

# PORT OF SAN FRANCISCO OPPORTUNITIES WITH THE WATERFRONT



## OPPORTUNITY TYPES



## UPCOMING PROJECTS

**Wharf Replacement**

**Resiliency Improvements**

**Bulkhead Walls**

**Earthquake Safety Retrofits**

**Sustainability Improvements**

## PREPARE YOURSELF FOR UPCOMING WORK

### GET YOUR CERTIFICATIONS

#### Local Business Enterprise (LBE)

All public projects in San Francisco must include LBEs for a portion of the project. This means more economic opportunity for small businesses like yours. If you are not a certified LBE yet, visit <https://www.sf.gov/get-certified-lbe> to get started.

#### More Certifications

For federally funded projects, you can distinguish yourself and apply for Disadvantaged Business Enterprise (DBE) certification at the state and federal levels.

State: <https://caleprocure.ca.gov/pages/index.aspx>  
Federal: [www.sba.gov/federal-contracting/contracting-assistance-programs](http://www.sba.gov/federal-contracting/contracting-assistance-programs)

### SHOW OFF YOUR EXCELLENT WORK

#### Statement of Qualifications (SOQ)

Showcase the skills, experience, and knowledge you and your team can bring to the job site. A SOQ should provide information on both your company's background and specific experiences qualifying you for a given job. Create a SOQ with your company's experience and customize it specific to the project you are bidding on.

#### Case Studies

In addition to your SOQ, create case studies to showcase your project experience and past clients. A case study should showcase jobs where comparable work and problem-solving skills were exhibited.

#### References

The last piece to showing your experiences is to gather your references. Prepare a list of individuals who your business has worked with and who can speak to your qualifications and experience.

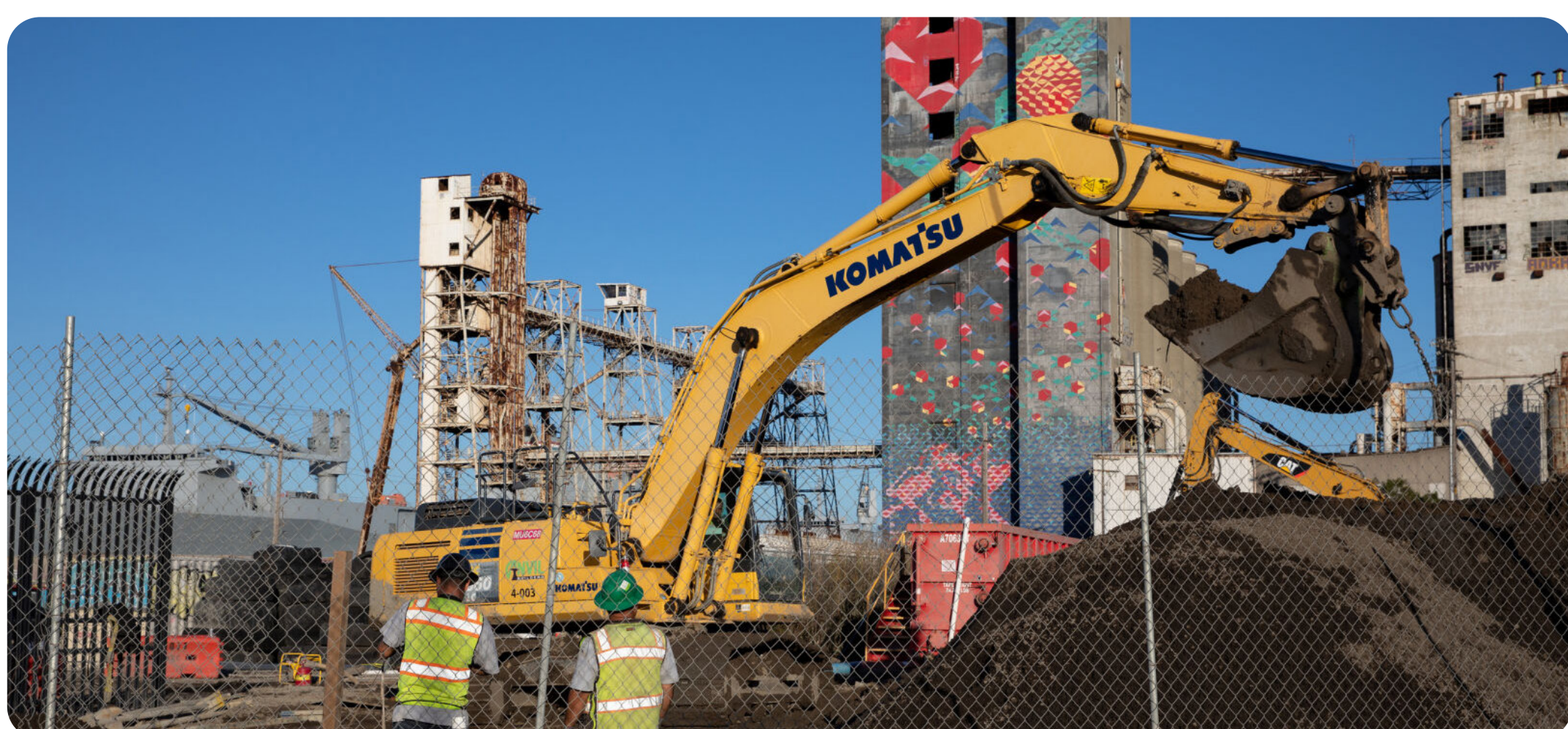
### STRENGTHEN YOUR RELATIONSHIPS

#### Grow Your Network

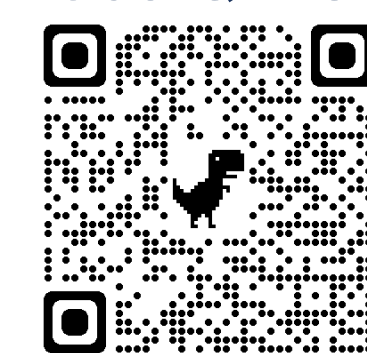
The Port of SF hosts events with prime contractors and City agencies. Attending these events allows you to build relationships with the primes and put forth more competitive bids. Knowing what the primes are looking for and having an existing relationship with them will allow you to craft a stronger bid. Additional outreach to primes outside of networking events also helps strengthen relationships.

#### Supplier Relationships

Build relationships with suppliers now for pay off in the long run. Getting to know the suppliers in your area can help you get competitive pricing when it comes to placing cost estimates and purchasing materials.



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# PROVIDE FEEDBACK HERE

# PROPORCIONE SUS IMPRESIONES AQUÍ • 在這裡提供反饋

**A staffer will transcribe your verbal comments that will then be submitted as official public comment on the Draft Plan.**

Other options are available to provide comment:

- Comment cards are available for written comments.
- Share written comments via email: [SFWFRS@usace.army.mil](mailto:SFWFRS@usace.army.mil)
- Share written comments via mail:  
U.S. Army Corps of Engineers, Tulsa District  
ATTN: RPEC-SFWS, 2488 E81st St., Tulsa, OK 74137
- Share comments online: learn more and comment at [sfport.com/wrp](https://sfport.com/wrp)

**Un miembro del personal transcribirá sus comentarios orales que luego se presentarán como comentario público oficial sobre el Borrador del Plan.**

Existen otras opciones para hacer comentarios:

- Tenemos tarjetas para hacer comentarios escritos.
- Comparta comentarios escritos por correo electrónico: [SFWFRS@usace.army.mil](mailto:SFWFRS@usace.army.mil)
- Comparta comentarios escritos por correo postal:  
U.S. Army Corps of Engineers, Tulsa District  
ATTN: RPEC-SFWS, 2488 E81st St., Tulsa, OK 74137
- Comparta comentarios en línea: infórmese más y haga comentarios en [sfport.com/wrp](https://sfport.com/wrp)

**工作人員將抄錄您的口頭意見，然後提交作為對計畫草案的正式公眾評論。**

提交評論的其他選項：

- 可使用評論卡進行書面評論。
- 透過電子郵件分享書面評論：[SFWFRS@usace.army.mil](mailto:SFWFRS@usace.army.mil)
- 透過郵件分享書面評論：  
U.S. Army Corps of Engineers, Tulsa District  
ATTN: RPEC-SFWS, 2488 E81st St., Tulsa, OK 74137
- 在線上分享評論：[在sfport.com/wrp](https://sfport.com/wrp)瞭解更多資訊並發表評論



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# PORT OF SAN FRANCISCO EARLY PROJECTS

The Early Projects, led by the Port through the Waterfront Resilience Program, address the areas of highest earthquake and sea level rise risks along the waterfront. They are near-term actions, focused on improving life safety and citywide disaster response capabilities, and are the first step toward building long-term, waterfront-wide resilience. These projects stem from the voter-approved Proposition A Seawall Safety Bond. The Draft Plan will build on this crucial investment.

## UPCOMING EARLY PROJECTS

### Wharf J9 Replacement and Resilient Shoreline Project



Wharf J9 contributes to the unique working industry character of Fisherman's Wharf. The shoreline here has high earthquake risk while sea level rise is an emerging threat. This project will replace an at-risk seawall and wharf with a resilient shoreline structure, provide ADA accessible berthing for commercial fishing boats, and improve public access along the shoreline. Phase 1 will construct a new float and phase 2 will replace the seawall and wharf.

### Seawall Earthquake Safety Projects



The bulkhead wharves have some of the highest earthquake risk along the Embarcadero Seawall. This project focuses on structural retrofits that improve safety at high occupancy locations such as Pier 15 and Pier 9. These retrofits are lower cost investments prior to a subsequent action to replace the seawall and wharf.

