WATERFRONT RESILIENCE
PORT OF SAN FRANCISCO/ARMY CORPS FLOOD STUDY

MISSION BAY WATERFRONT RESILIENCE
COMMUNITY MEETING
Thursday March 7, 2019
UCSF Mission Bay Campus

MEETING AGENDA

- Thank you for joining us tonight at the Mission Bay Waterfront Resilience Community Meeting!
- Tonight we will cover:
  - City/Port of San Francisco Resilience
  - Scales of Resilience
    - Project
    - Neighborhood/Asset
    - Landscape Scale/Citywide
  - U.S. Army Corps of Engineers/Port Flood Study
  - Related projects and efforts
  - Engagement Exercise
  - Next Steps

TONIGHT'S OBJECTIVES

1

March 2019

Introduction

Mission Bay Army Corps Flood Study

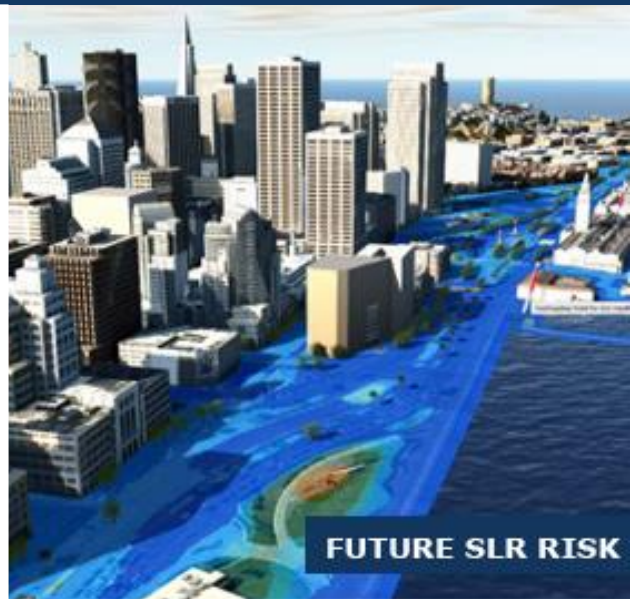
1. **Informational**: Learn about the Army Corps/Port of San Francisco Flood Study and related resilience projects and efforts

2. **Participation and engagement**: Engagement activity to better understand what is important/what people care about

3. **Discussion**: Discuss outcomes of engagement exercise and what it means for equity, environment, economy, community, City and regional issues, priorities, and opportunities

This meeting is designed to allow us to better understand the assets and services in the project area and identify what people care about, what they think is most important, what they are concerned about, and what this means to their lives.

FLOOD HAZARD

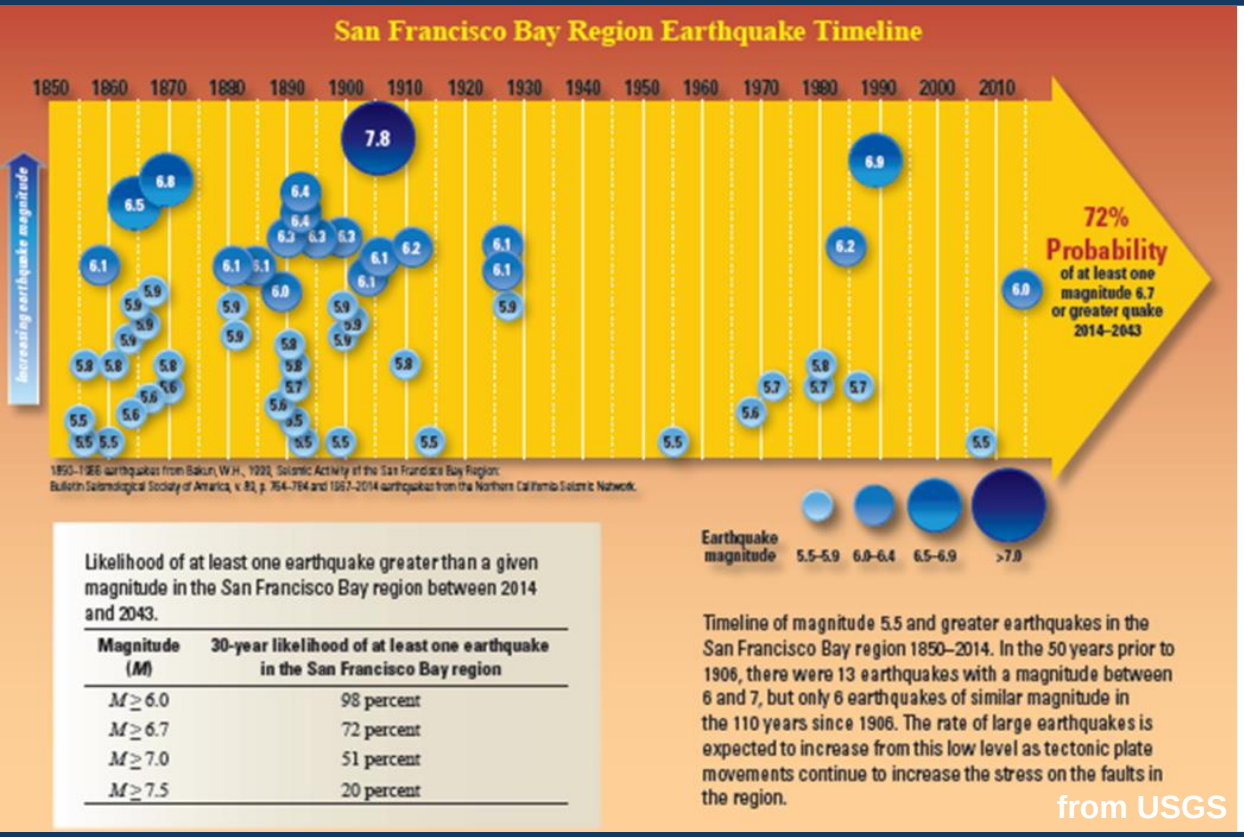


San Francisco faces increasing flood risk.

- Some shoreline areas already experience flooding
- 100 year flood event would create significant disruption to critical assets and services
- Increasing flood risks from sea level rise (SLR)
  - Up to 3 feet by 2050
  - Up to 6–10 feet by 2100

San Francisco's shoreline will flood more often and new areas will begin to experience flooding in the coming decades

EARTHQUAKE HAZARD

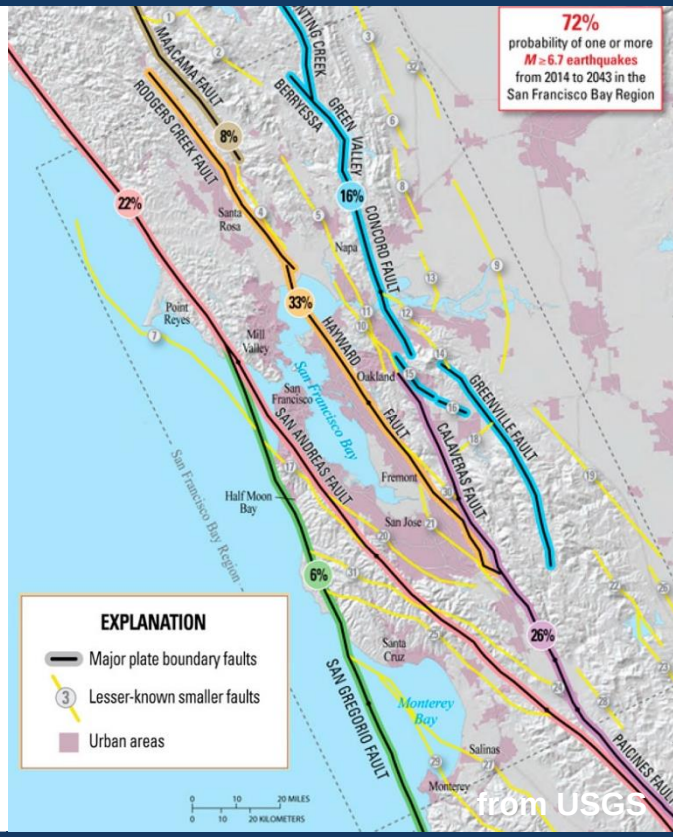


Likelihood of at least one earthquake greater than a given magnitude in the San Francisco Bay region between 2014 and 2043.

Magnitude (*M*)	30-year likelihood of at least one earthquake in the San Francisco Bay region
$M \geq 6.0$	98 percent
$M \geq 6.7$	72 percent
$M \geq 7.0$	51 percent
$M \geq 7.5$	20 percent

Timeline of magnitude 5.5 and greater earthquakes in the San Francisco Bay region 1850–2014. In the 50 years prior to 1906, there were 13 earthquakes with a magnitude between 6 and 7, but only 6 earthquakes of similar magnitude in the 110 years since 1906. The rate of large earthquakes is expected to increase from this low level as tectonic plate movements continue to increase the stress on the faults in the region.

from USGS



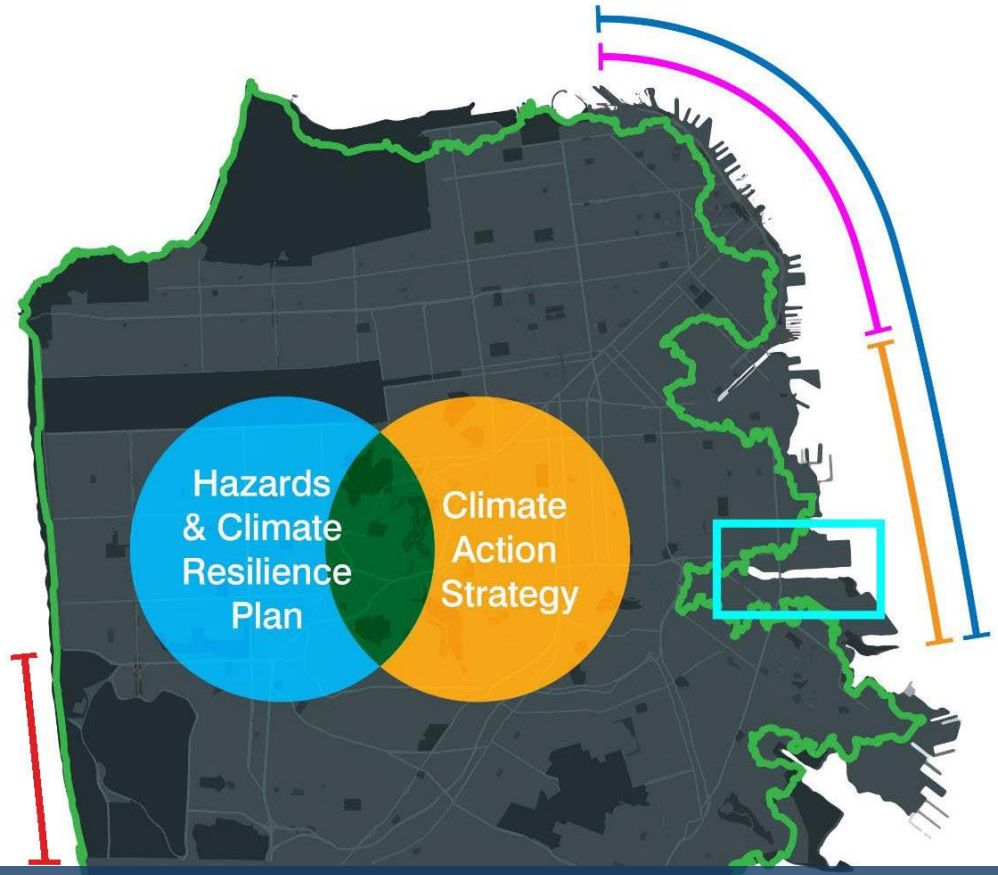
from USGS

The likelihood of a major earthquake is high and increasing every day:

