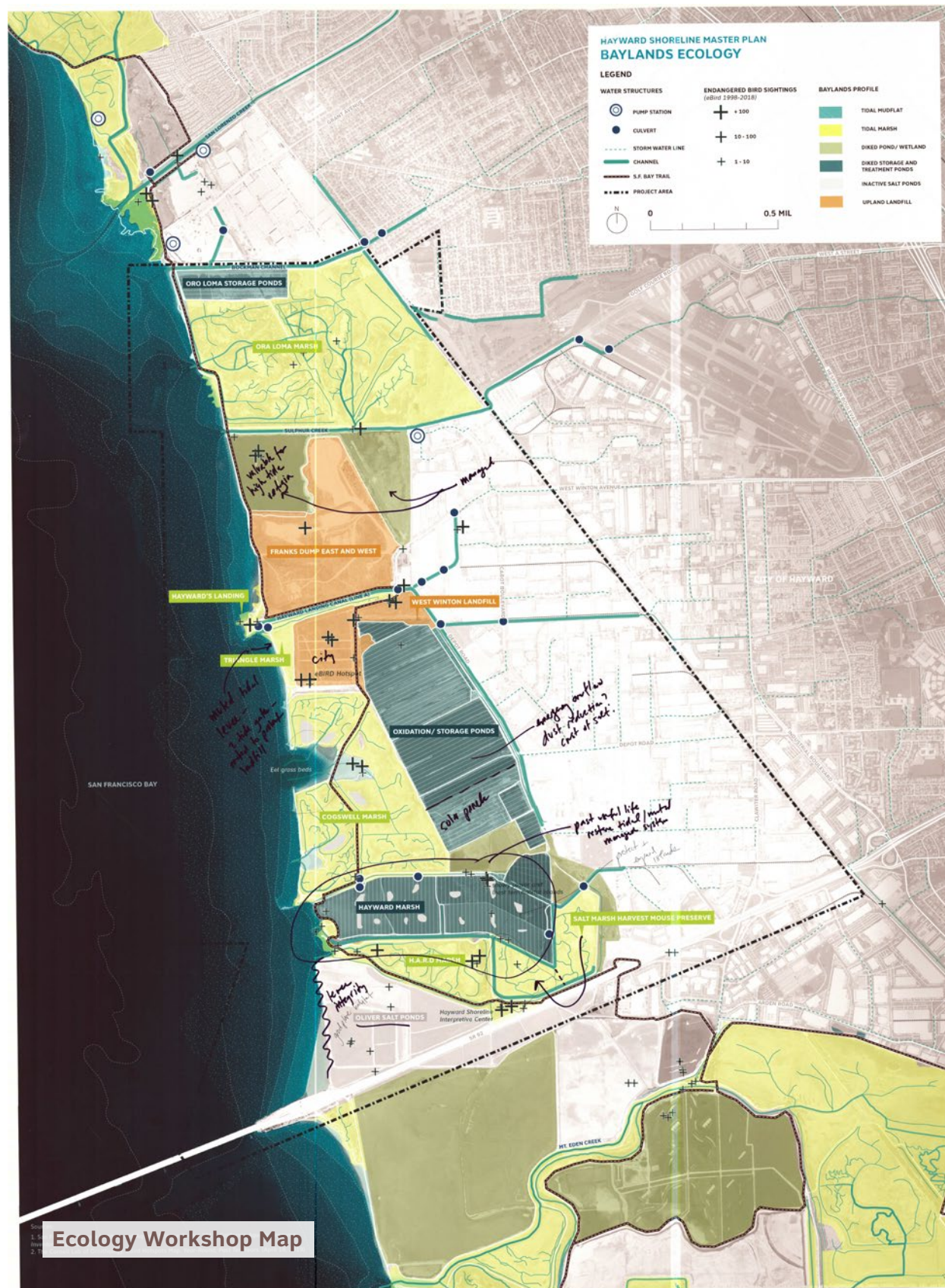


Stakeholder Workshop #1: Infrastructure Table

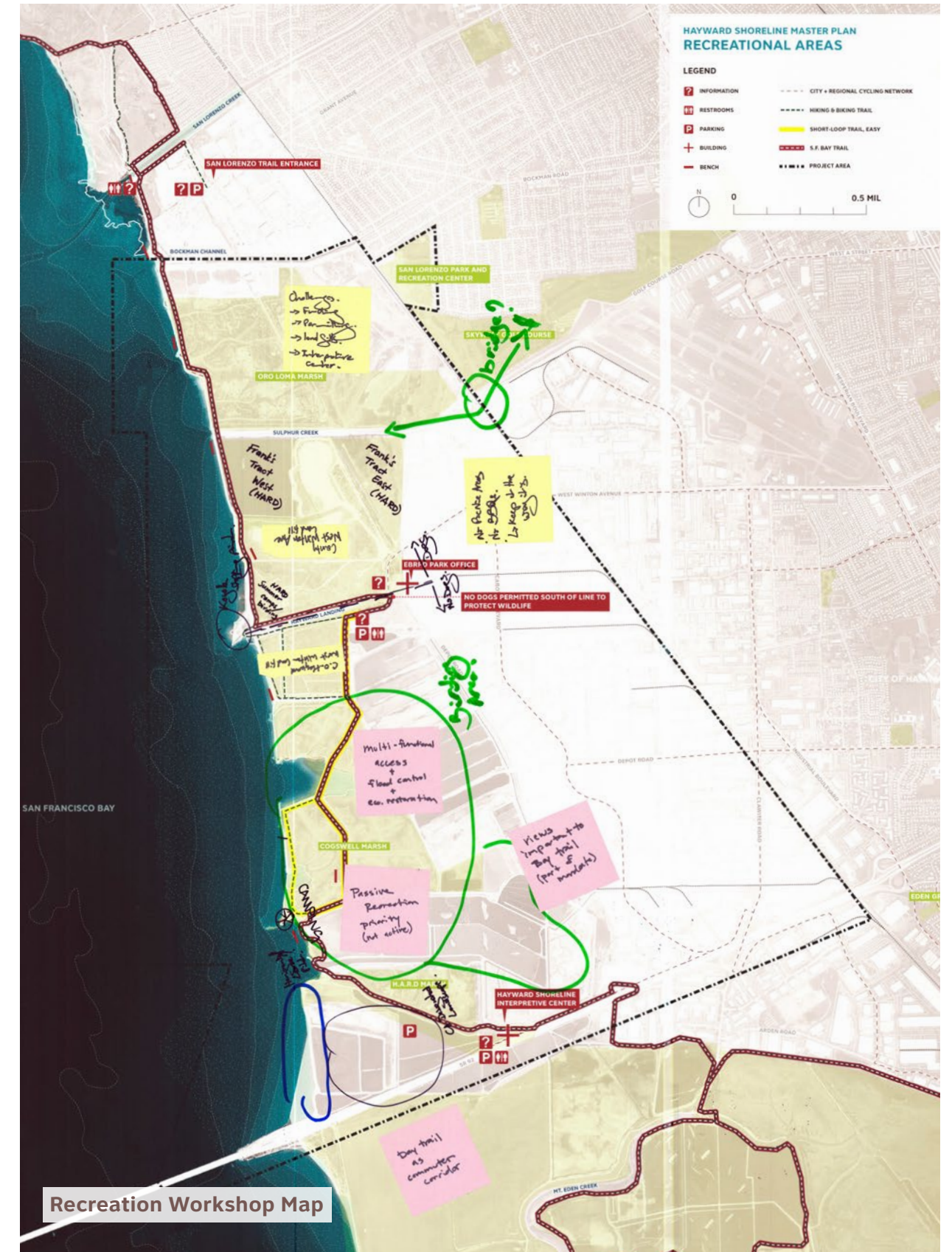


Stakeholder Workshop #1: Recreation Table

MAP DOCUMENTATION FROM STAKEHOLDER WORKSHOP #1



HAYWARD SHORELINE MASTER PLAN
July 11, 2019



Recreation Workshop Map

ONLINE SURVEY SUMMARY OF FINDINGS

OVERVIEW

- **Completed in Spring 2019**
- **23 questions**
- **900 responses**
- **Shared via:**
 - Email