### Southern Embarcadero Coastal Resilience Project



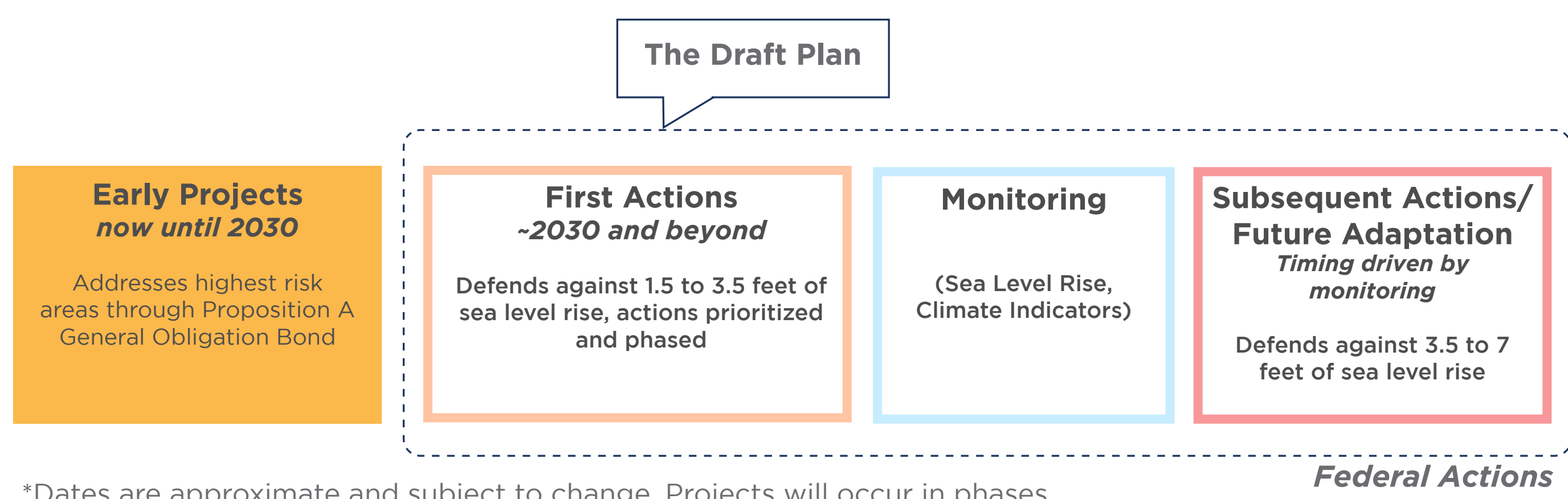
The bulkheads between Pier 24.5 and Pier 40 are some of the oldest on the waterfront, facing high earthquake risk, and some of the biggest storm-driven waves. This project will begin the process of replacing the wharves and seawall with earthquake resilient structures that can be easily adapted for sea level rise.

### Pier 50 Earthquake Improvement Project



Located in Mission Bay, Pier 50 is an important maritime facility housing equipment, supplies, and labor needed for day-to-day operations and waterfront emergencies. This project will assess existing structural conditions, evaluate earthquake and sea level rise risk, develop an overall resilience strategy, and advance one or more projects to improve earthquake performance and strengthen the City's capability to respond and recover.

## TIMELINE



### Downtown Coastal Resilience Project



The waterfront between Broadway and Harrison Streets, centered on the Ferry Building, has high coastal flood and earthquake risk today. This project focuses on protecting regional transit and waterfront neighborhoods from near-term coastal flooding, maintaining a thriving waterfront as longer-range plans are developed. Improvements include raising bulkheads, flood protection railings, and deployable structures used during storm events. Earthquake safety improvements are also being considered, including enhanced capability to move first responders and people after an earthquake.

## PROJECT IDENTIFICATION

The Port has identified 23 Embarcadero Early Projects based on its extensive risk assessment work, including the Embarcadero Seawall Multi-Hazard Risk Assessment and the joint Disaster Response Exercise conducted with the Department of Emergency Management.

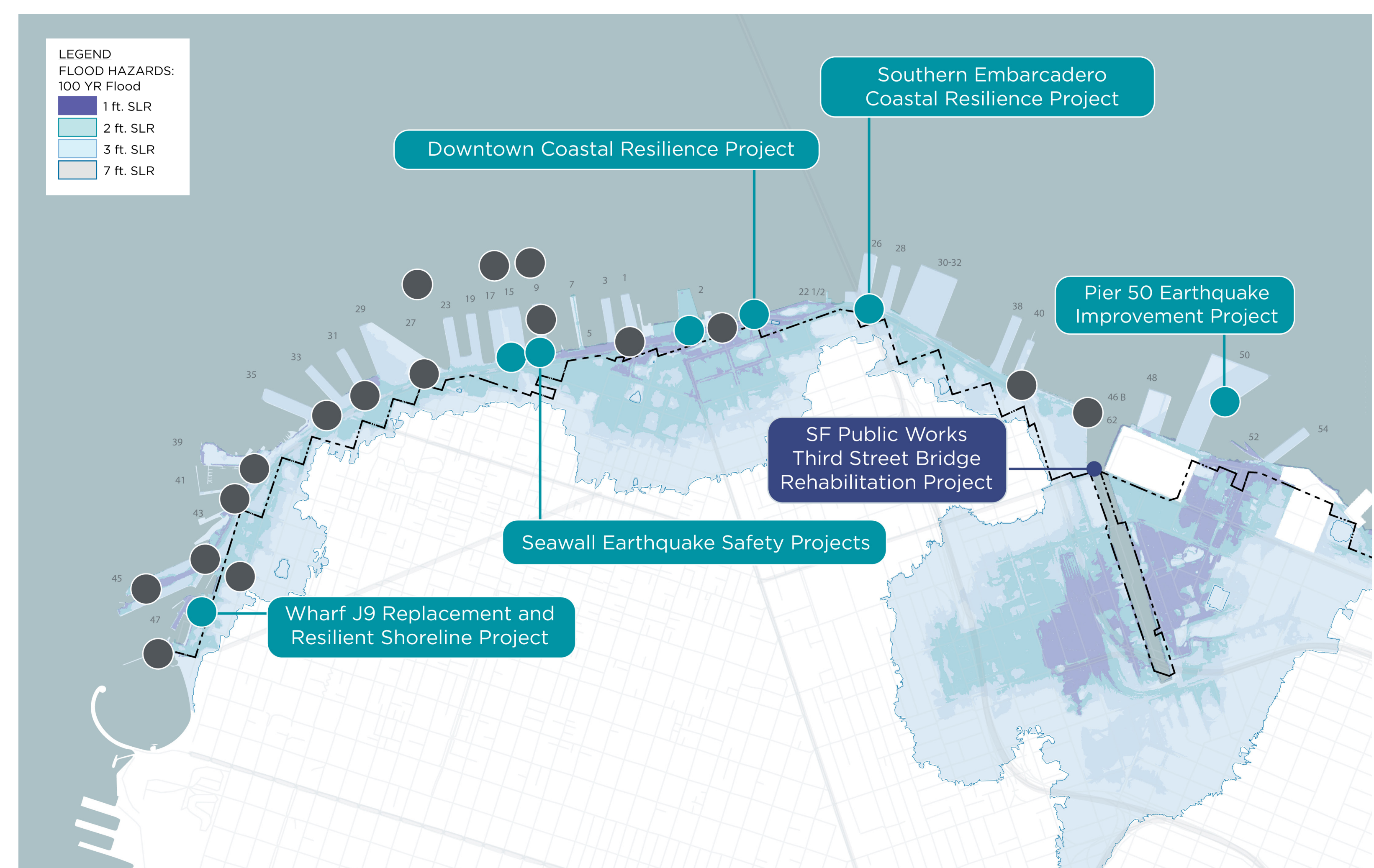
These projects were evaluated and prioritized using criteria developed with community input. Embarcadero Early Projects respond to community priorities by:

- Prioritizing life safety and emergency response
- Enhancing and sustaining economic and ecological opportunities
- Supporting an adaptable and equitable waterfront
- Ensuring public access to the waterfront and historic places
- Protecting and preserving historic and maritime resources

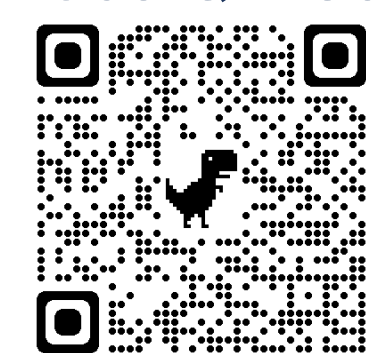
The Port is recommending 16 Embarcadero Early Projects to advance through Proposition A General Obligation Bond, with plans to advance the remaining projects by pursuing additional funding sources and partnerships:

- 5 projects through geographic development for the stretch between Piers 19 and 41, allowing for multiple funding sources to improve the area with high occupancy and critical City and Port infrastructure
- 11 projects straight to pre-design through Proposition A funding; and
- 7 projects through coordination with Port tenants, capital programs, and City agency coordination.

Alongside identification of Embarcadero Early Projects to address the areas of highest earthquake and sea level rise risks along the Embarcadero waterfront, the Port continues to advance work to reduce risk in the central and southern waterfront. These efforts include partnerships with the U.S. Army Corps of Engineers San Francisco Waterfront Coastal Flood Study, Islais Creek Southeast Mobility Adaptation Strategy, and the Southern Waterfront Seismic Vulnerability Assessment.



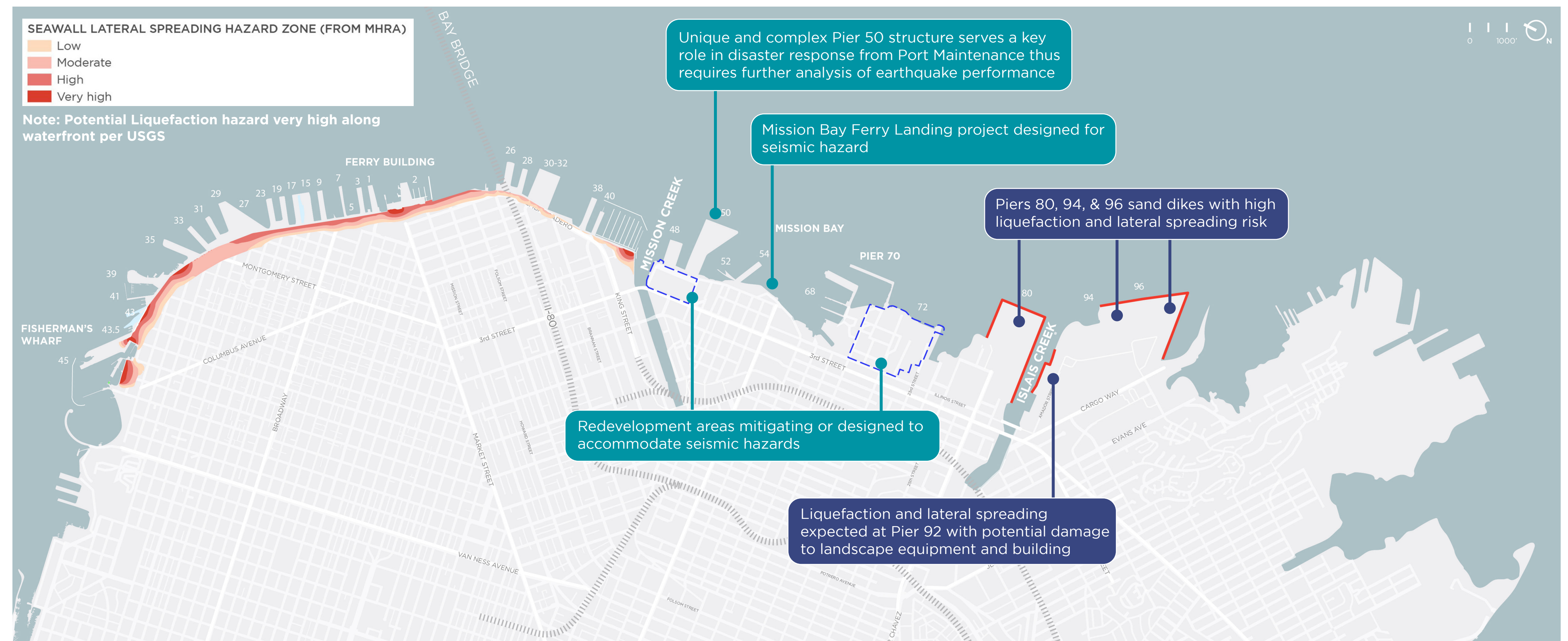
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# EARTHQUAKE HAZARDS

Most of the bayside shoreline of San Francisco was built over 75 years ago in earthquake country. Shoreline infrastructure was built atop weak young bay mud and liquefiable sands, which means that many of these structures do not meet modern seismic standards. Earthquake hazards vary along the 7.5 miles of shoreline based upon the types of soil, depth to bedrock and history of construction. The map to the right provides a combination of earthquake hazard information from the 2020 Embarcadero Multi-Hazard Risk Assessment and the 2022 Initial Southern Waterfront Earthquake Assessment.