- USGS forecast: **72% likelihood of at least one major earthquake by 2043**
- **Historically quiet period since 1906:** In the 50 years prior to the great 1906 Earthquake, there were 13 M6-M7 earthquakes, but only 6 in the 112 years since
- **San Andreas & Hayward Faults are highest risk**

CITYWIDE RESILIENCE EFFORTS

Efforts Underway Across Scales, Hazards & Assets



CITYWIDE PLANS & STRATEGIES

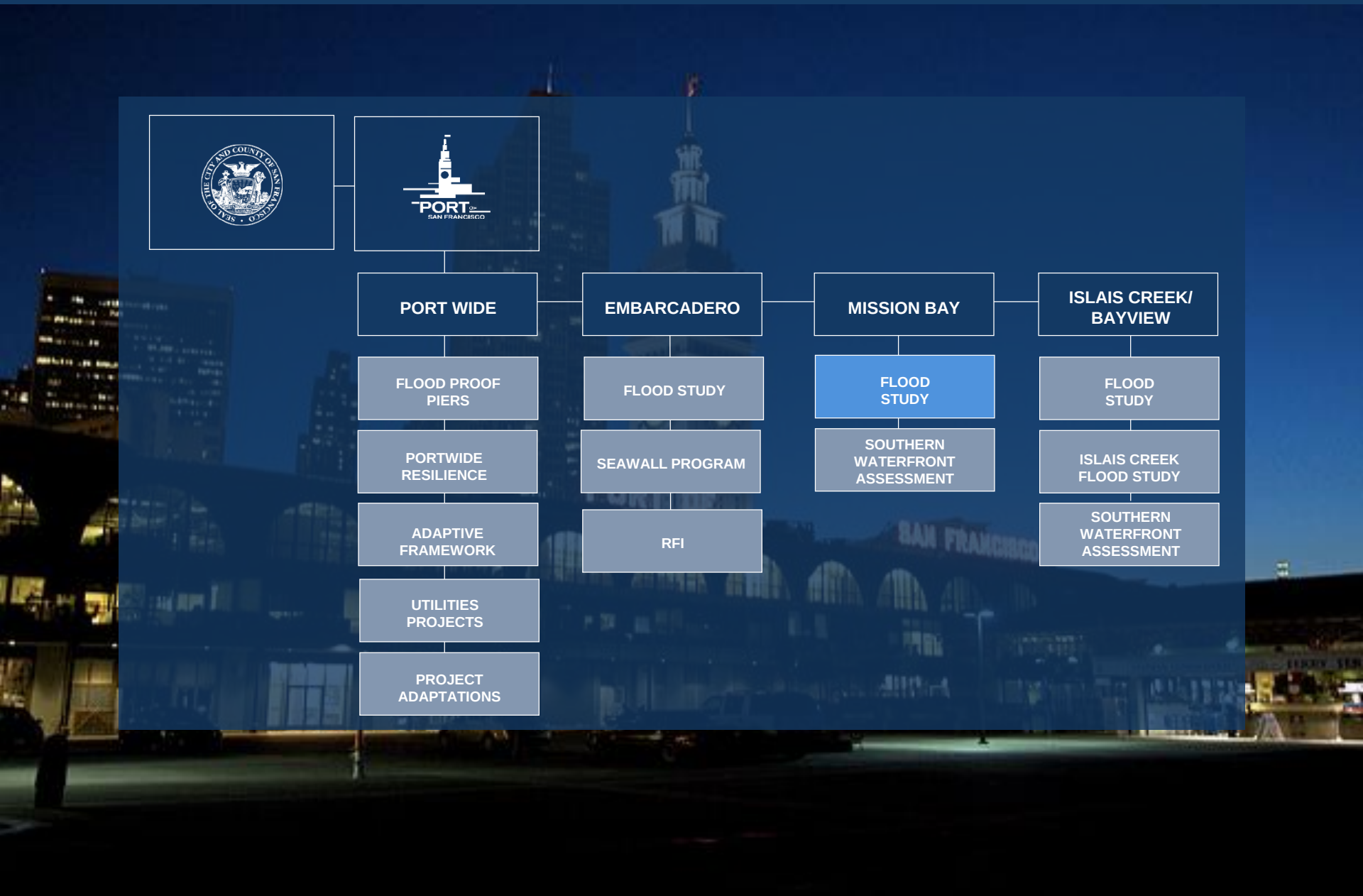
- Sea Level Rise Action Plan (Vulnerability & Consequence Analysis)
- Hazards & Climate Resilience Plan
- Climate Action Strategy

SHORELINE ASSESSMENTS & PROJECTS

- Southern Waterfront Assessment
- Embarcadero Seawall Program
- USACE/Port Flood Study
- Islais/Southeast Mobility Adaptation Strategy
- Ocean Beach Implementation

- City and Port are working at a variety of scales to address resilience:
  - Project scale: Mission Rock
  - Asset scale: Transportation Assets
  - Neighborhood scale: Islais Creek Adaptation Project
  - Hazard shed or reach: Army Corp Flood Study
  - Citywide: Citywide Sea Level Rise Action Plan

PORT RESILIENCE EFFORTS



PORT RESILIENCE FRAMEWORK

STRENGTHEN ELEMENT

STRENGTEN THE SEAWALL FOR PUBLIC SAFETY

Objective:
Immediately implement highest priority disaster response and life safety projects along the Embarcadero Seawall

Planning and Implementation Horizon:
2018 – 2026

Priorities:
Current Seismic & Flood Risk

Geographic Focus:
Embarcadero Seawall

ADAPT ELEMENT

ADAPT TO MID-CENTURY RISKS

Objective:
Identify policies and projects that will result in a Port that is resilient to seismic and increasing flood risks and that can respond to changing priorities. Projects will be integrated into city, regional, and private actions, resulting in coordinated actions to increase waterfront resilience.

Planning and Implementation Horizon:
2018 – 2050, Plan updated every five years

Priorities:
Seismic Risk and Future Flood Risk

Geographic Focus:
Entire Port Jurisdiction

ENVISION ELEMENT

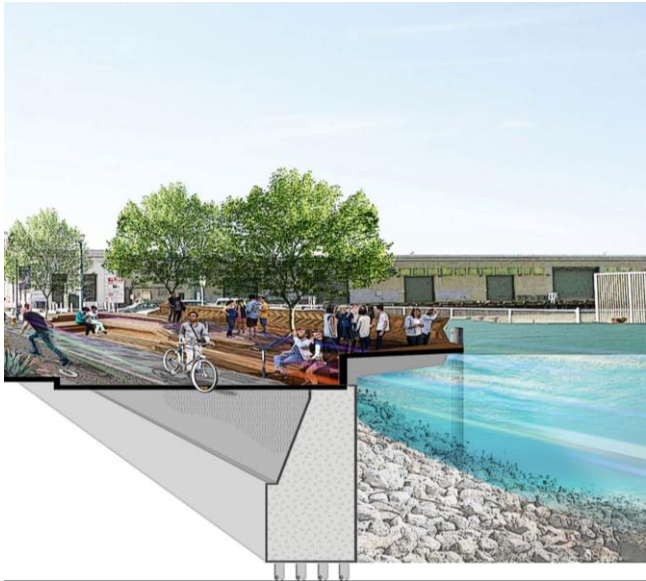
ENVISION THE WATERFRONT IN 2100

Objective:
Develop visions that can respond to remaining seismic risk and increasing flood risks and have an ongoing public conversation about the trade-offs of different options.

Planning and Implementation Horizon:
2018 – 2100, Vision Element updated every 10 years

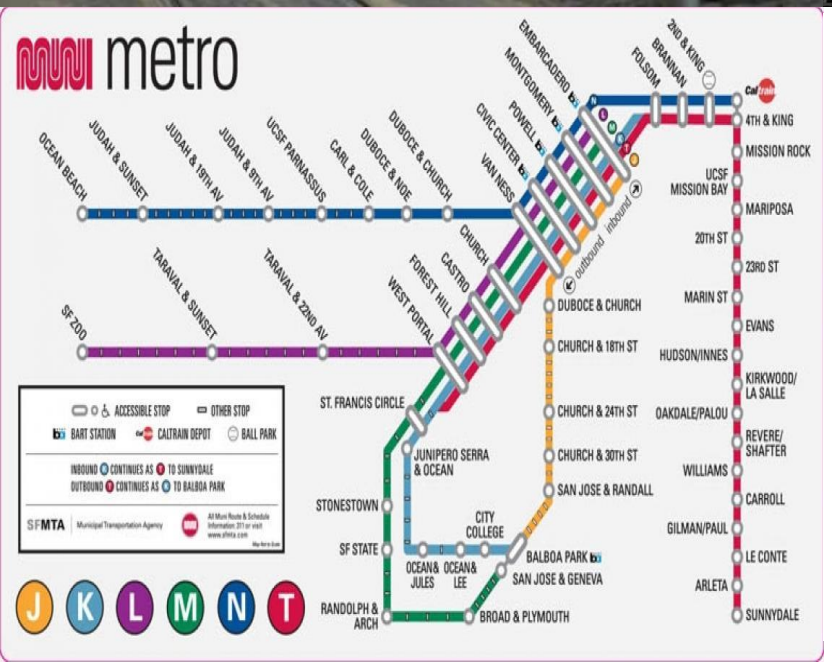
Priorities:
Seismic Risk and Future Flood Risk