 - Newsletters
 - Social media
 - City of Hayward's website
 - EBRP's website

KEY FINDINGS

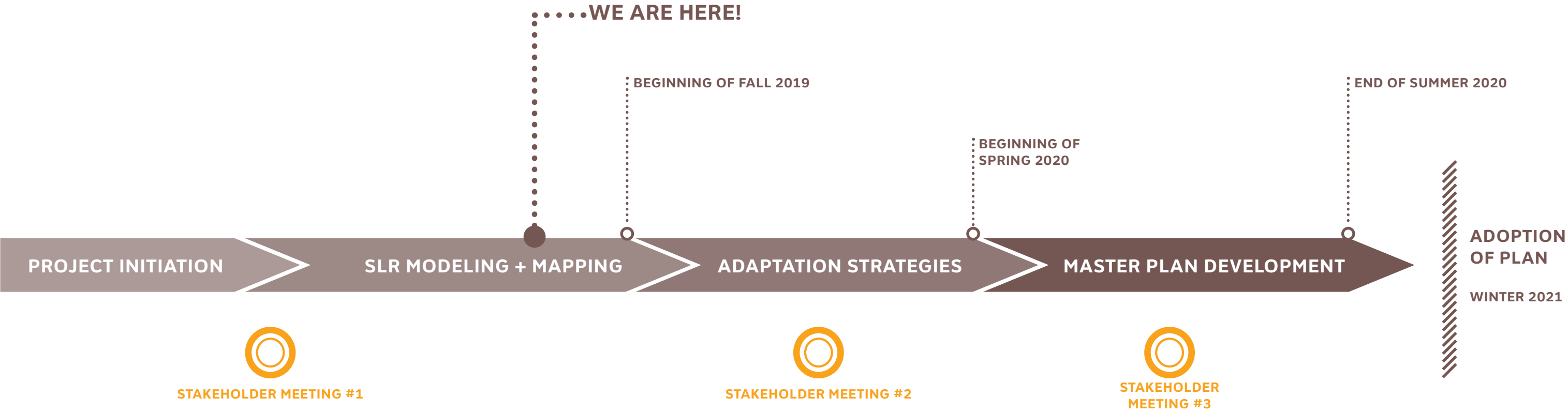
- **Very important or important to be protected against flooding.**
- **Wetlands are vital to the health of the Bay.**
- **Recreation creates a bond with ecological resources**
- **Shoreline views do not perform in any way to alleviate the impacts of climate change.**
- **Access is more important than views.**