## EARTHQUAKE HAZARDS ALONG THE WATERFRONT



## TYPES OF SEISMIC HAZARD

### Liquefaction

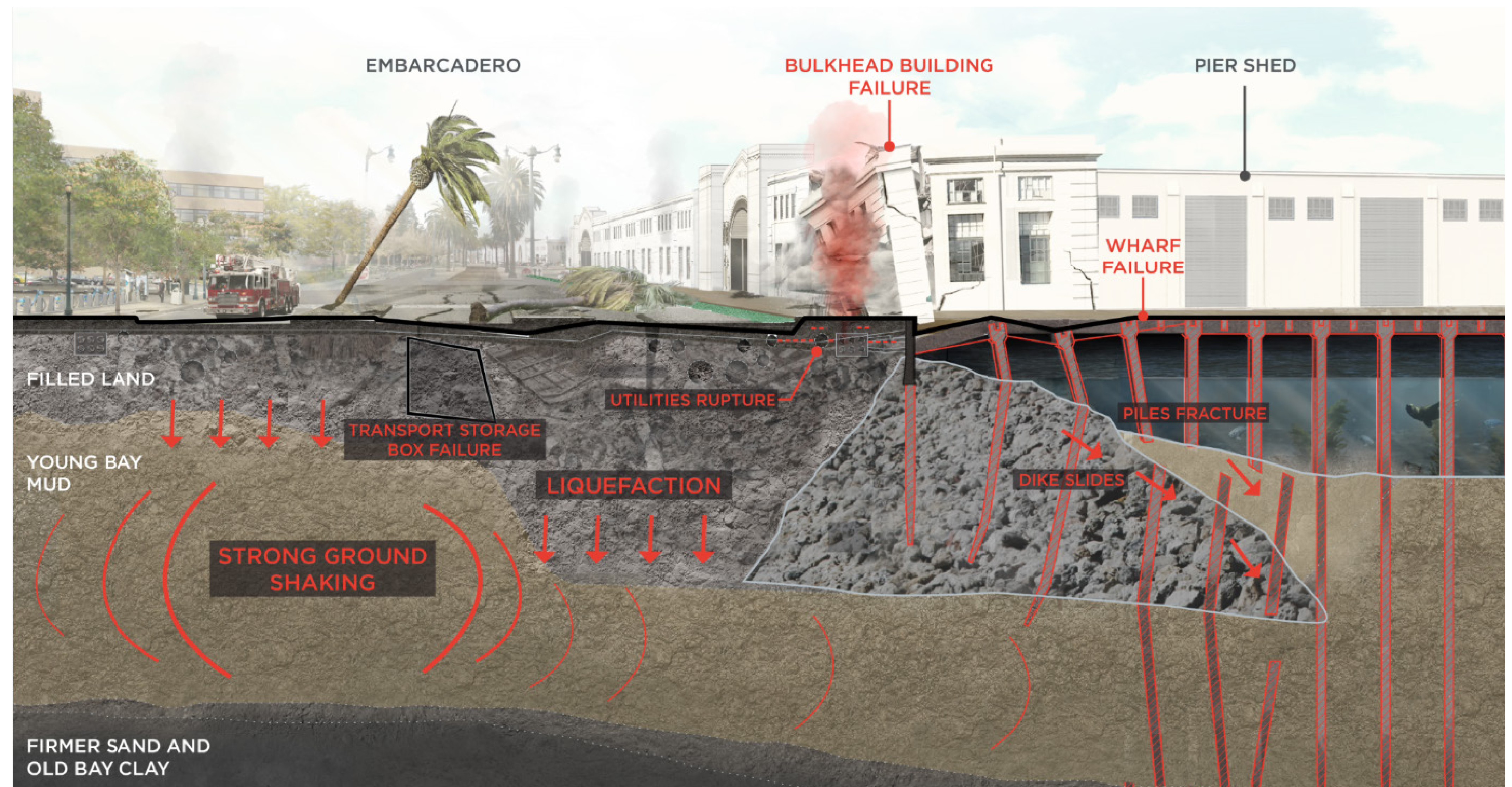
This can occur in sandy soils with high water tables. When soil liquefies, it loses strength and behaves like a liquid. Fill behind the Seawall and natural sand deposits below the Seawall can liquefy during moderate to strong ground shaking. Liquefaction increases damages to roadway, utilities, and buildings on shallow foundations.

### Groundshaking

This is the primary seismic hazard and depends on the size of the fault ruptures (magnitude), the distance from the epicenter and the type of soils and rocks underground. Bay mud amplifies ground shaking, making a moderate earthquake more damaging. The downtown area is particularly susceptible to this because it sits over a deep layer of bay mud.

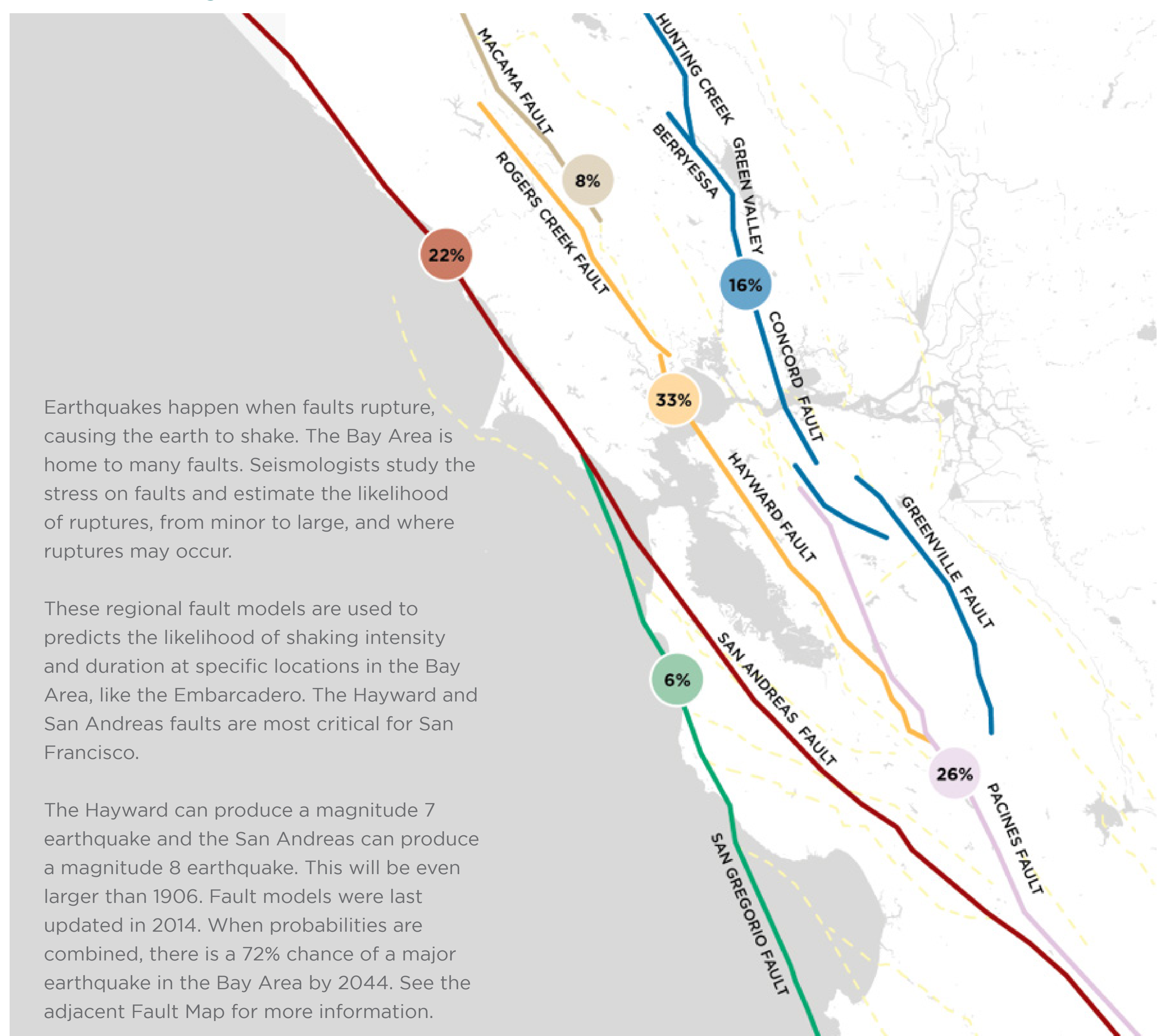
### Lateral Spreading

This happens when surface soils slide and crack, often occurring along shorelines and river beds. This hazard is very damaging for the Embarcadero waterfront and can greatly increase earthquake damage in roadways, infrastructure, wharves and buildings. Seawall failures and/or liquefied soil layers below the ground can lead to lateral spreading. Much of the recent geotechnical exploration and engineering analysis has been focused on refining predictions of lateral spreading.