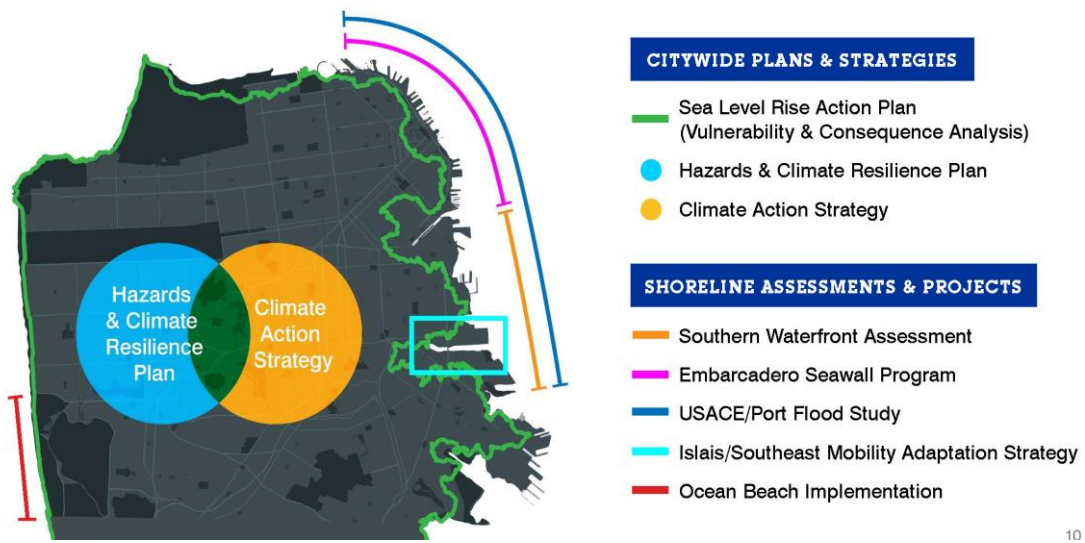
Geographic Focus:
Entire Port Jurisdiction



RESILIENCE PROJECTS SCOPE AND SCALE EXAMPLE

Asset: Muni Portal
System: Muni Metro and BART
Hazard Reach: Army Corps Flood Study
Citywide: SLR and HCR





PROJECT RESILIENCE: MISSION BAY FERRY LANDING

- Design addresses sea level rise projections through approximately 2070, able to be adapted for higher water levels
- Designed to be available for first response and evacuation
- Does not address access to site, utilities, the ferry network or surrounding uses

PROJECT RESILIENCE: PIER 70 & MISSION ROCK

PIER 70

- Mixed use development with 3000 homes, nine acres of parks
- Accommodates up to six feet of sea level rise
- Generates an estimated $88 million to be used for adaptation

MISSION ROCK

- Mixed use development with homes and parks
- Accommodates up to six feet of sea level rise, including China Basin Park designed to accommodate periodic flooding
- Establishes an ongoing Shoreline Protection revenue stream

Projects are not able to address access, utilities and surrounding assets and services

U.S. ARMY CORPS OF ENGINEERS / PORT OF SAN FRANCISCO FLOOD STUDY

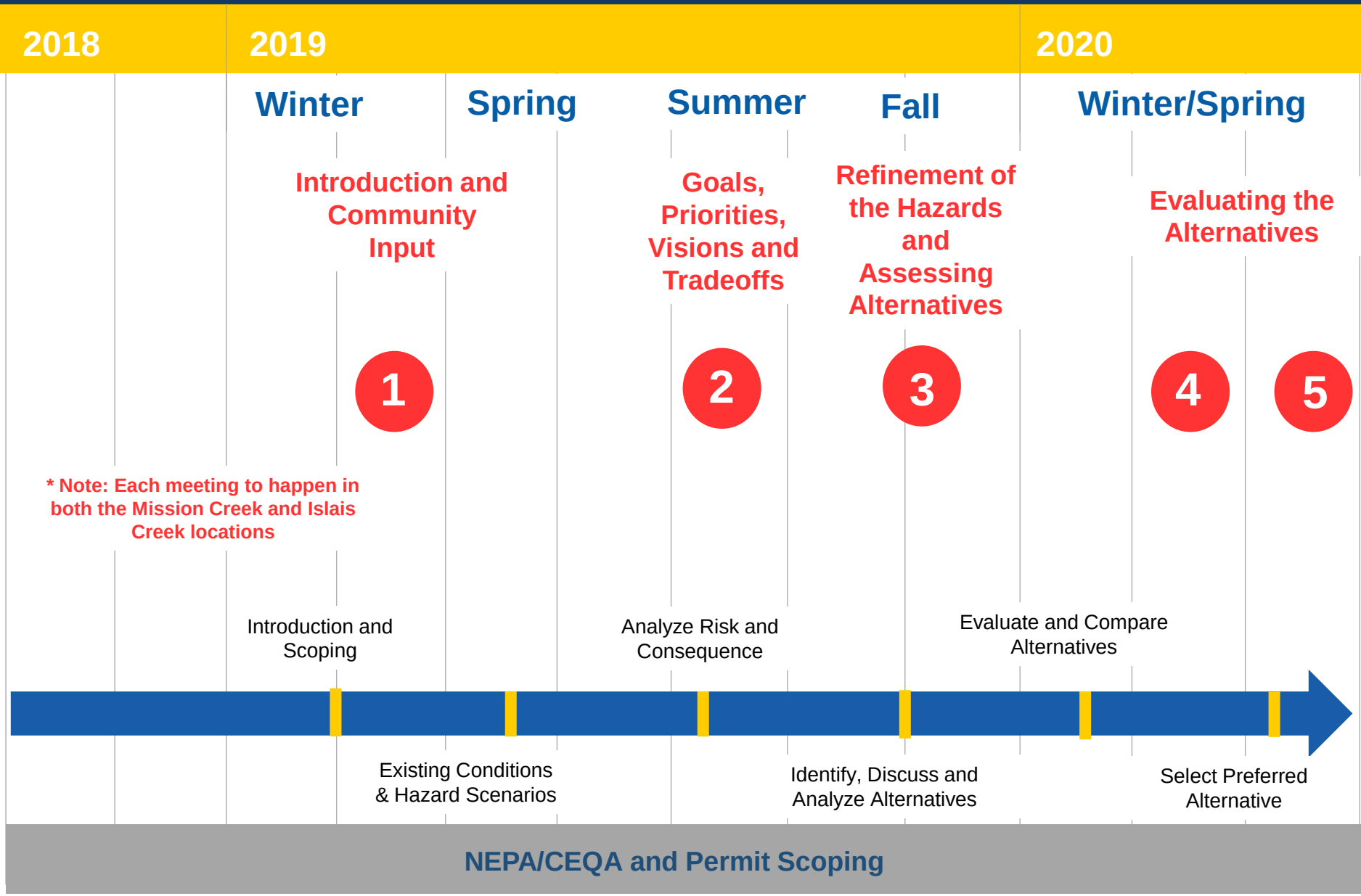
A partnership of:

US Army Corps of Engineers®

PORT OF SAN FRANCISCO

SEAL OF THE CITY AND COUNTY OF SAN FRANCISCO
ORO EN PAZ
HIERRO EN GUERRA

FLOOD STUDY COMMUNITY MEETING AND PROJECT SCHEDULE



PUBLIC ENGAGEMENT

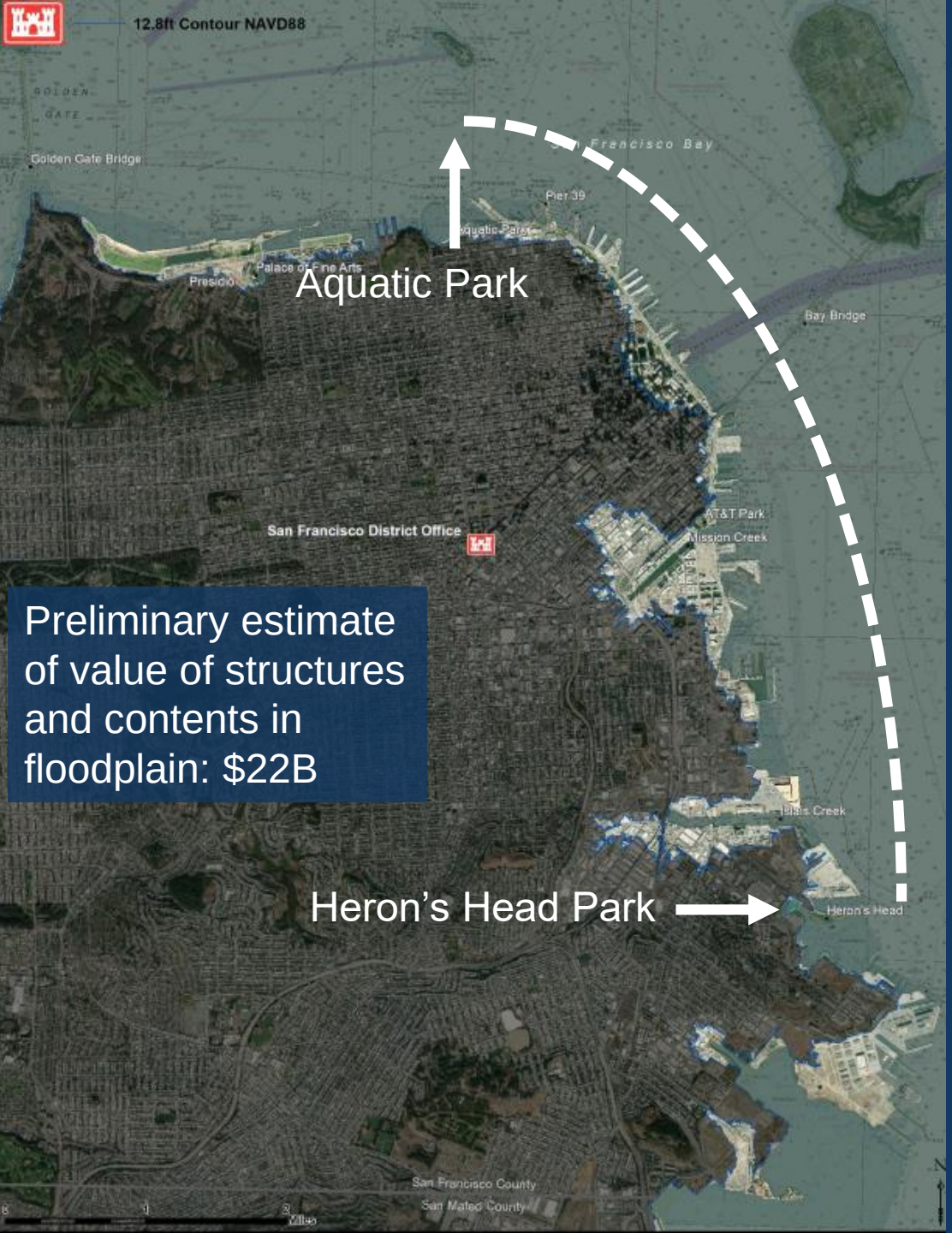
Public engagement and participation is how we get to a plan and a project.