KEY FINDINGS

- **Very important to conserve the shoreline's natural environment.**
- **Biodiversity, in both native plant species and native animals, maintaining natural habitats, preserving the wetlands, and having clean water and air are important for a healthy environment**
- **Using landscaping would be a good way to help reduce the impact of sea level rise.**
- **Relocate at-risk infrastructure to higher ground, or that using vacant land as a place to “store” excess floodwater would be best.**

NEXT STEPS

NEXT STEPS



- BACKGROUND REPORT ON EXISTING CONDITIONS
- STAKEHOLDER OUTREACH PLAN

- SEA LEVEL RISE AND GROUNDWATER MAPPING ANALYSIS
- ONLINE DISPLAY OF SLR MAPS AND ASSOCIATED RISKS

- GOALS AND POLICIES
- ADAPTATION STRATEGIES AND IMPLEMENTATION ACTIONS

- SHORELINE MASTER PLAN CONCEPT
- DESIGN ALTERNATIVES
- IDENTIFY FUNDING SOURCES
- MASTER PLAN (DRAFT AND FINAL)

SHORELINE STRATEGIES FOR CONSIDERATION

STRATEGIES FOR CONSIDERATION



Protection of Critical Infrastructure



Resilient Zoning

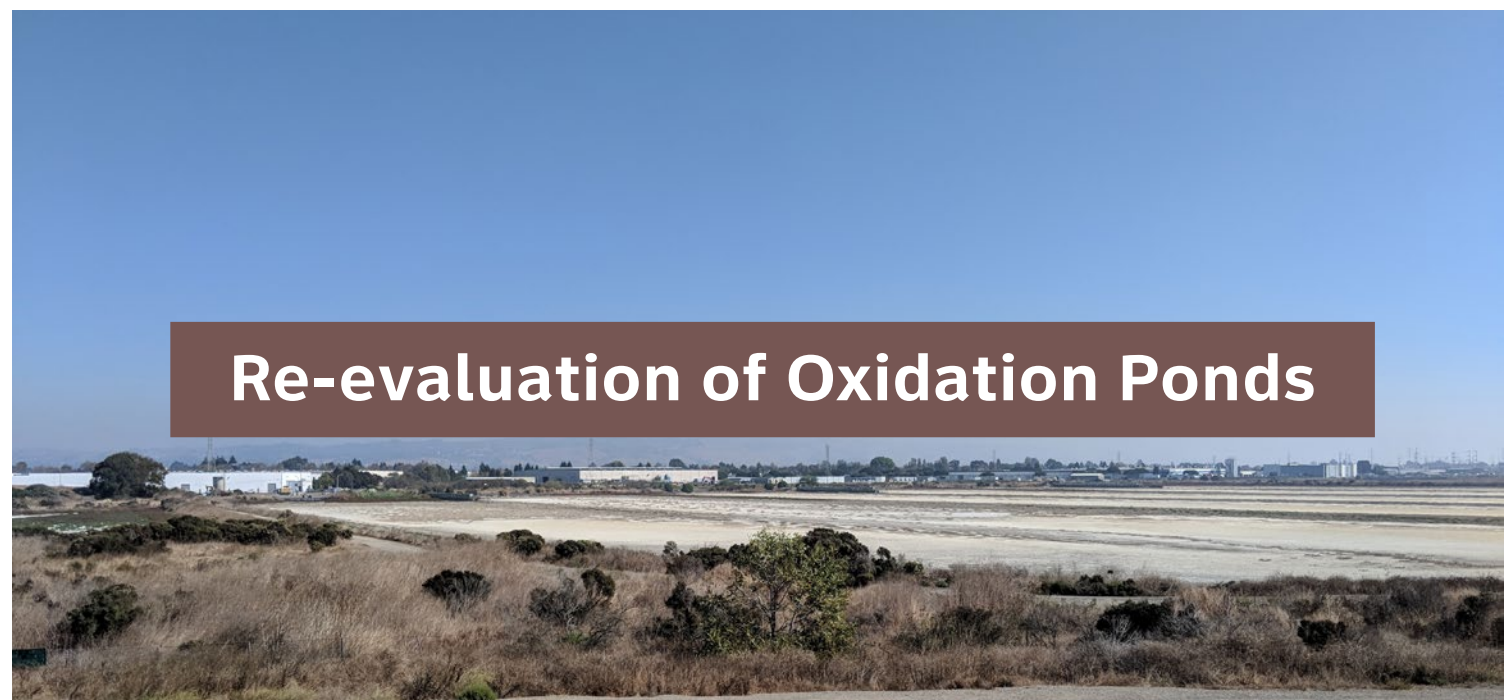
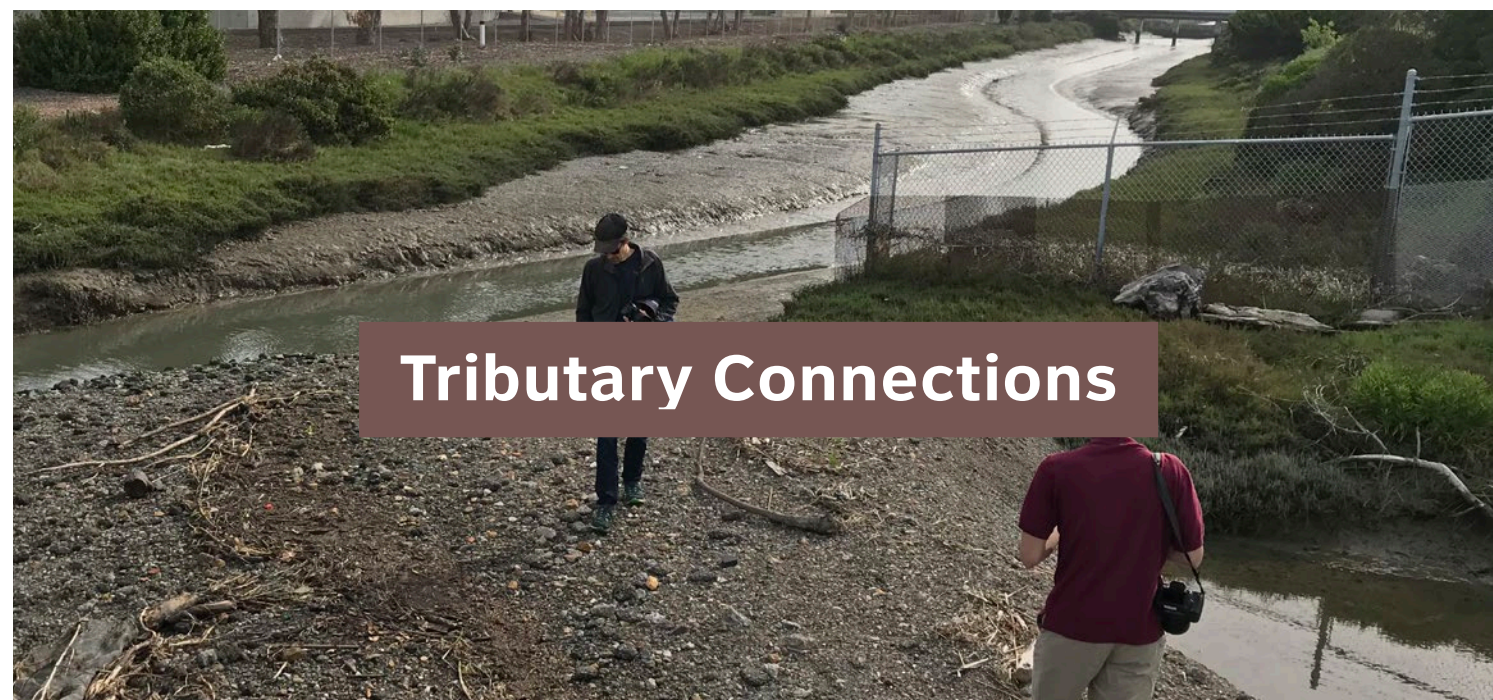