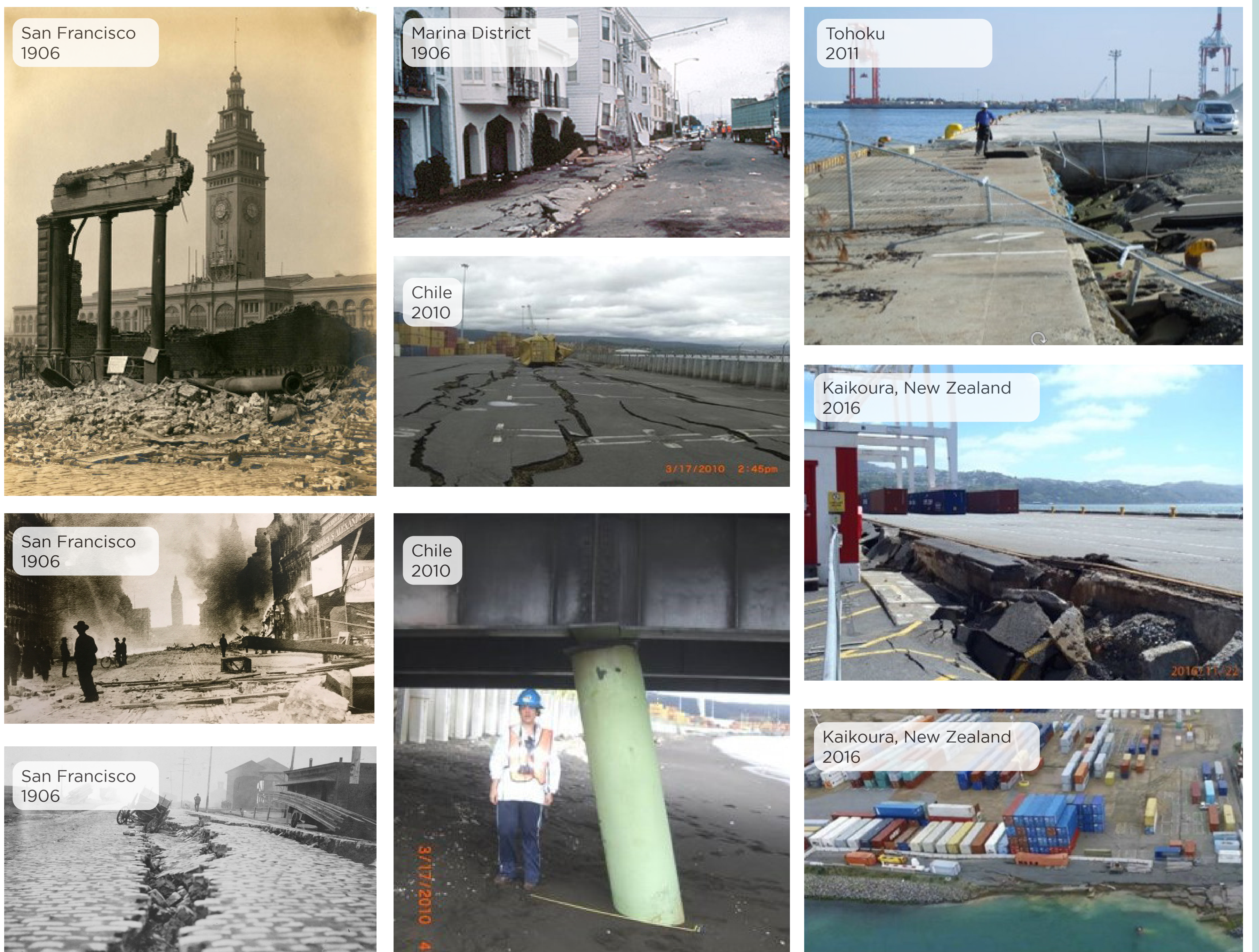


## HOW LIKELY ARE EARTHQUAKES?

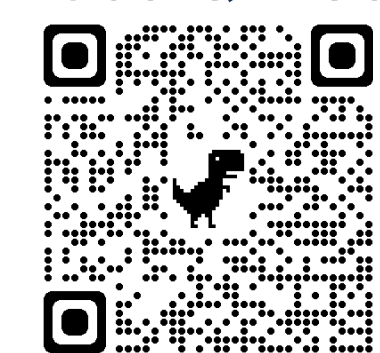
The USGS found a 72% chance of an earthquake over 6.7 by 2044.



## Historic Earthquake Damages in San Francisco and Port Facilities Around the World



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# PROPOSED ENGINEERING WITH NATURE IN THE DRAFT PLAN

## WHAT IS ENGINEERING WITH NATURE?

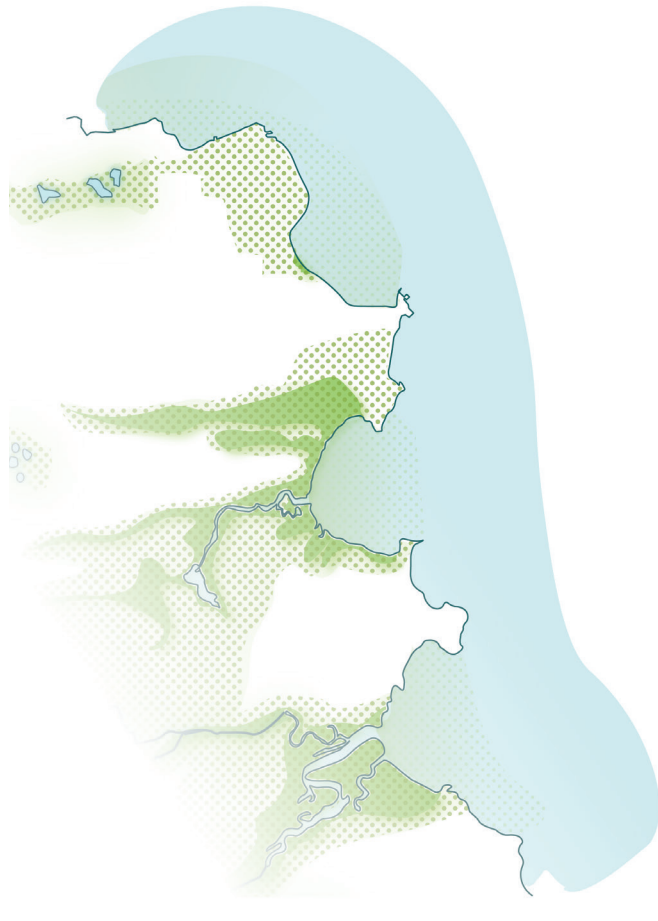
Engineering with Nature (EWN) is a USACE initiative that intentionally aligns natural and engineering processes to efficiently and sustainably reduce flood risks while delivering economic, environmental, and social benefits through collaboration.

### The goals of EWN in the Draft Plan

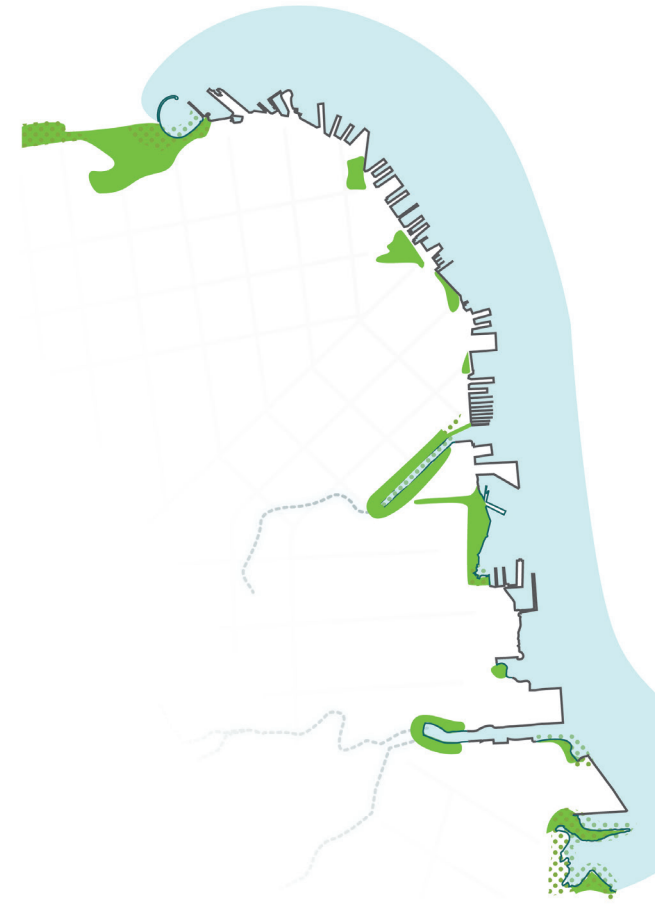
The San Francisco shoreline, though highly modified and urban, nevertheless supports a diversity of habitat types and species. This habitat fosters fishing and recreation and provides resilience against the challenges of climate change. The goal of EWN is to integrate these benefits into the approach to adapt the shoreline to sea level rise.

## San Francisco's Waterfront History


**Past**  
Before the arrival of European migrants, the peninsula's eastern waterfront featured large expanses of coves, mudflats and tidal wetlands fed by the historic tributaries of Mission Creek and Islais Creek.



**Present**  
Much of the waterfront was filled to support urban development. Today, the Pier 94 and Heron's Head wetlands remain of the shoreline's once vast marshlands. City parks dot the shoreline.

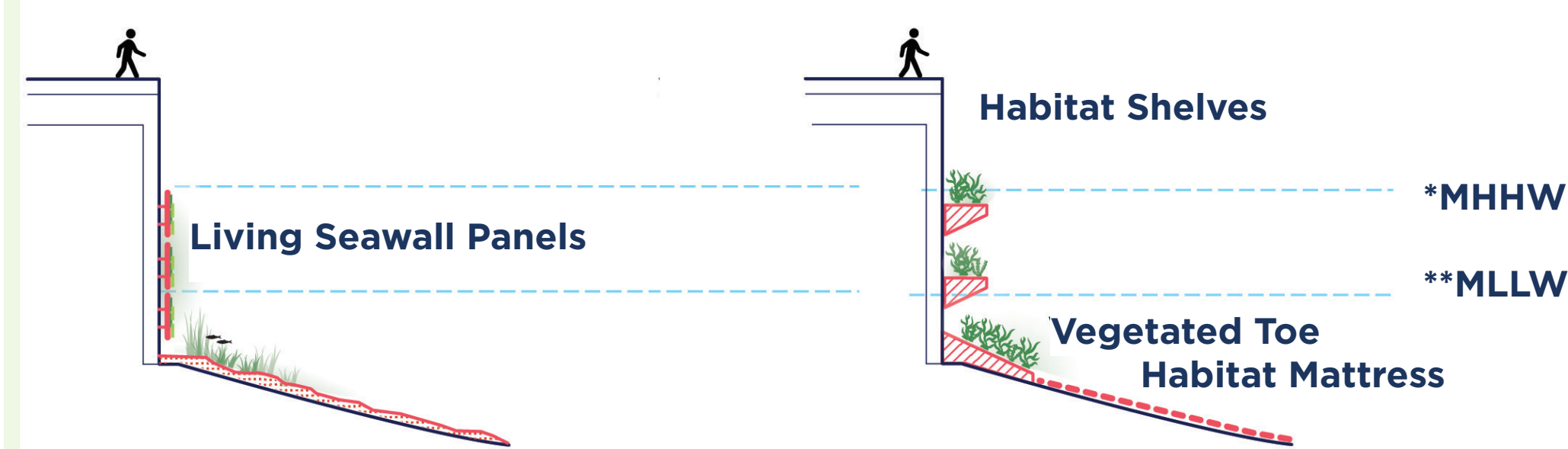


**Proposed**  
In the future, new developments and green streets could help to link pockets of habitat and open space, reduce runoff pollution in the Bay, and boost the shoreline's ecological connectivity.