Opportunities for participation will include community meetings held in adjacent neighborhoods, online engagement, and other activities throughout the study period.

Communities, businesses, and interested parties will be asked to help identify top priorities for:

FLOOD RISK REDUCTION for community assets, resources, and critical infrastructure.

INVESTMENT in flood risk management and approaches that also achieve benefits for community, environment, and economy.



US Army Corps of Engineers

STUDY AREA

Approximately 7½ miles of waterfront between Aquatic Park (to the North) and Heron's Head Park (to the South)*

- Area based on preliminary assessment of coastal flood risk
- Significant cultural, historic and maritime assets
- Critical public infrastructure, including local and regional transit (above ground, below ground, and ferries) and wastewater treatment
- Dense residential, commercial, and industrial land use

*Other areas outside of study area should be a focus of future studies

FLOOD STUDY OVERVIEW

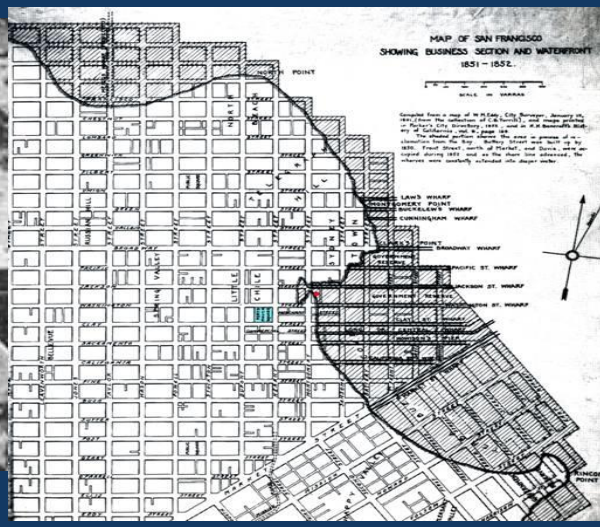
- Approximately three to five year study (2018–2022) of flood risk along the San Francisco shoreline
- Army Corps expertise
- Funds the assessment of flood risk and the identification of a preferred alternative that becomes eligible for Federal funding
- Required to identify risks to the Federal interest, which drives the project that can be funded from the study

FLOOD STUDY GOALS

- Better understand current and future flood risk along San Francisco's Bayside shoreline
- Identify alternatives to reduce flood risk
- Engage the public and other stakeholders to identify priorities for the Flood Study
- Create opportunities for funding for flood risk reduction projects

UNDERSTANDING THE HAZARDS

Mission Bay was originally an over 500 acre salt marsh and lagoon inhabited by the Costanoan people before it was filled in the late 1800s/early 1900s. The area began to transition to industrial in the late 1800s and was filled with 1906 debris.



EARTHQUAKE RISK
Evaluate existing information to develop an understanding of the seismic risk, including ground shaking and liquefaction in the project area.

FLOOD RISK
Evaluate extent of coastal flood hazard to estimate damage to exposed assets. Flood hazard will consider wind-wave joint probability analysis and sea level rise projections.

UNDERSTANDING EXISTING ASSETS AND SERVICES

The Port and the Army Corps are collecting information on existing assets with City agencies, partners and community stakeholders

INFRASTRUCTURE

URBAN AND CULTURAL

PARKS AND ECOSYSTEMS

MARITIME

DISASTER RESPONSE

OUTCOMES OF THE FLOOD STUDY

- A refined understanding of the hazards
- A refined understanding of the assets and services at risk and the consequences of disruption and damage
- Engagement with stakeholders to define goals, priorities and issues
- Education and outreach
- Identification of risk reduction alternatives
- Selection of a preferred alternative
- Federal expertise and possible funding for that preferred alternative

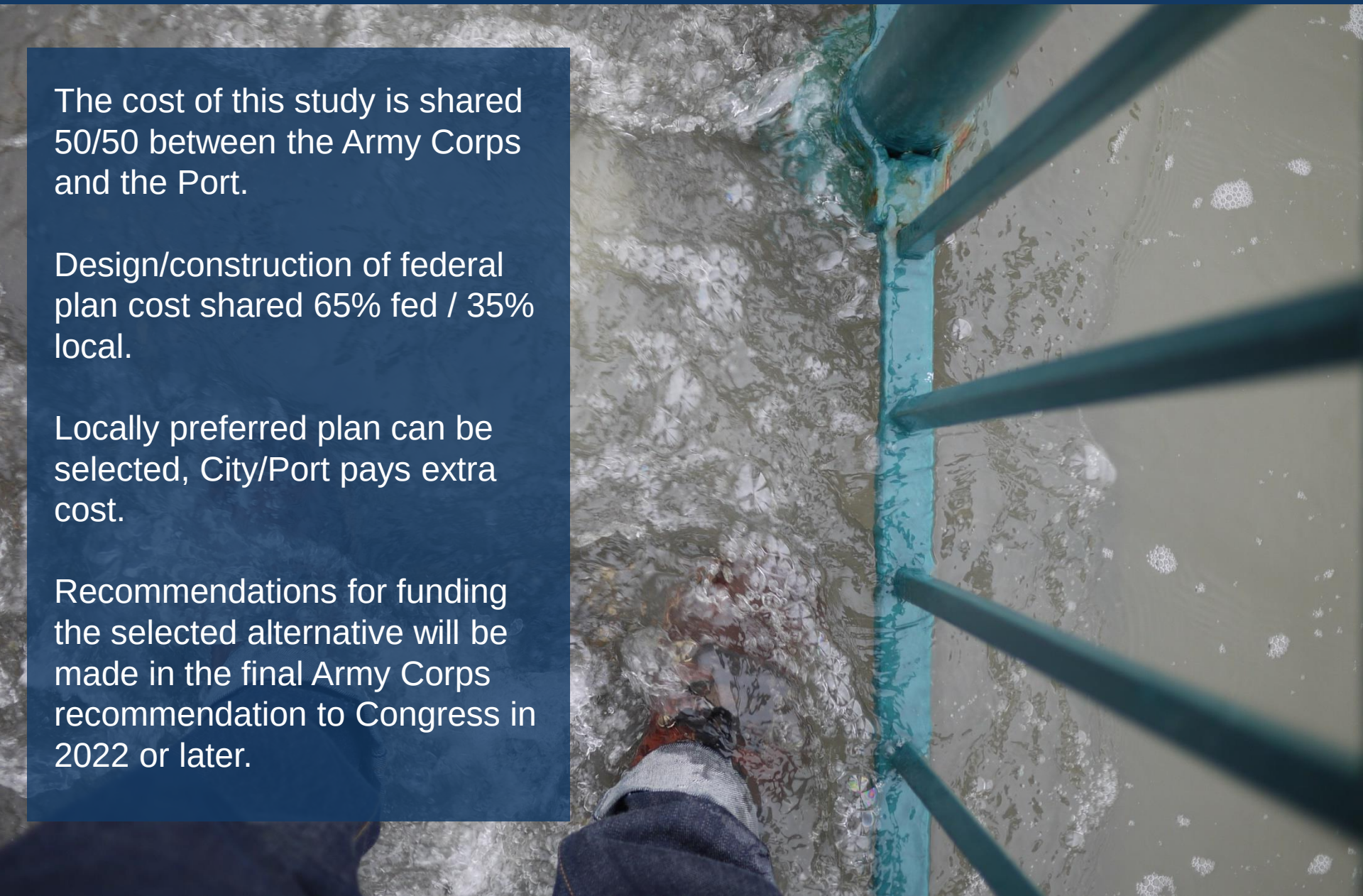
HOW IS THIS BEING FUNDED?

The cost of this study is shared 50/50 between the Army Corps and the Port.

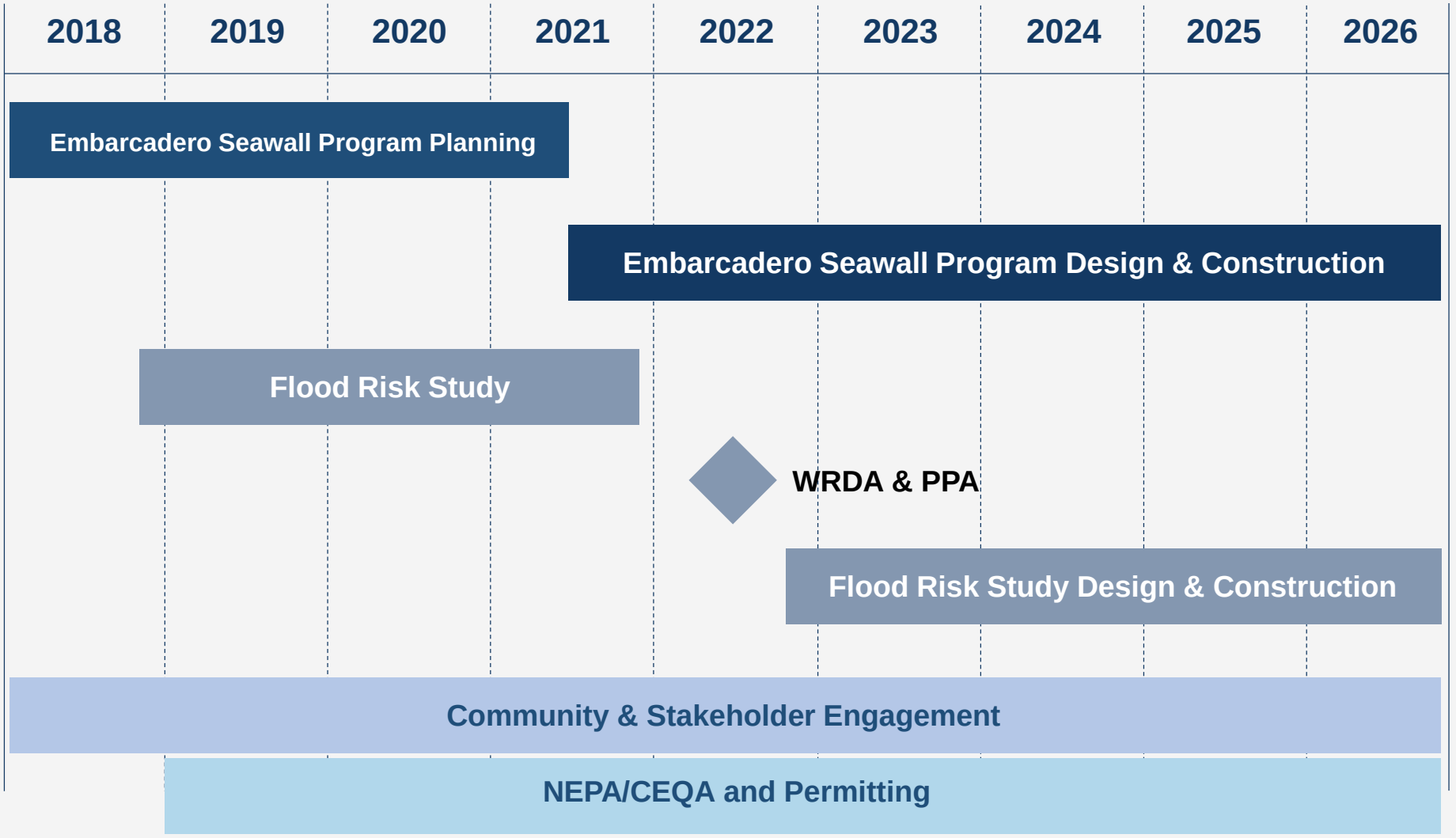
Design/construction of federal plan cost shared 65% fed / 35% local.