Protecting Human Health and Safety



Prioritize Levee Repair

STRATEGIES FOR CONSIDERATION



STRATEGIES FOR CONSIDERATION



Horizontal Levee Application



Identification of Transition Zones

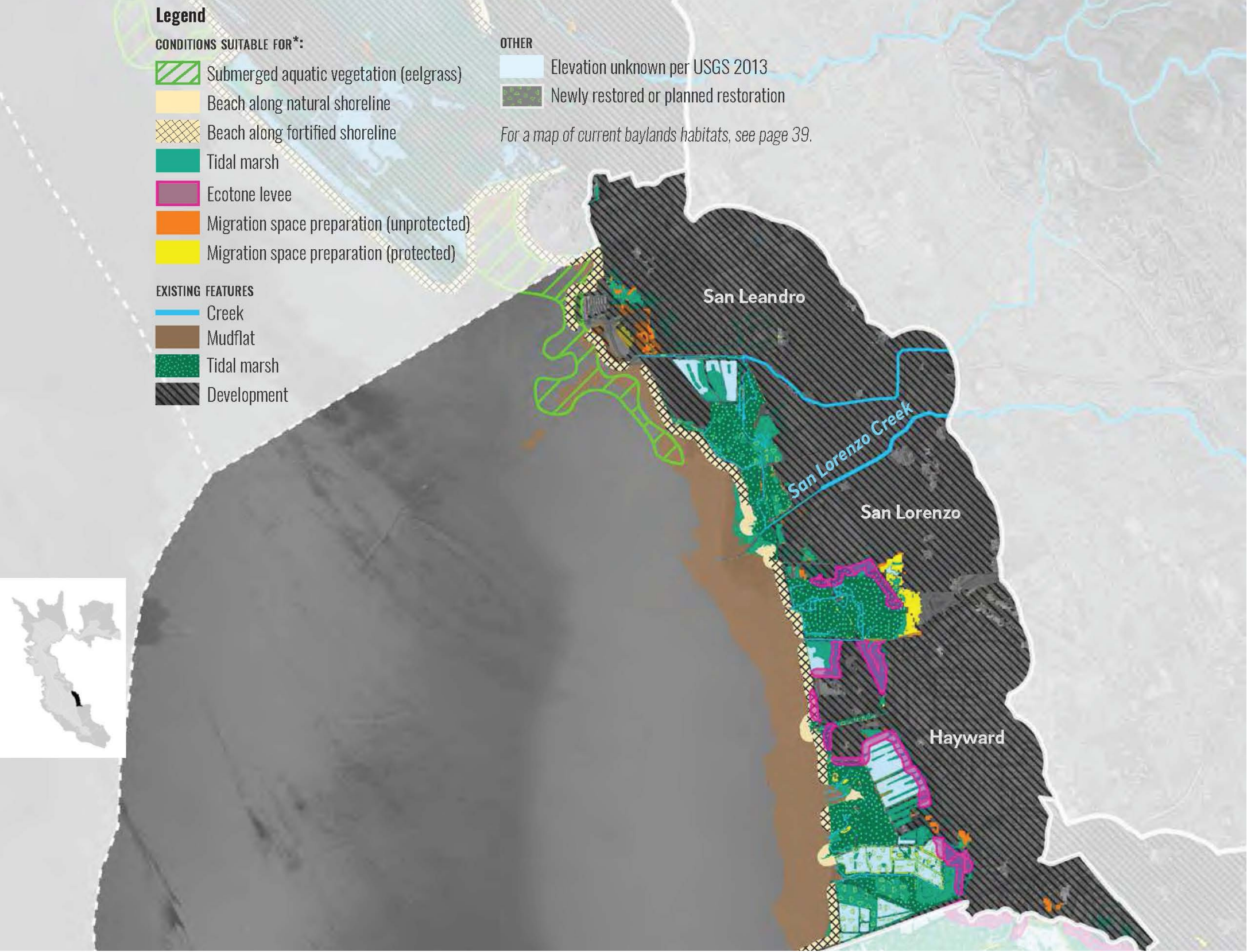


Resilient Bay Trail Alignments



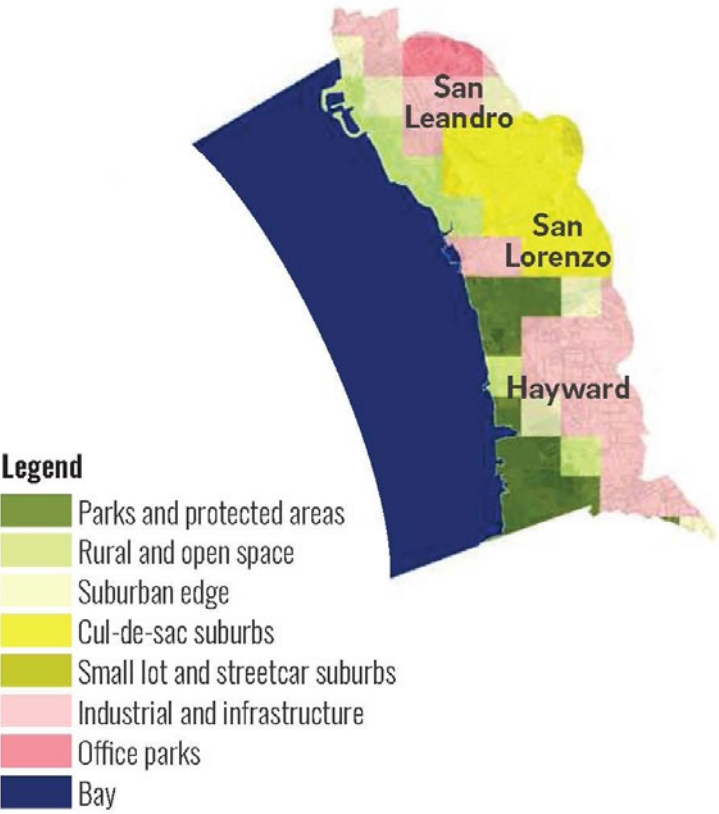
Citizen Science + Monitoring

NATURE BASED ADAPTATION OPPORTUNITIES



Selected Measures		Suitability
NATURE-BASED	Nearshore reefs	○
	Submerged aquatic vegetation	●
	Beaches	●
	Tidal marshes	●
	Polder management	◐
	Ecotone levees	●
	Migration space preparation	◐
<hr/>		
○ Limited suitability		◐ Some suitability
		● High suitability

Place Types Map



ADAPTATION ATLAS: TIDAL MARSHES

COASTAL RISKS MANAGED



Storm surge



Erosion



Combined flooding



Short term SLR



Long term SLR



Fluvial flooding

OTHER ECOSYSTEM SERVICES

- Biodiversity • Food supply •
- Climate regulation •
- Water quality improvement •
- Recreation •
- Other cultural services •