## INTEGRATING NATURAL AND NATURE-BASED FEATURES INTO THE DRAFT PLAN

### Living Seawall



Traditional seawalls have barren, exposed concrete surfaces unlike natural marine habitats. Living seawalls can transform these surfaces to mimic natural environments that encourage underwater habitat and support native species over invasive species.

The Living Seawall Pilot is an innovative study led by the Port of San Francisco and Smithsonian Environmental Research Center (SERC) that is testing and evaluating engineering with nature concepts from around the world - from Seattle to Sydney - to learn how we can make San Francisco's seawalls more ecologically friendly in the future.

The Living Seawall Pilot is testing different wall textures using tiles made with special materials designed to promote biodiversity. Monitoring of the tiles will help answer questions on the optimal textures and conditions that can benefit native species and help improve the habitat quality and diversity along San Francisco's urbanized Bay waterfront. The living sea wall concept can be expanded in the draft plan across other reaches of the study area.

The Pilot is not part of the Flood Study. Living seawalls along some parts of the Embarcadero are included in the Flood Study as an optional nature-based feature and may be added into the Recommended Plan at a later date.



photo credit: SERC, Corryn Knapp



### Berms/Levees with Naturalized Shorelines and Creek Enhancements



Berms/levees are areas of raised ground that can help prevent flooding. They can be paired with naturalized shorelines and creek enhancements to further reduce wave risks and provide ecological benefits. These berms/levees are planted with native vegetation that helps break up waves and reduce their impacts, protect against erosion, and provide tidal and upland habitats. Where space is available, berms/levees with naturalized shorelines have gentle slopes that can incorporate features such as upland planting, habitat shelves, tidal wetlands, beaches, and rock mounds. In more constrained spaces, they may include upland planting and vegetated rip rap. Along creeks, berms/levees can be enhanced with habitat improvements that reinforce and vegetate creek banks, helping to reduce erosion.

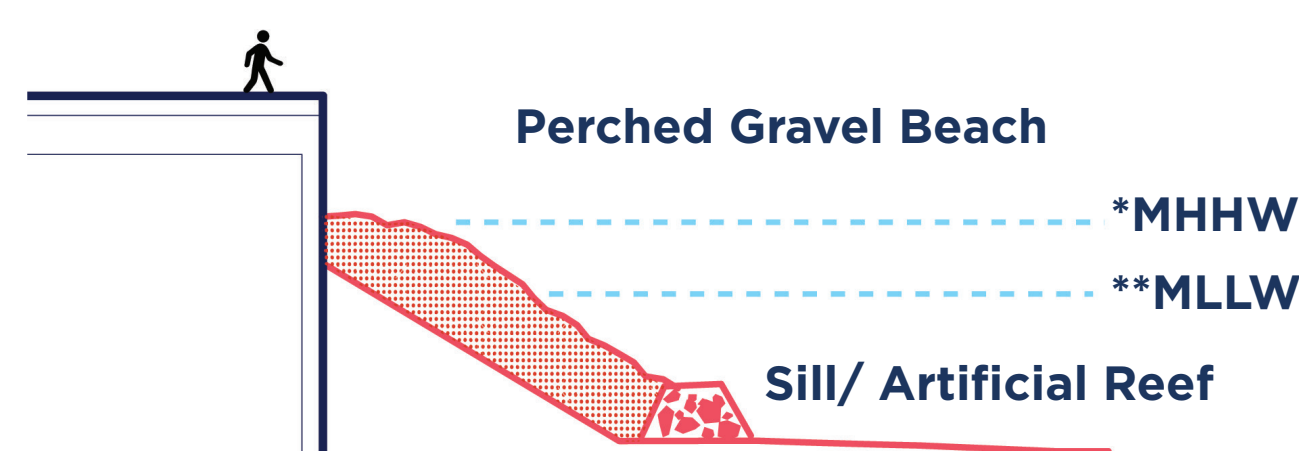


photo credit: USACE, Engineering with Nature Air Atlas, 2016

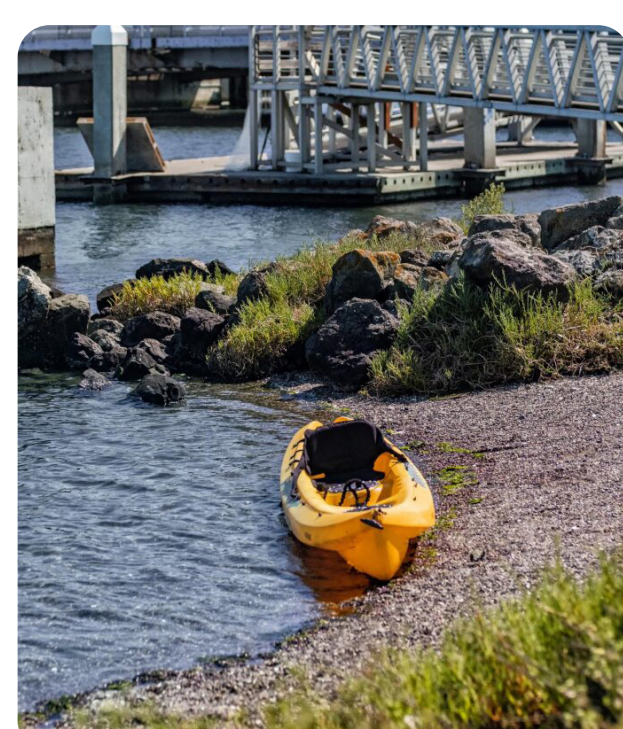
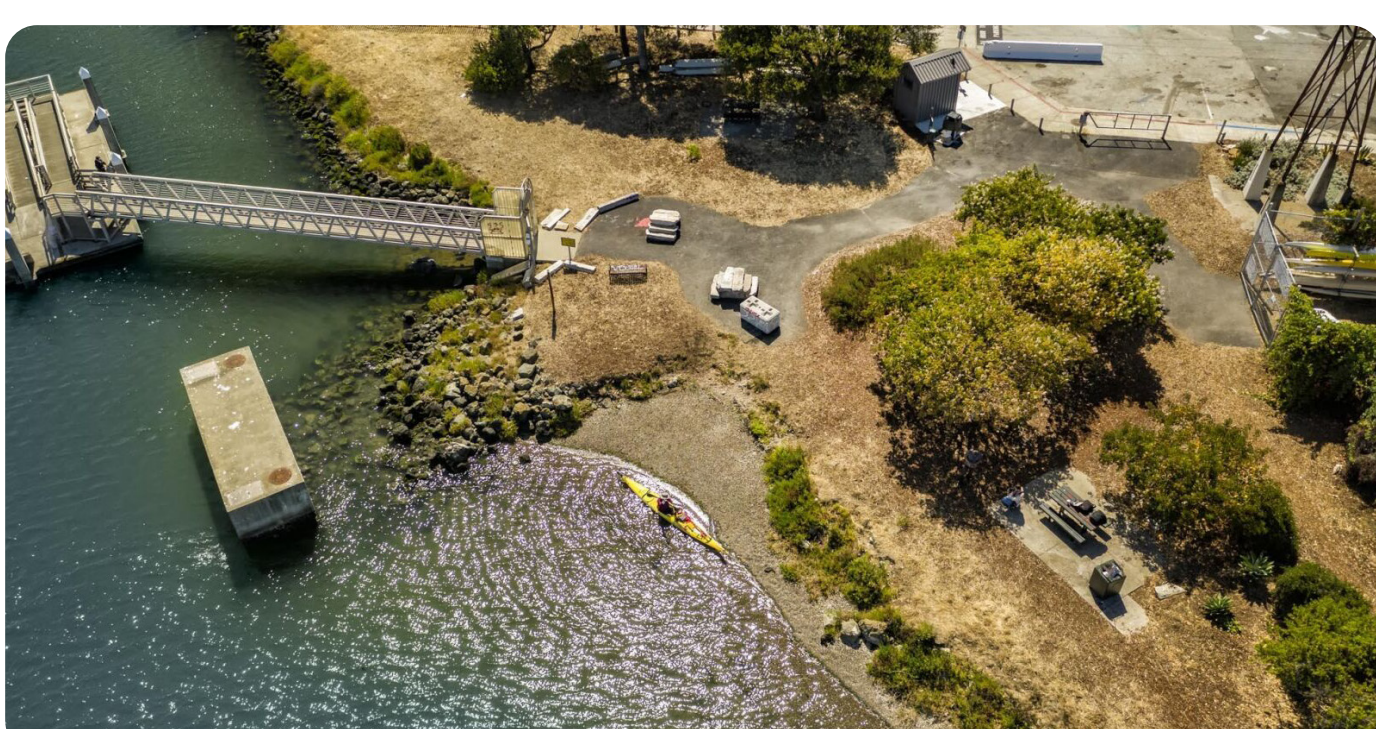


photo credit: Sitelab Urban Studio

### Coarse Beach



A coarse beach is composed of coarse sand, gravel, boulders, or cobble and mimics a natural "pocket beach" feature that existed along the historic San Francisco shoreline. Often found along steep slopes, a coarse beach helps reduce wave energy while also providing valuable underwater habitat. The Flood Study includes a coarse beach at Rincon Park as an optional measure. This feature may be added to the Recommended Plan at a later date.



\* MHHW- Mean High High Water  
\*\*MLLW- Mean Low Low Water

### Wetlands



Tidal wetlands help reduce wave hazards, and they are an important part of many coastal flood risk projects. Although small, the Pier 94 and Heron's Head tidal wetlands provide immense habitat value. The Draft Plan would attempt to expand these existing wetlands over time. Without enhancement and conservation, many wetlands in the Bay may drown and disappear as sea levels rise. Nature-based features can help create, restore, and enhance tidal wetlands so they can maintain their many benefits into the future.