Locally preferred plan can be selected, City/Port pays extra cost.

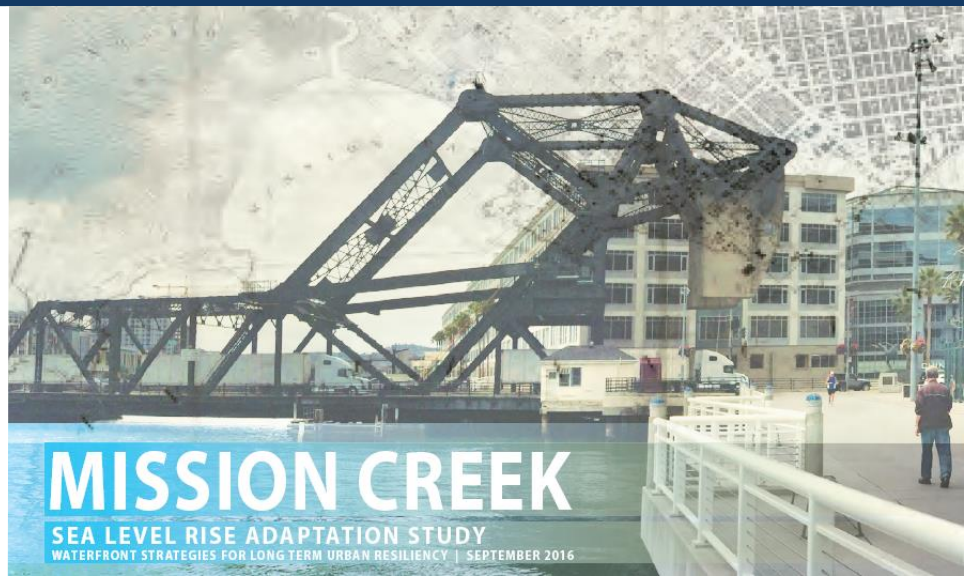
Recommendations for funding the selected alternative will be made in the final Army Corps recommendation to Congress in 2022 or later.

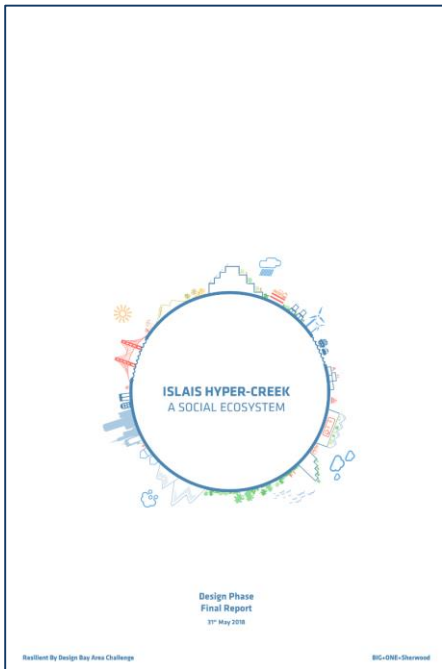


FLOOD STUDY AND SEAWALL PROJECTS SCHEDULE



RELEVANT STUDIES AND PROJECTS





OPPORTUNITIES TO ENGAGE

- **MAP THE WATERFRONT ASSETS! sfseawall.com**
- **ATTEND UPCOMING COMMUNITY MEETINGS**
  - Islais Creek-Bayview Community Waterfront Resilience Meeting

    Thursday March 14
    5:30 – 7 PM
    Bayview Opera House
    4705 3rd Street
  - Webinar
    Wednesday March 27
    1 - 1:30 PM

ARMY CORPS/PORT FLOOD STUDY
PUBLIC ENGAGMENT

MEETING 1: Let's build this together! Learn about the project and provide input on study priorities. Share how you want to stay engaged.

MEETING 2: Shape study goals! Review draft goals based on participation from Meeting 1 and a discuss how goals could guide near, mid and long term alternatives.

MEETING 3: Envision alternatives! Begin to envision alternatives for addressing the flood risk and prioritize action based on risk and the priorities identified in the first two meetings.

There will be other opportunities for engagement, including meetings in the field, tours and charrettes. Your suggestions are welcome!

THANK YOU!

Lindy Lowe
Resilience Program, Port of San Francisco
Lindy.Lowe@sfport.com

Flood Study Assets & Community Engagement Exercise

Mission Creek Community Meeting

March 7th, 2019

FLOOD HAZARD: *SEA LEVEL RISE*

Sea Level is on the rise & we're running out of time!

History:

- 8 inches from 1900 to 2000

Future:

- 1 to 2 feet by 2050 (CCSF 2016)
- 3 to 5.5 feet by 2100 (CCSF 2016)
- New CA guidance up to 10 ft by 2100 (H++)

FLOOD HAZARD ZONES: *Current (6 inches of SLR)*

CURRENT (2019 - 2030)

Immediate Flood Hazards:

- Parts of Mission Bay
- Pier 96
- Heron's Head Park

FLOOD HAZARD ZONES: *Near Term (Up to 1 foot of SLR)*

CURRENT (2019 - 2030)

NEAR (2030 - 2050)

Near Term Flood Hazards:

- CalTrain King Street Station Yard
- Pier 80
- Islais Creek Industries

FLOOD HAZARD ZONES: *Mid-Term (Up to 3 feet of SLR)*

CURRENT (2019 - 2030)

NEAR (2030 - 2050)

MID (2050 - 2100)

Mid Term Flood Hazards:

- Mission Bay
- SOMA Neighborhood
- Islais Creek Industrial Area

FLOOD HAZARD ZONES: *Long-Term (Up to 5.5 feet of SLR)*

- CURRENT (2019 - 2030)
- NEAR (2030 - 2050)
- MID (2050 - 2100)
- LONG (2100 - 2140)

Long Term Flood Hazards:

- Mission Bay
- SOMA Neighborhood
- Islais Creek Industrial Area

FLOOD HAZARD ZONES: *H++ Scenario (Up to 10 feet of SLR)*

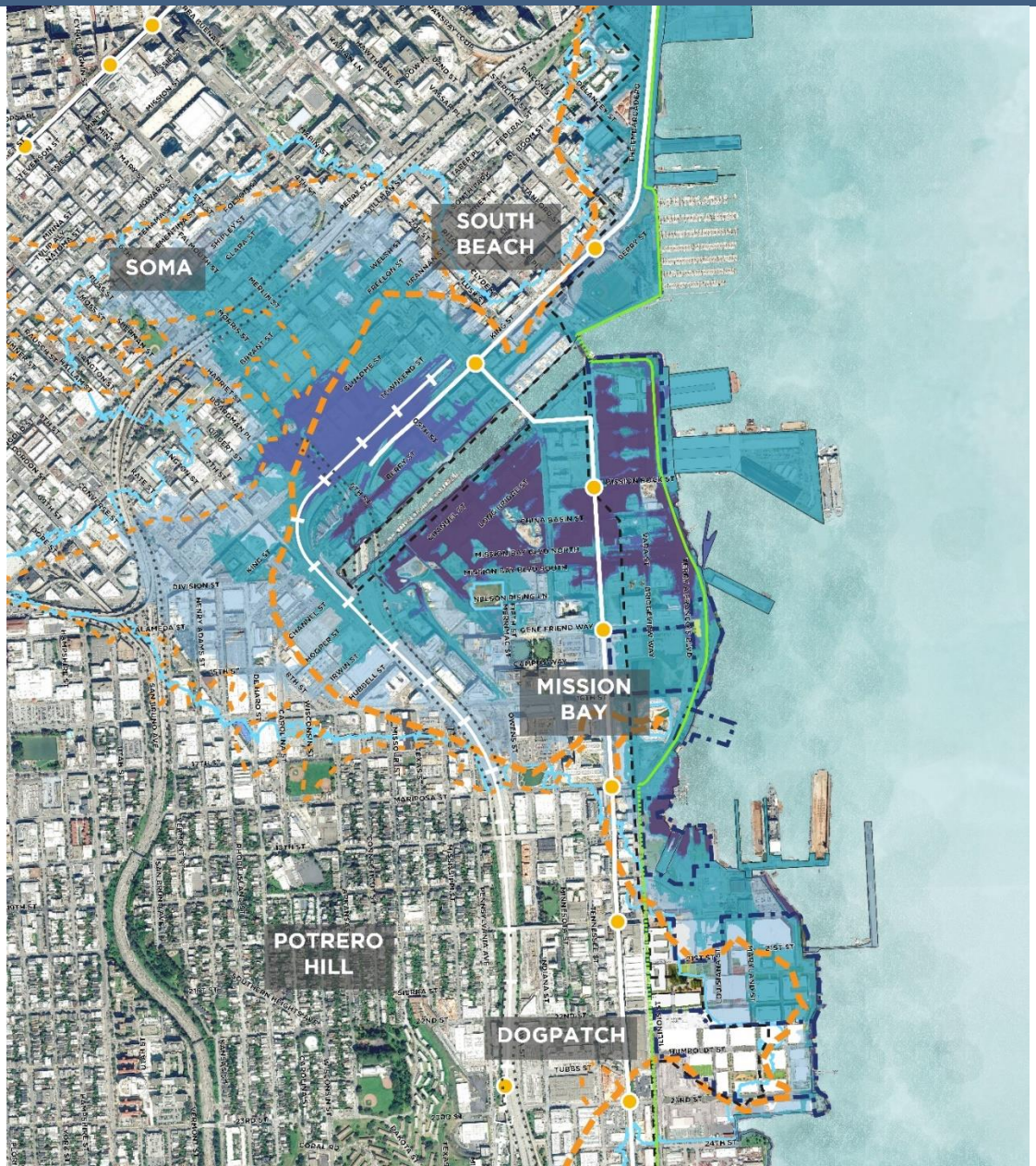
- CURRENT (2019 - 2030)
- NEAR (2030 - 2050)
- MID (2050 - 2100)
- LONG (2100 - 2140)
- H++ SCENARIO