IMPACT ON SHORELINE

Protect • Accommodate • Retreat

LOCATION WITHIN TIDAL TRANSECT

SHORE

Supratidal

MHHW

MHW

MTL

MLW

MLLW

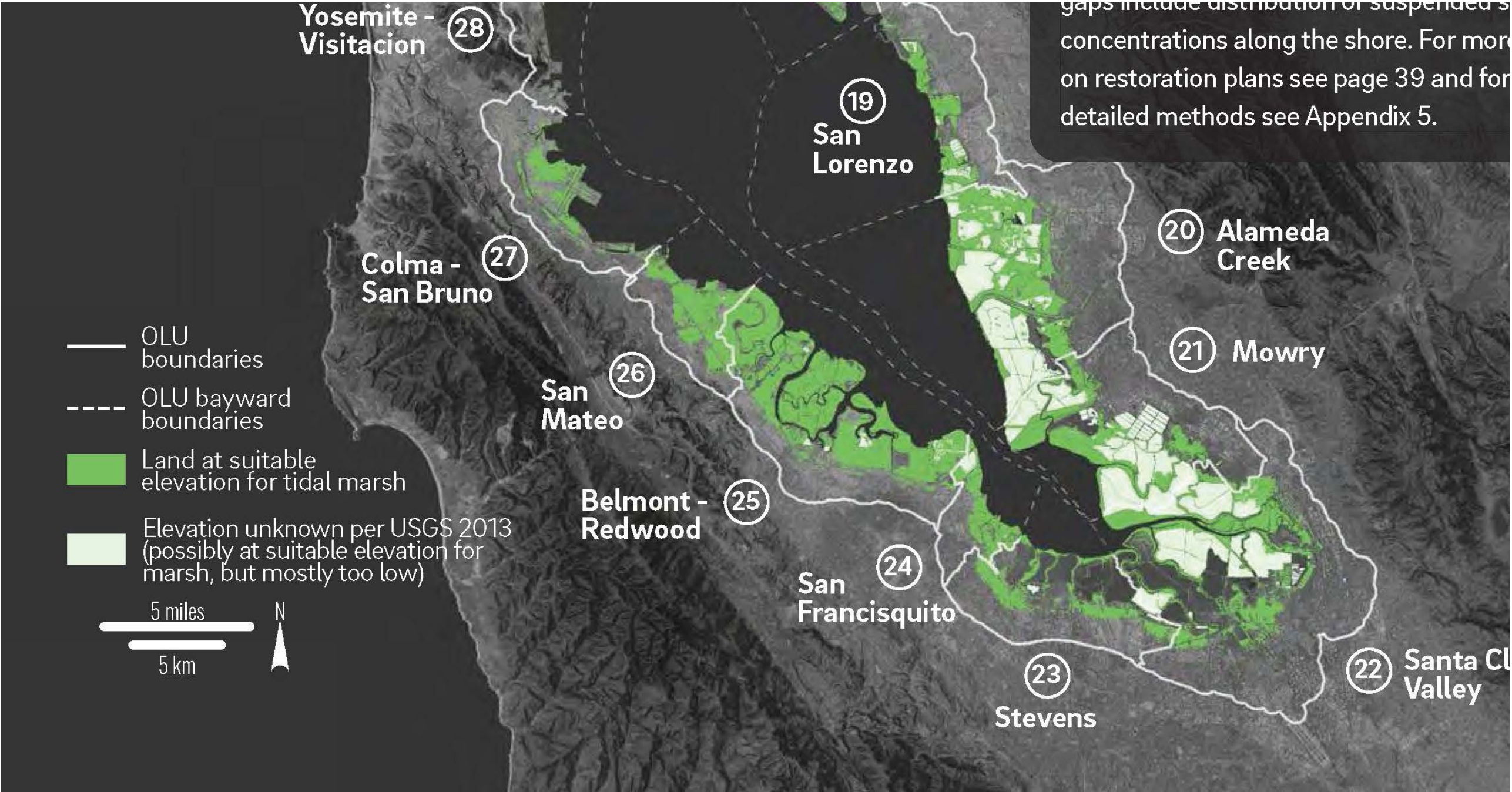
Shallow subtidal

Deep subtidal

BAY

EXAMPLES

Bair Island, Sonoma Baylands, South Bay Salt Ponds, Giant Marsh and many others



ADAPTATION ATLAS: BEACHES

COASTAL RISKS MANAGED



Storm surge

Erosion

Combined flooding



Short term SLR

Long term SLR

Fluvial flooding

OTHER ECOSYSTEM SERVICES

- Biodiversity • Food supply •
- Climate regulation •
- Water quality improvement •
- Recreation •
- Other cultural services •