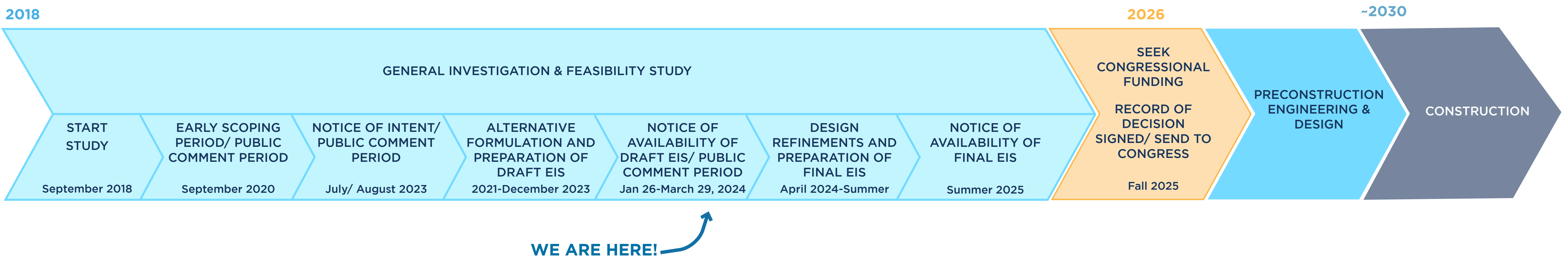


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# ENVIRONMENTAL REVIEW OF THE DRAFT PLAN

## WHERE ARE WE IN THE FLOOD STUDY PROCESS?



## NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) OF 1969

NEPA is one of the nation's oldest environmental laws. It requires Federal agencies to consider and disclose the environmental and social effects of their proposed actions in a publicly available document. Since significant effects are anticipated with the Draft Plan, an **Environmental Impact Statement (EIS)** has been prepared and integrated with the Draft Integrated Feasibility Report. The decision will be documented in a **Record of Decision (ROD)**.

The EIS describes the potential environmental impacts of the Draft Plan on various resources. Findings on key resources are summarized here.



### Transportation

- Significant traffic delays, detours, road closures, loss of access and parking, and increased vehicles would be expected near the construction areas until construction is done
- Minimizes the potential for road closures, shut-down of public transportation, and loss of access due to flooding over the long-term



### Air Quality

- Air emissions would be produced while operating heavy machinery during construction
- Best Management Practices (BMPs) and low-emitting equipment would be used to minimize the emissions
- With the information available now, air emissions would be within the state standards and not require a General Consistency Determination



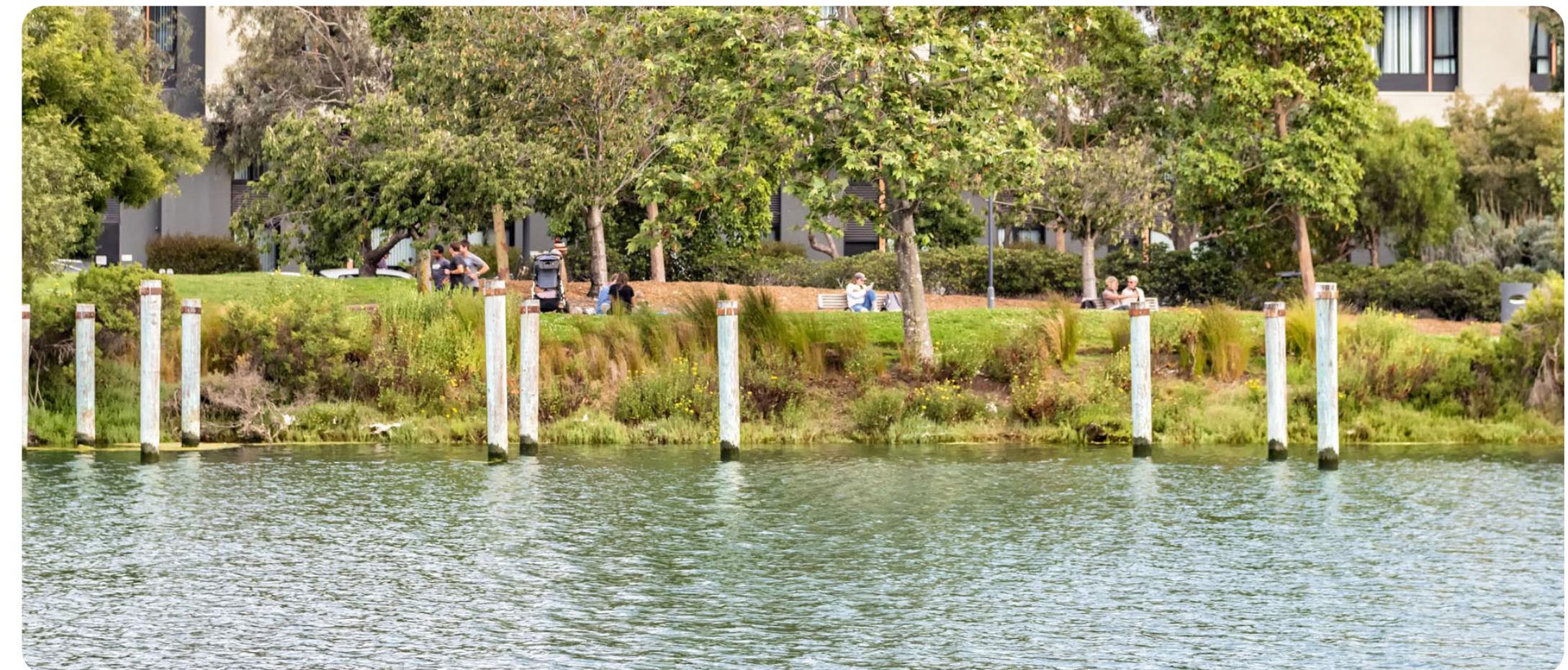
### Aesthetics

- Preserves the visual connections with the Bay by creating a raised shoreline that is gradual and blends with the surroundings
- Construction materials similar in color and texture to the surrounding environment and historic nature of the area will be used



### Habitats

- Avoids impacts to existing habitats such as tidal marsh, eelgrass beds, and beaches
- Integrates nature-based features like living seawalls, ecotone levees, and marsh and coarse beach restoration
- 8.0 acres of Bay Fill is needed to construct a small area near the Ferry Building. Compensatory mitigation, such as pier and pile removal, is included to offset the loss of subtidal habitat



### Water Quality

- Construction activities will avoid in-water work to the extent feasible
- Best Management Practices (BMPs) would be used to minimize changes to water quality while work is occurring in the water
- Changes to the existing sewer and stormwater system will be required to avoid long-term impacts



### Real Estate

- Keeps all housing in place (no buyouts required)
- Most private parcels and land uses would remain in place. A few properties would be impacted by construction of coastal flood defenses



### Hazardous, Toxic Radioactive Waste (HTRW)

Under USACE regulations, sites with hazardous materials in the project area would be avoided or cleaned up by San Francisco or parties responsible for the existing contamination at no cost to USACE, which may reduce the levels of contamination or minimize impacts to human health and the environment.

In coordination with USACE, the Port has documented recent and past efforts to address contaminated sites in the Study area, including potential vulnerability to ground water rise expected from sea level rise.

In the next phase of the Study, USACE and the City are discussing potential additional site investigation to understand the extent of hazardous materials in the Draft Plan right-of-way.

As work with USACE progresses, the City wishes to:

- Explore how USACE and the City can leverage the Draft Plan to minimize hazardous materials risks to human health and the environment;
- Understand how rising ground water could mobilize hazardous materials and how to address this risk.

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# EQUITY AND THE DRAFT PLAN

## BUILDING A RESILIENT WATERFRONT WITH EQUITY IN MIND

Keeping equity in mind is essential in developing a waterfront where all community members can thrive. The Draft Plan will continue to be refined while keeping ideas to advance equitable outcomes for community members. By gaining an understanding of opportunities for communities to benefit, the Draft Plan will be fine-tuned, addressing workforce development, environmental justice, health, mobility, and safety along the way.



Life safety



Revenue loss



Transit access



Impacts on underserved communities



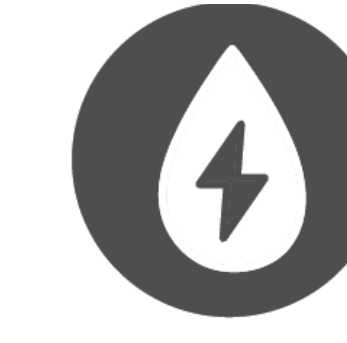
Economic impacts



Community access



Protection of cultural assets



Service disruptions

## WORK TO ADVANCE EQUITY IN THE DRAFT PLAN

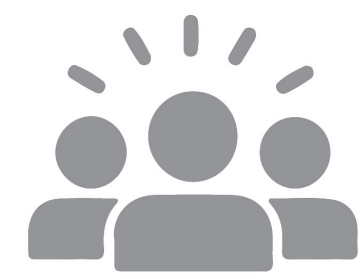
### An Equity Evaluation Framework

The WRP developed an Equity Evaluation Framework, which is a tool that guides the assessment and integration of equity considerations into every phase of the waterfront adaptation process. The Equity Evaluation Framework was developed based on input from:



#### An Equity Working Group

Assembled expertise from diverse city agencies to advise on equity outcomes.



#### Community-Based Organization Leader Insights

Organized focus groups with diverse community organizations to provide feedback on the Equity Evaluation Framework.