H++ Flood Hazards:

- Mission Bay
- SOMA Neighborhood
- South East Wastewater Treatment Plant

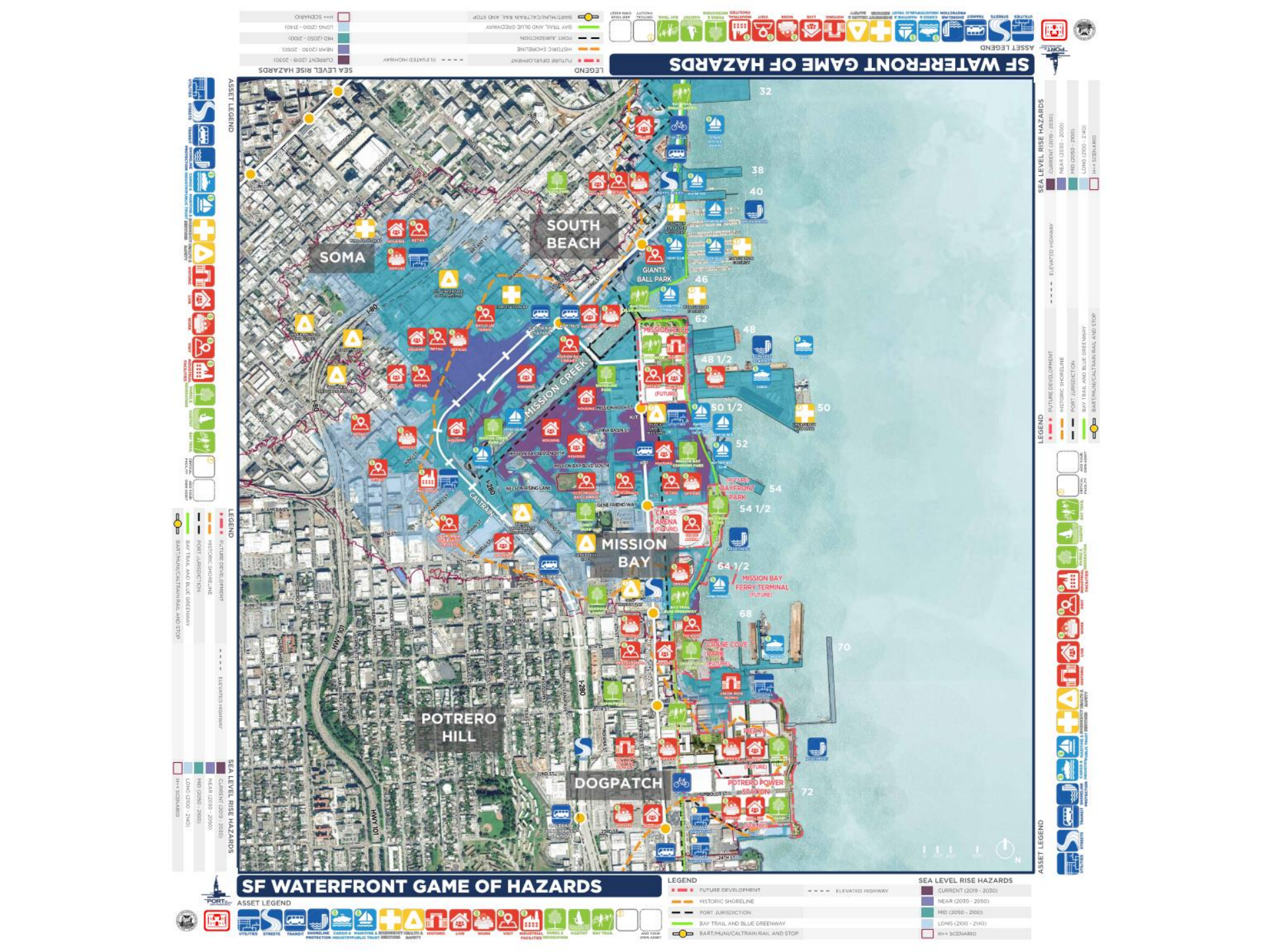
WHAT'S OUT THERE AND WHAT'S AT STAKE?

SAN FRANCISCO'S SOUTHERN WATERFRONT: MISSION BAY



SAN FRANCISCO'S SOUTERN WATERFRONT: MISSION BAY

GAME OF HAZARDS!


SF WATERFRONT GAME OF HAZARDS
SOUTH BEACH
SOMA
MISSION CREEK
MISSION BAY
POTRERO HILL
DOGPATCH
GIANTS BALL PARK
CHASE ARENA (FUTURE)
FUTURE BAYFRONT PARK
MISSION BAY FERRY TERMINAL (FUTURE)
CRANE COVE PARK (FUTURE)
POTRERO POWER STATION
I-280
I-80
HWY 101
CALTRAIN
LEGEND
FUTURE DEVELOPMENT
HISTORIC SHORELINE
PORT JURISDICTION
BAY TRAIL AND BLUE GREENWAY
BART/MUNI/CALTRAIN RAIL AND STOP
ELEVATED HIGHWAY
SEA LEVEL RISE HAZARDS
CURRENT (2019 - 2030)
NEAR (2030 - 2050)
MID (2050 - 2100)
LONG (2100 - 2140)
H++ SCENARIO
ASSET LEGEND

INFRASTRUCTURE

UTILITIES

STREETS

TRANSIT

SHORELINE PROTECTION

INFRASTRUCTURE

UTILITIES STREETS TRANSIT SEAWALL

INFRASTRUCTURE

UTILITIES STREETS TRANSIT SEAWALL

URBAN AND CULTURAL

URBAN AND CULTURAL

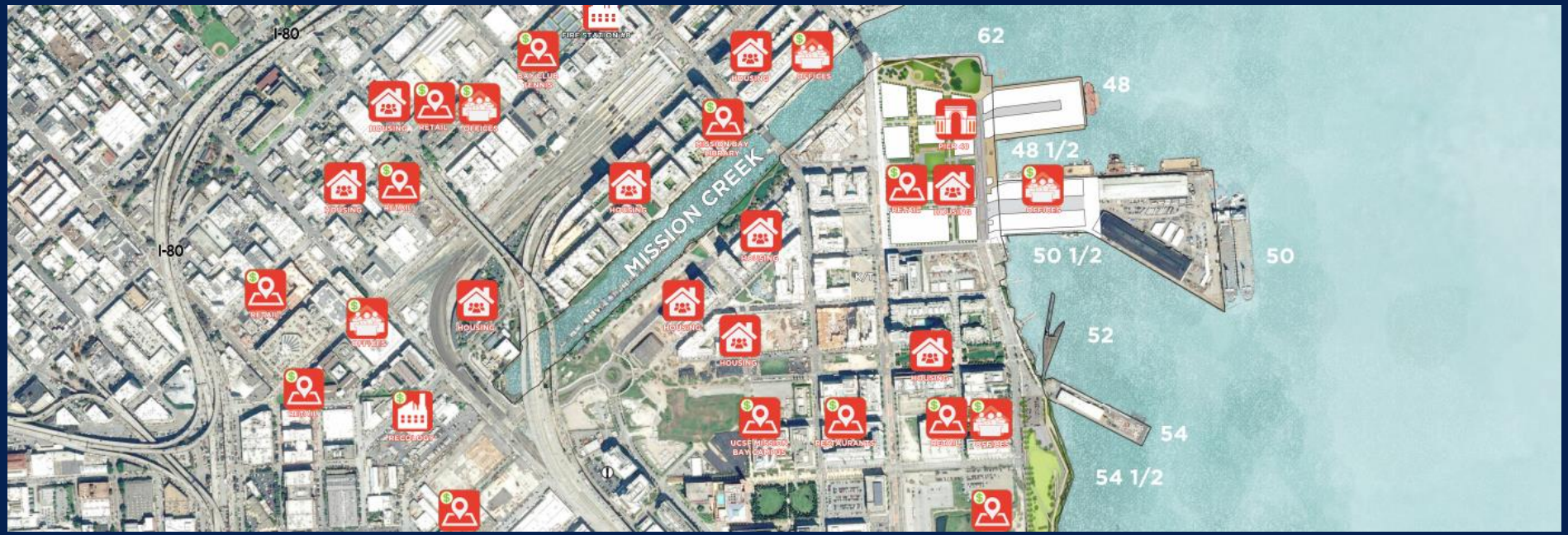
HISTORIC

LIVE

WORK

VISIT

INDUSTRIAL FACILITIES



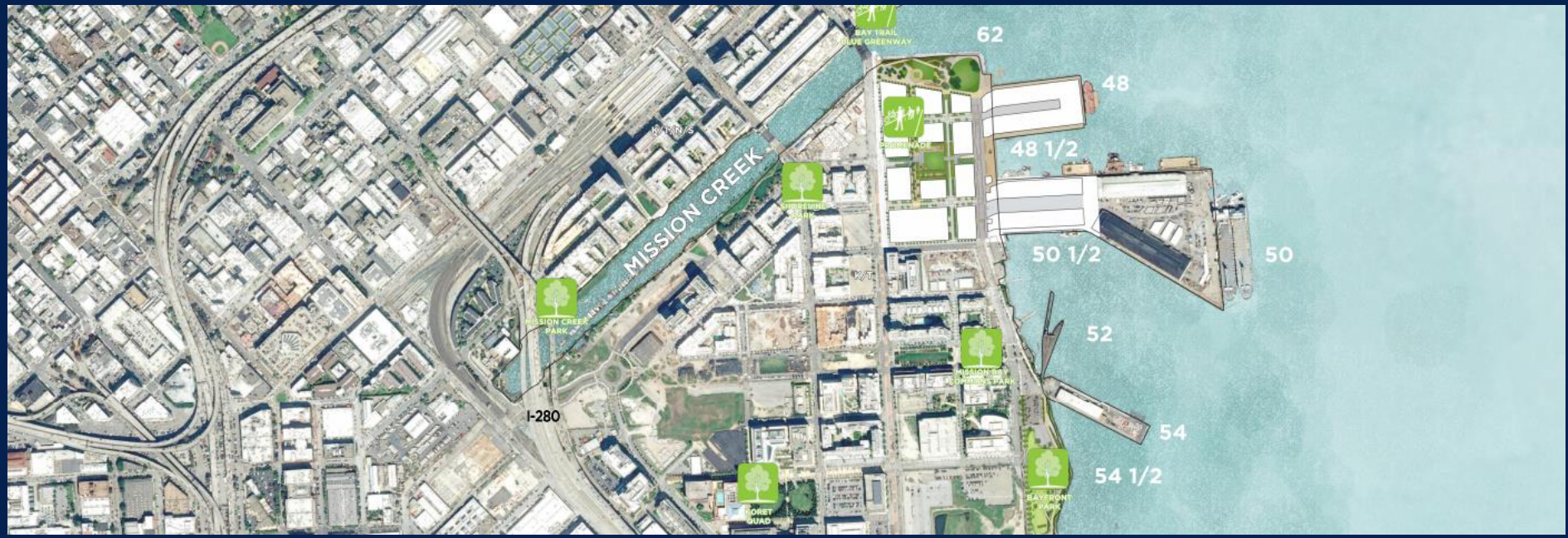
PARKS AND ECOSYSTEMS

PARKS AND ECOSYSTEMS

BAY TRAIL

PARKS

HABITAT



MARITIME ASSETS

MARITIME ASSETS

MARITIME & PUBLIC TRUST

CARGO & INDUSTRY

HEALTH & SAFETY

HEALTH & SAFETY

EMERGENCY SERVICES

HEALTH & SAFETY

THE GAME


SF WATERFRONT GAME OF HAZARDS
SOMA
SOUTH BEACH
MISSION BAY
POTRERO HILL
DOGPATCH
MISSION CREEK
GIANTS BALL PARK
MISSION ROCK
CHASE ARENA
BAYFRONT PARK
MISSION BAY FERRY TERMINAL
CRANE COVE PARK
PIER 70
POTRERO POWER STATION
I-80
I-280
SF WATERFRONT GAME OF HAZARDS
ASSET LEGEND
LEGEND
SEA LEVEL RISE HAZARDS