IMPACT ON SHORELINE

Protect • Accommodate • Retreat

LOCATION WITHIN TIDAL TRANSECT

SHORE

Supratidal

MHHW

MHW

MTL

MLW

MLLW

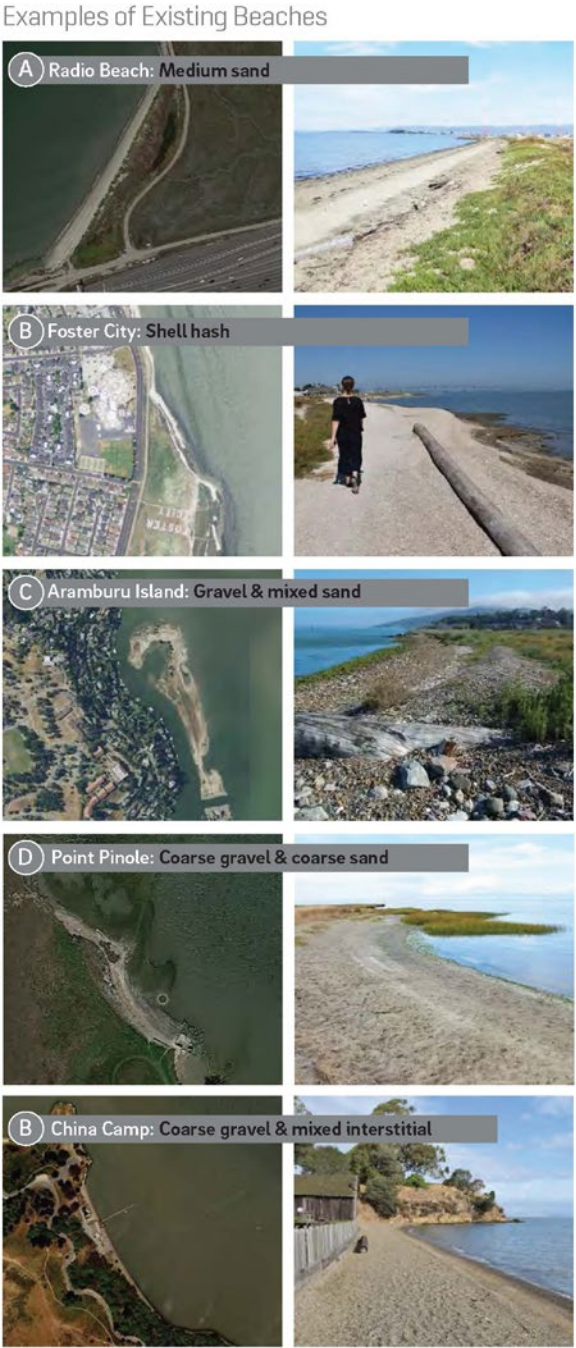
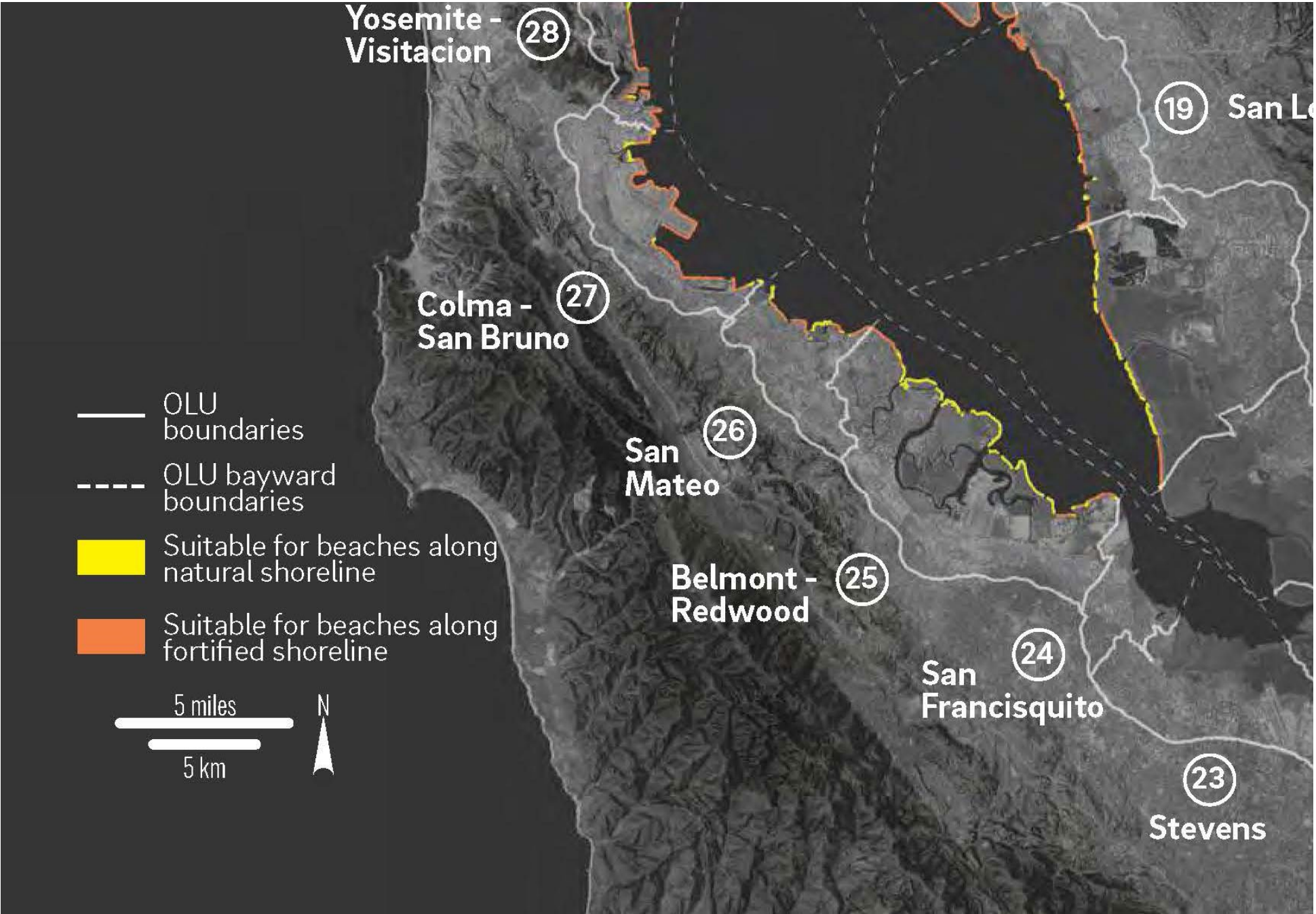
Shallow subtidal