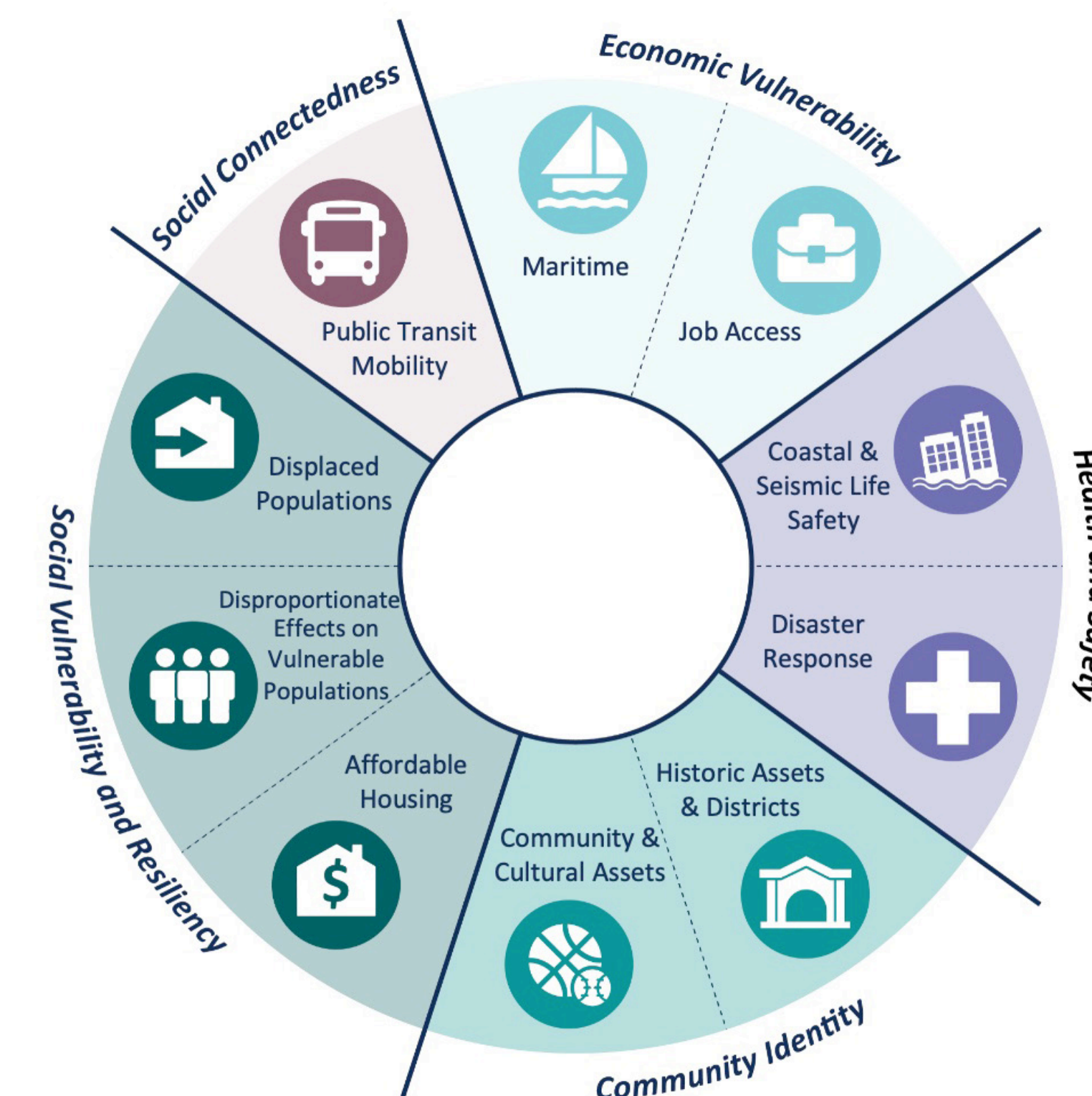


### Other Social Effects Assessment

In the plan selection process, USACE considers the benefits of proposed alternatives and compares them against costs. Typical plan selection maximizes net national economic benefits. This plan incorporates analysis of benefits across four dimensions:

- National Economic Development (including damages prevented, cost of construction)
- Regional Economic Development (including jobs)
- Environmental Quality, consequences, and compliance (including pollution)
- Other Social Effects (OSE)

The 'Other Social Effects' assessment helped us understand the social and community impacts of our plan. This assessment incorporated a new criterion, 'Disproportionate Effects on Under-served Communities', which brings an important environmental justice lens to climate impacts along the waterfront.



## HOW WAS THE DRAFT PLAN INFORMED BY EQUITY?



We incorporated Equity Key Drivers into our planning and decision-making processes to ensure that our work reflects the values and needs of communities along the waterfront. Key Equity Drivers capture the most critical equity issues, informed by the Equity Framework and OSE Analysis. As the Draft Plan continues to be refined, we will work to incorporate public input to ensure the Plan reflects community needs and values.

### Across the Waterfront

#### Citywide concerns that feedback to choices made at reach-scale

- **Jobs** • Prevents employment loss and increases jobs by defending the existing shoreline
- **Housing** • Keeps all housing in place - 13,500 residents
- **Transit** • Defends all transit lines, facilities, and the interconnected mobility network, serving 360,000 commuters from the city and the region
- **Impacts** • Minimizes disproportionate effects on vulnerable communities

### Hazardous Materials

USACE regulations require that hazardous materials are removed or made safe before construction projects can begin. Working with USACE, the Port has identified and assessed past and recent efforts to clean up contaminated areas within the project area. This assessment also considered the potential risks posed by rising groundwater due to sea level rise. In the next phase, the City and USACE are working together to make sure the draft plan protects people and the environment from hazardous materials.

### Islais Creek/Bayview



#### Key equity drivers were prioritizing life safety and emergency response and defending against contaminated site impacts, residential displacement, and employment loss

- Defends 3rd street, a key thoroughfare for delivery emergency supplies, staff, and services as well as a vital transit and transportation corridor.
- Keeps all housing in place and defends Port working lands and other industrial jobs.
- Avoids tide gates, which can have a greater impact on water quality and neighboring communities.

### South Beach/Mission Bay



#### Key equity drivers were minimizing economic impacts, service disruptions, and defending transit access

- Avoids tide gates, which can have a greater impact on Bay life and neighboring communities.
- Maintains vital transit connections between the Embarcadero and the Islais Creek/Bayview by avoiding impacts to Muni.
- Keeps all housing in place and defends jobs and services.

### Fisherman's Wharf + Embarcadero

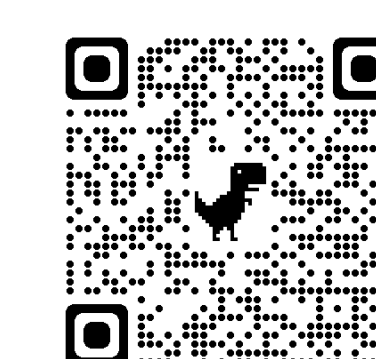


#### Key equity drivers were prioritizing life safety and emergency response and defending transit access, community access, and cultural assets

- Defends the Ferry Building, an iconic waterfront destination and one of San Francisco's and the Bay Area's key emergency response sites, as well as the Embarcadero Roadway, a key thoroughfare for delivery emergency supplies, staff, and services.
- Presents an opportunity for new waterfront public spaces by elevating the shoreline along the Embarcadero and maintaining visual and physical connections, with 2' walls along piers.

We want to hear from you on how we can make the Draft Plan work better for everyone.

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# LAND ACKNOWLEDGEMENT

## RECONOCIMIENTO DE LA TIERRA • 土地確認書



The Port of San Francisco acknowledges that we are on the unceded ancestral homeland of the Ramaytush Ohlone who are the original inhabitants of the San Francisco Peninsula.

As the indigenous stewards of this land and in accordance with their traditions, the Ramaytush Ohlone have never ceded, lost nor forgotten their responsibilities as the caretakers of this place, as well as for all peoples who reside in their traditional territory.

As guests, we recognize that we benefit from living and working on their traditional homeland.

We wish to pay our respects by acknowledging the Ancestors, Elders and Relatives of the Ramaytush Community and by affirming their sovereign rights as First Peoples.

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El Puerto de San Francisco reconoce que estamos en la patria ancestral no cedida de los Ramaytush Ohlone que son los pobladores originales de la Península de San Francisco.

Como administradores indígenas de esta tierra y de conformidad con sus tradiciones, los Ramaytush Ohlone nunca han cedido, perdido ni olvidado sus responsabilidades como personas a cargo de este lugar, así como para todas las personas que viven en su territorio tradicional.

Como huéspedes, reconocemos que nos beneficiamos de vivir y trabajar en su patria tradicional.

Deseamos presentar nuestros respetos al reconocer a los Antepasados, Ancianos y Familiares de la Comunidad Ramaytush y afirmar sus derechos soberanos como Primeros Pueblos.

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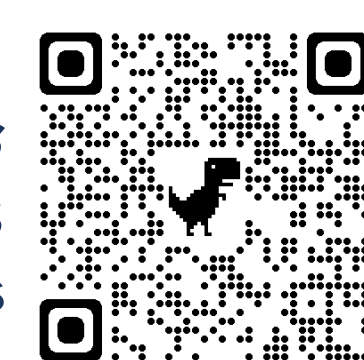
三藩市港務局承認，我們位於Ramaytush Ohlone人未割讓的祖傳家園，他們是三藩市半島的原始居民。

Ramaytush Ohlone人作為這片土地的土著管理者，秉承傳統，從未放棄、失去或忘記他們作為守護這片土地以及對於住在祖傳領土上人民的責任。

作為客人，我們體認從他們的傳統家園生活和工作中受益。

我們謹向Ramaytush社區的祖先、長者和親屬表示敬意，並肯定他們作為第一民族的主權。

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# SAN FRANCISCO WATERFRONT FLOOD STUDY