STEP 1: STUDY THE MAP

STEP 1: AND TELL US WHAT WE MISSED

5 min

STEP 2: SAY WHAT YOU LOVE ABOUT THE WATERFRONT

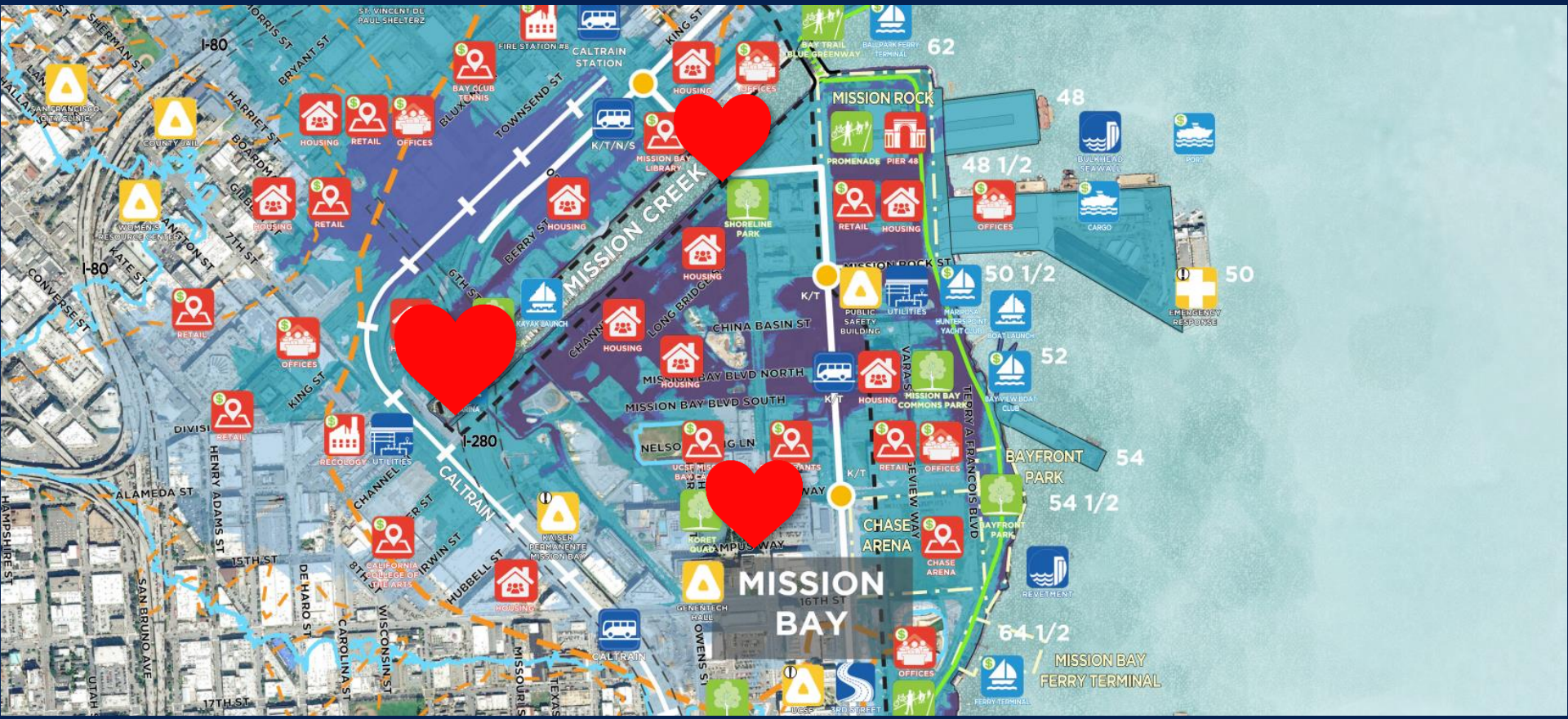
STEP 2: SAY HOW YOU USE THIS AREA / WHAT BRINGS YOU HERE