Deep subtidal

BAY

EXAMPLES

Aramburu Beach



ADAPTATION ATLAS: MUDFLAT AUGMENTATION

COASTAL RISKS MANAGED



Storm surge

Erosion

Combined flooding



Short term SLR

Long term SLR

Fluvial flooding

OTHER ECOSYSTEM SERVICES

- Biodiversity • Food supply •
- Climate regulation •
- Water quality improvement •
- Recreation •
- Other cultural services •

IMPACT ON SHORELINE

Protect • Accommodate • Retreat

LOCATION WITHIN TIDAL TRANSECT

SHORE

Supratidal

MHHW

MHW

MTL

MLW

MLLW

Shallow subtidal

Deep subtidal

BAY

EXAMPLES

Seal Beach (Southern California)



ADAPTATION ATLAS: ECOTONE LEVEL

COASTAL RISKS MANAGED



Storm surge



Erosion



Combined flooding



Short term SLR



Long term SLR



Fluvial flooding

OTHER ECOSYSTEM SERVICES

- Biodiversity • Food supply •
- Climate regulation* •
- Water quality improvement* •
- Recreation •
- Other cultural services •

* Service dependent on chosen management approach

IMPACT ON SHORELINE

Protect • Accommodate • Retreat

LOCATION WITHIN TIDAL TRANSECT

SHORE

Supratidal

MHHW

MHW

MTL

MLW

MLLW

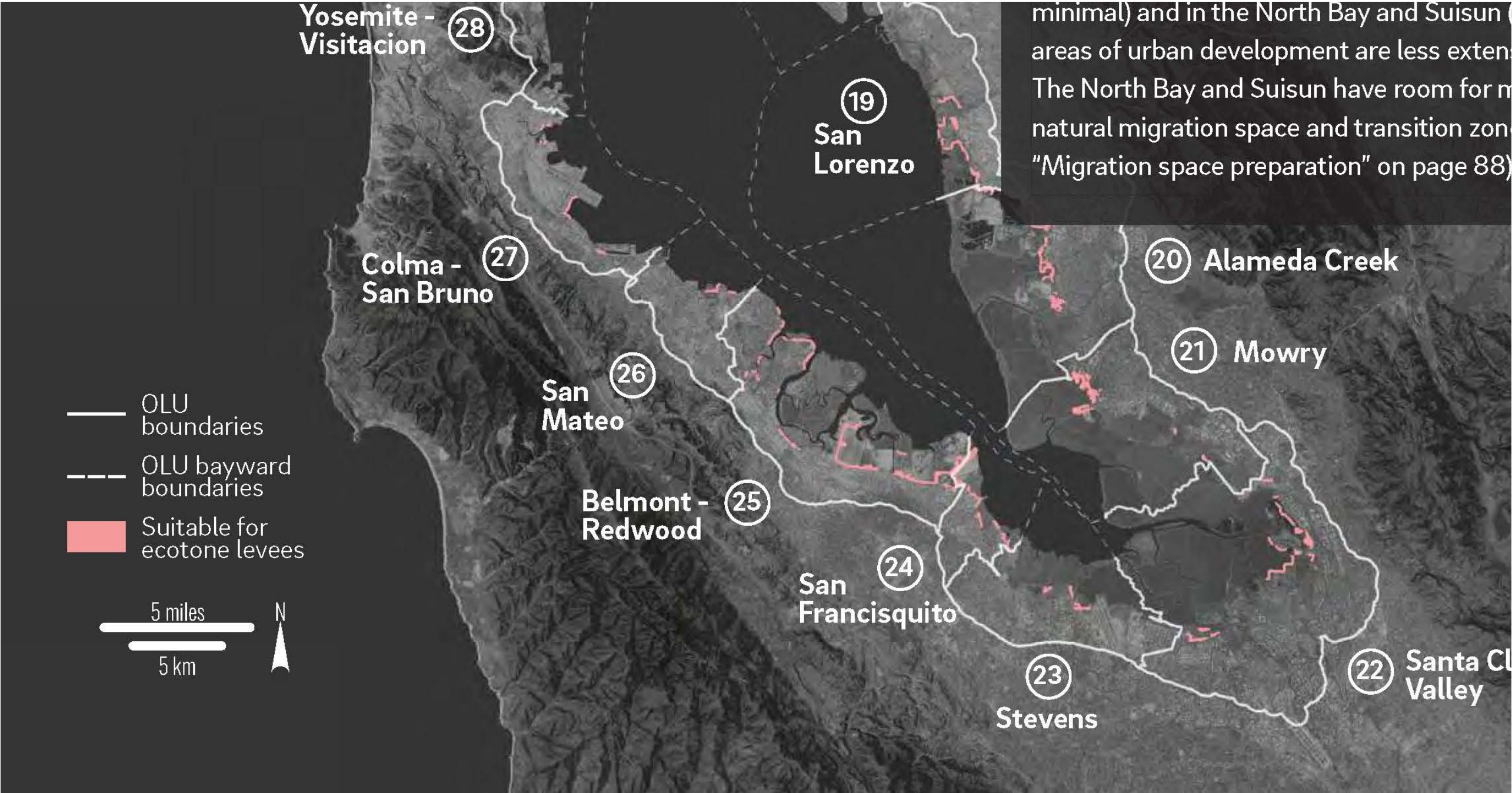
Shallow subtidal

Deep subtidal

BAY

EXAMPLES

Oro Loma Sanitary District



THANK YOU!