STEP 2: AND WHAT IS MOST IMPORTANT TO THE CITY

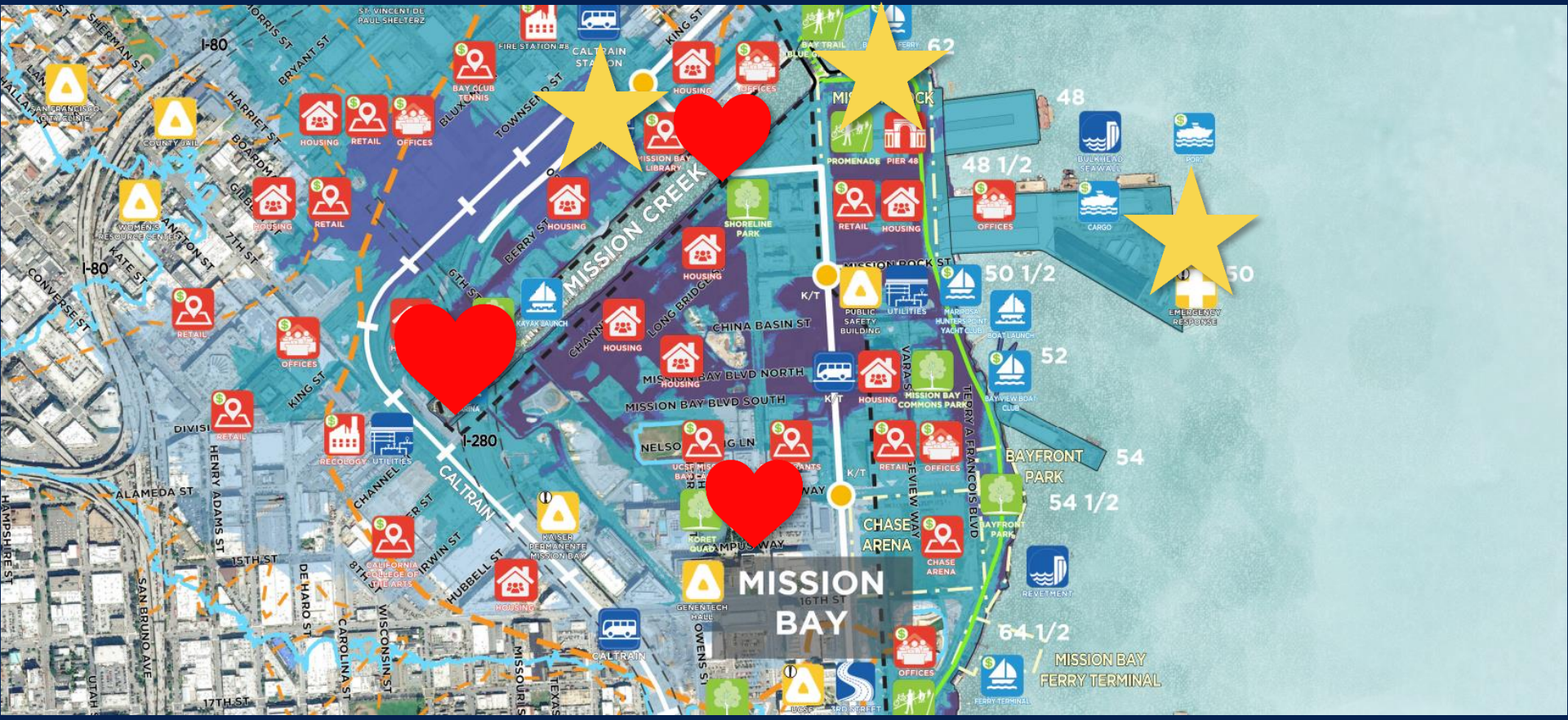
10 min

STEP 2: DECIDE WHAT YOU LOVE THE MOST AS A GROUP

STEP 2: DECIDE WHAT YOU LOVE THE MOST AS A GROUP

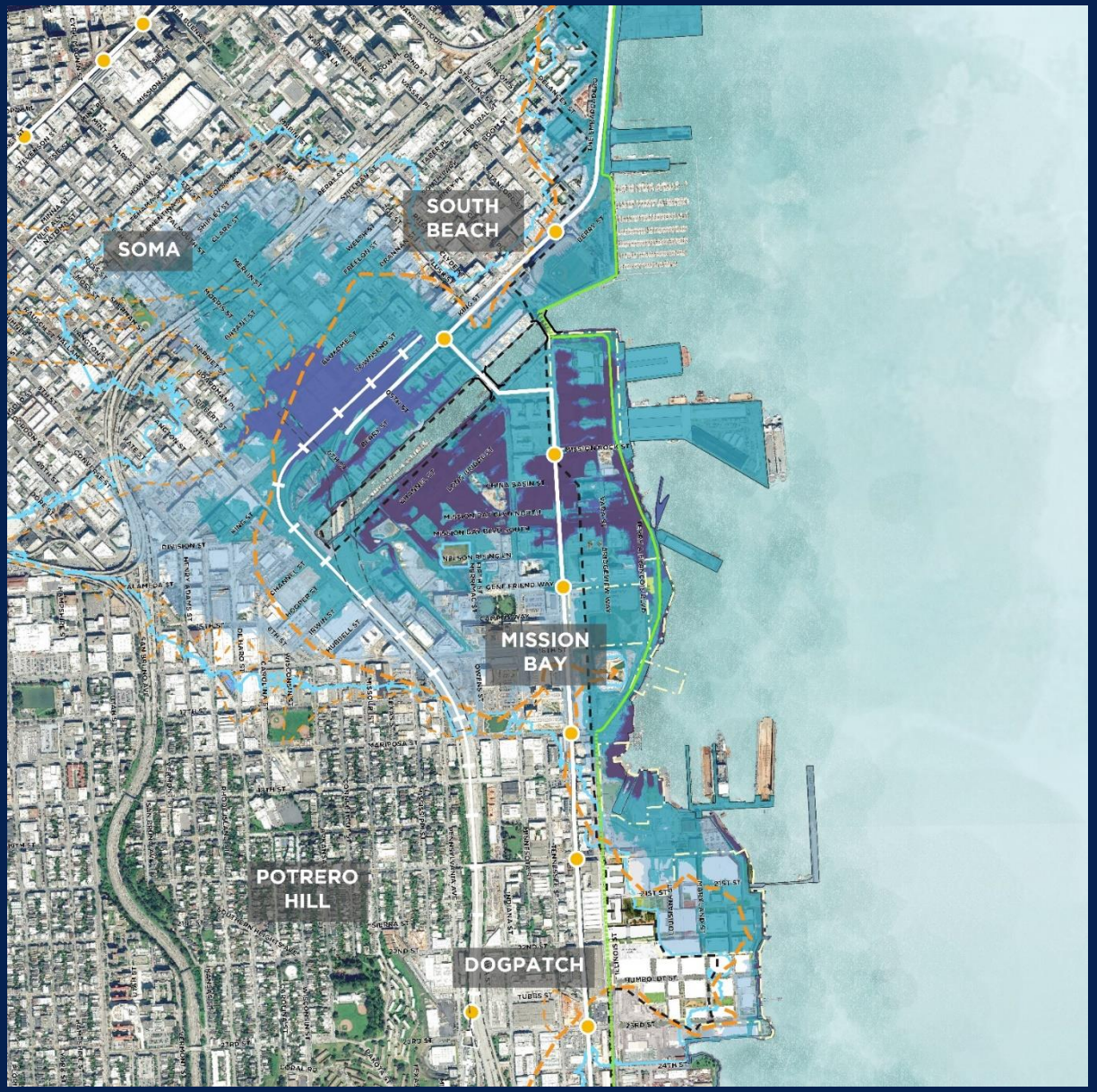


STEP 2: AND WHAT'S MOST IMPORTANT TO THE CITY



3 min

STEP 3: CONSIDER FLOODING

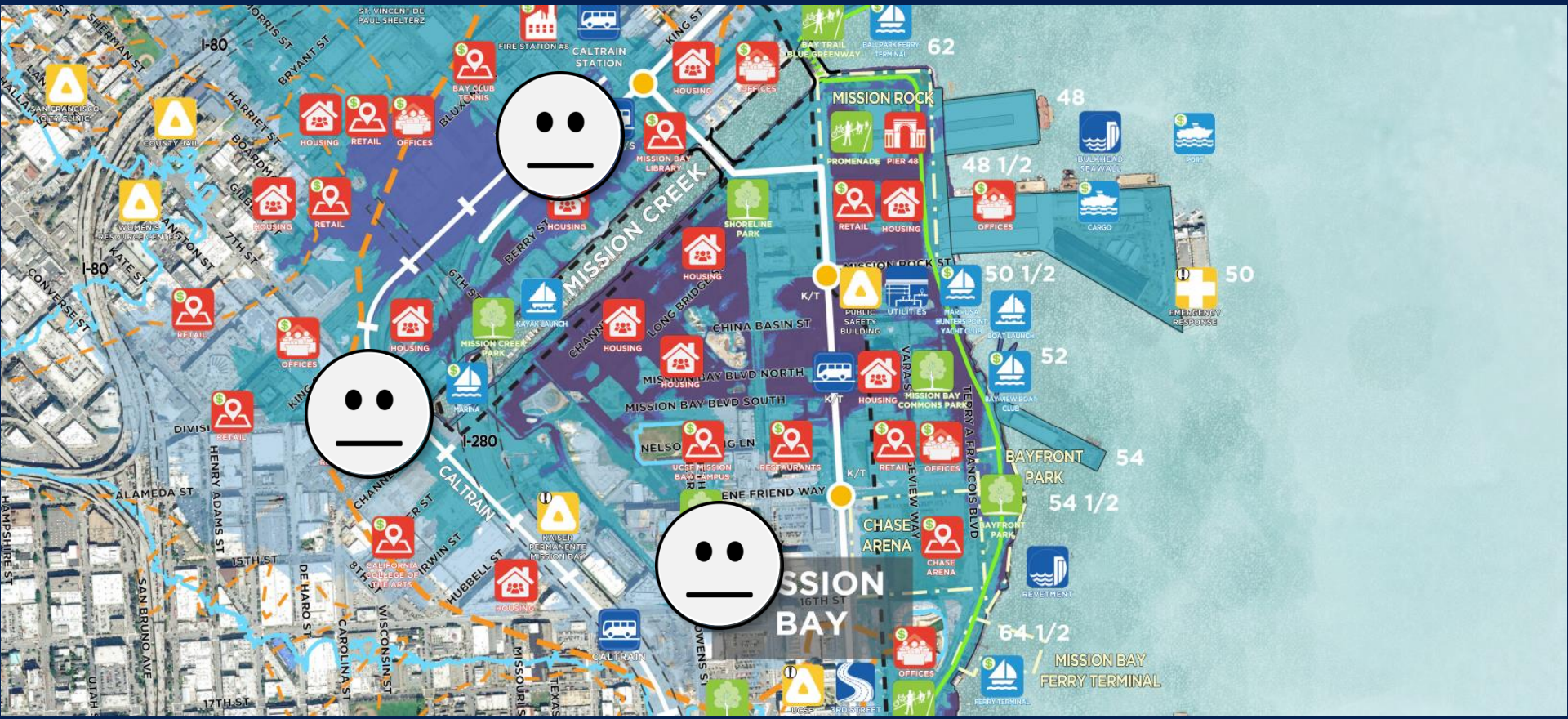


…SHARE WHAT CONCERNS YOU THE MOST

10 min

STEP 3: DECIDE AS A GROUP
WHAT CONCERNS YOU THE MOST

STEP 3: DECIDE AS A GROUP
WHAT CONCERNS YOU THE MOST

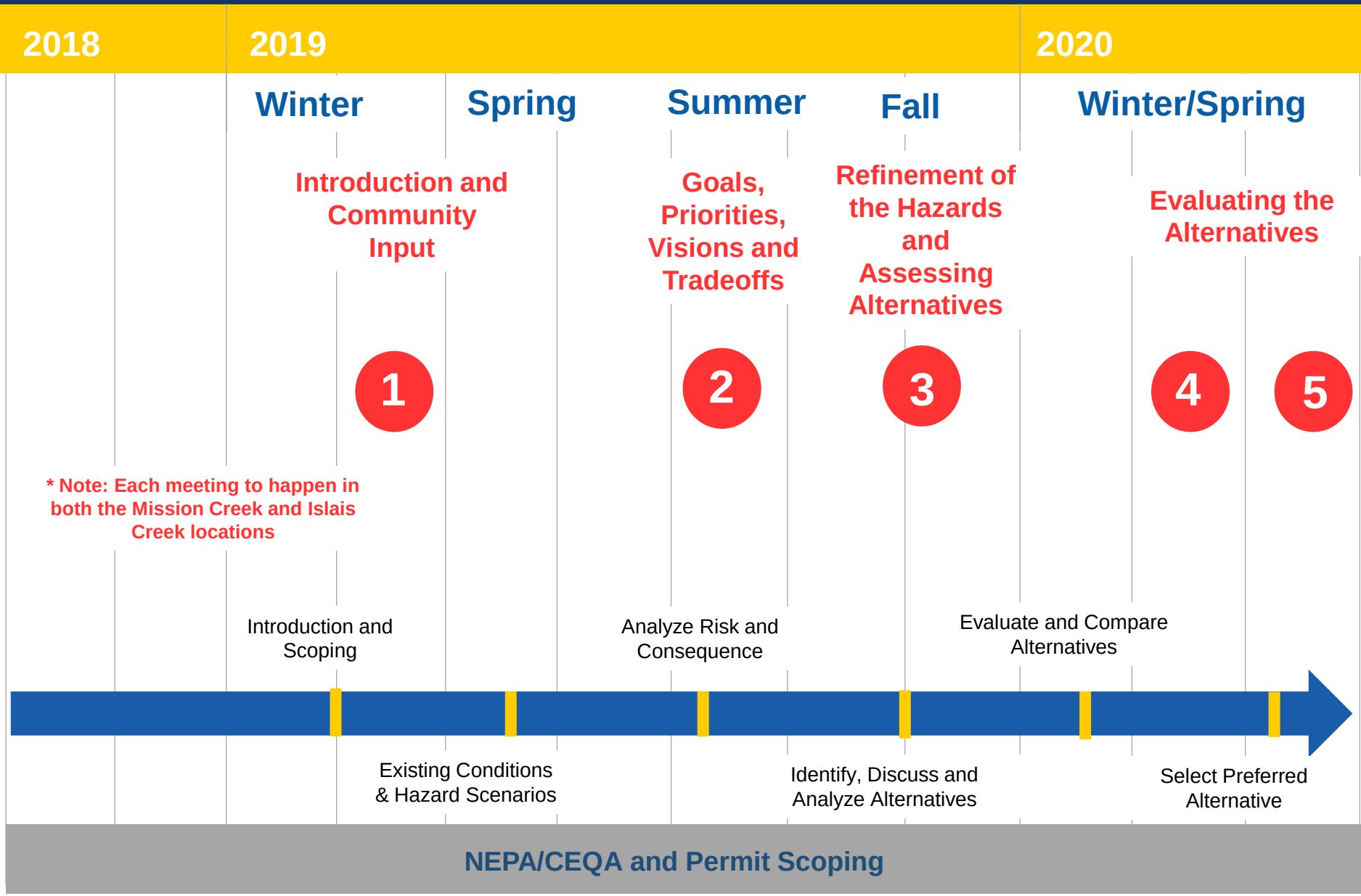


3 min

STEP 4: REPORT OUT

6 min

FLOOD STUDY COMMUNITY MEETING AND PROJECT SCHEDULE



RULES OF THE GAME

- Be a polite fellow citizen and listener
- Recognize that this is a game
- Follow the instructions and guidance of your facilitator
- Next meeting focus on detailed strategies – this is high level
- Have fun!

TIME TO FORM GROUPS