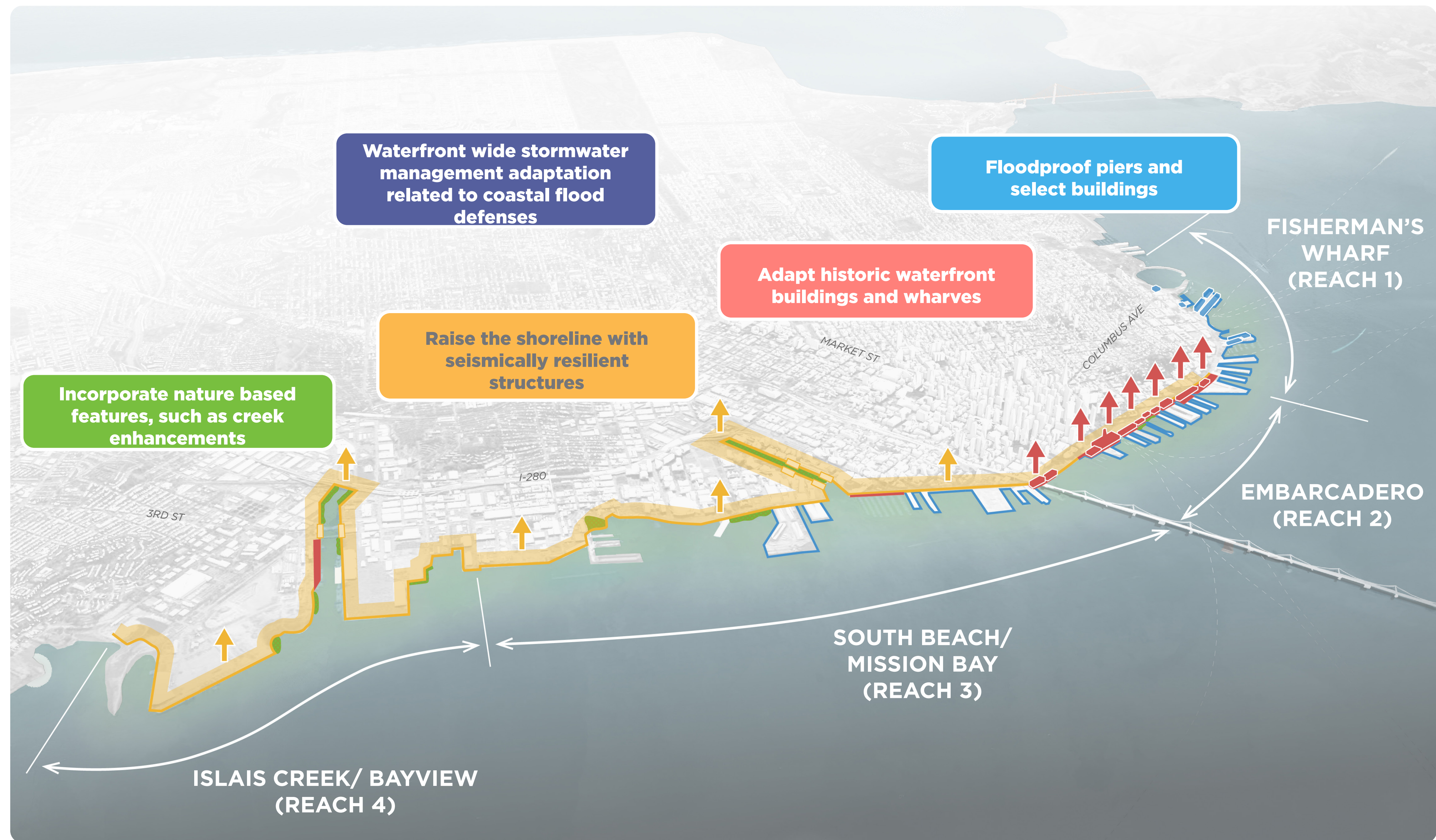
## DRAFT PLAN FOR REVIEW

The San Francisco Waterfront Flood Study<sup>1</sup> (Flood Study) is a multi-year effort led by the U.S. Army Corps of Engineers (USACE) in collaboration with the City of San Francisco (City). The Flood Study has reached an important milestone - the development of the Draft Plan<sup>2</sup>, which proposes where to build coastal flood defenses and how much sea level rise the future coastal flood defenses will manage for the next century.

### What is the Draft Plan?

The Draft Plan is a proposal combining different flood defenses, such as floodproofing, seawalls, berms, floodwalls, and nature-based features, which could be used to defend our waterfront, and also identifies their proposed locations. The Draft Plan evolved from the best ideas and approaches from the Draft Waterfront Adaptation Strategies released for public review in 2022. The proposed solutions are estimated to cost \$13.5 billion (high-level, preliminary cost estimate), and, if approved, the Federal government may pay 65% of the cost. The Draft Plan includes a Monitoring and Adaptation Plan to track evidence of sea level rise and global climate change to understand when future adaptation to plan actions will be required. The Draft Plan will inform subsequent stages of funding and design in order to develop targeted construction projects.

Reflecting more than six years of community engagement and public input, the Draft Plan is a critical milestone in San Francisco's continued, long-term efforts to defend our waterfront against flood risk and sea level rise, while also enhancing the seismic stability of our waterfront's flood management structures and complementing waterfront improvements.



## WHAT IS INCLUDED IN THE DRAFT PLAN?

### How did community feedback shape the Draft Plan?

The City of San Francisco has connected with tens of thousands of community members through over 150+ events to understand community priorities and concerns. Based on community feedback, the Draft Plan:

Keeps all housing in place: 13,500 residents



"Put people first, prioritize assets and services"



"Prioritize nature and healing the bay"

Includes options for nature-based features like living seawalls

Proposes 7.5 miles of new flood defenses



"Focus on life, safety and emergency response"



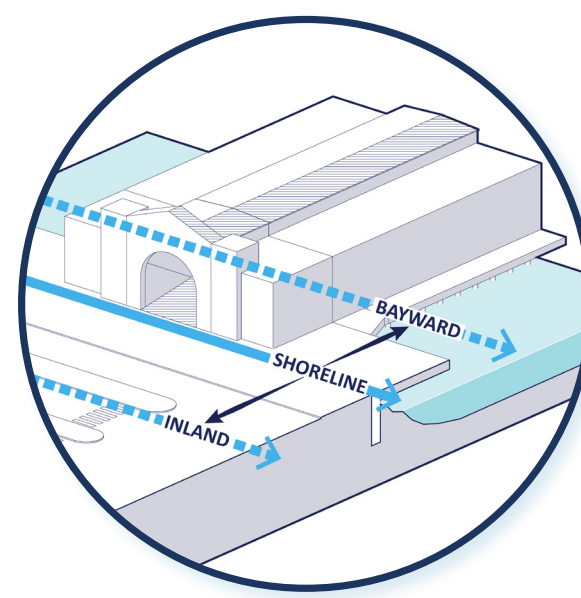
"Maintain and create new connections to the waterfront"

Creates opportunities for water recreation and access

### 12 Draft Plan Actions

#### Where to build flood defenses?

Have we located the flood defenses in the right place?

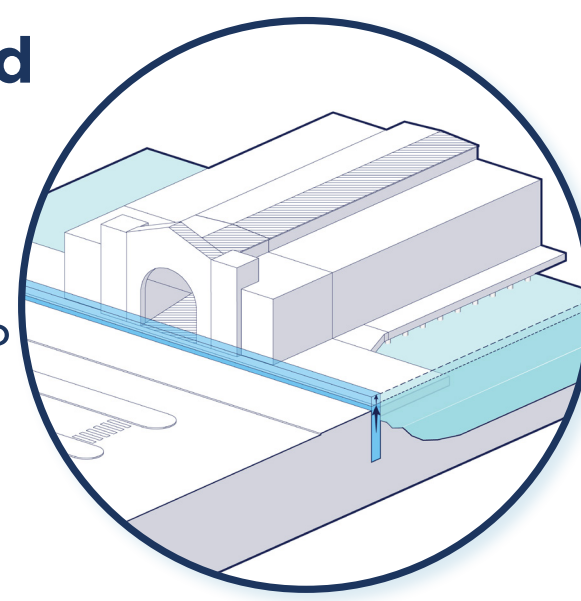


#### Raise the shoreline with seismically resilient structures

1. Raise the shoreline to defend against 1.5' to 3.5' of Sea Level Rise
2. Undertake seismic ground improvements to flood defenses
3. Construct closure structures on the bridges/ tie into existing bridge project

#### How high to build flood defenses?

Should we invest in higher levels of flood defense first, or adapt in multiple phases?

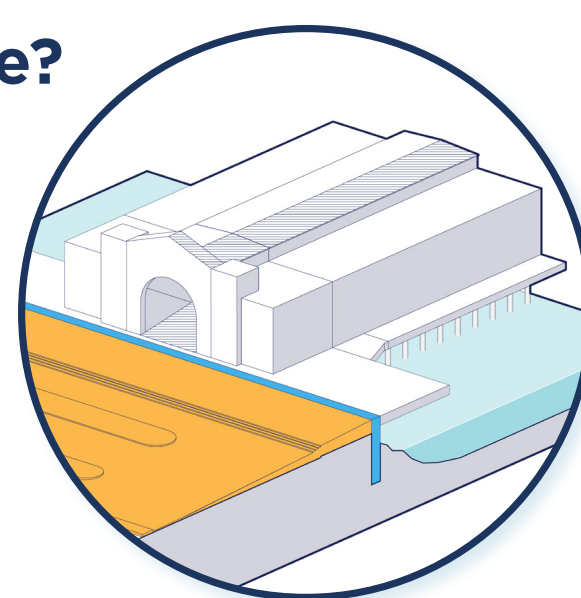


#### Adapt historic waterfront buildings and wharves

4. Elevate Historic Buildings like the Ferry Building and bulkhead buildings
5. Replace existing wharves with new seismically-sound, elevated wharves

#### How much space to use?

More space provides more flexibility but is associated with more disruption. Less space means more abrupt grade changes.



#### Floodproof piers and select buildings

6. Floodproof select buildings in Fisherman's Wharf
7. Construct 2-foot-tall walls around perimeter of the piers

#### Incorporate nature based features

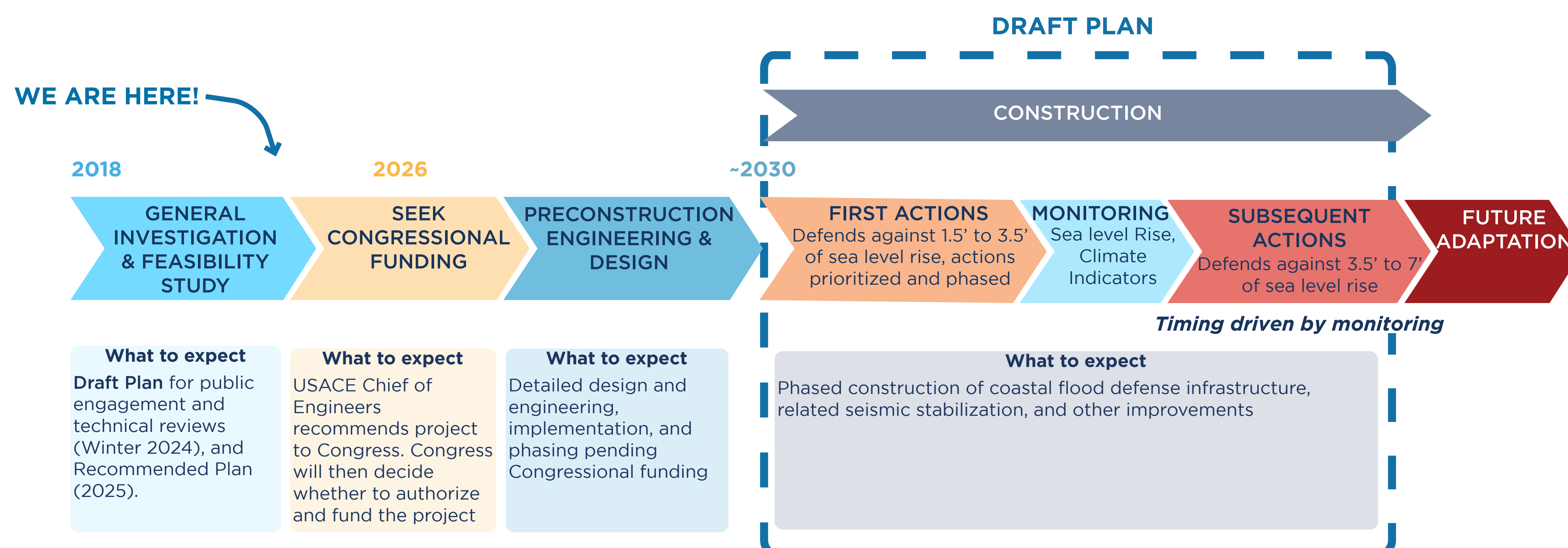
8. Construct living seawalls (optional)
9. Build berms/levees with naturalized shorelines and creek enhancements
10. Preserve wetlands

#### ... and How flood defenses can be adapted in the future.

#### Waterfront wide stormwater management adaptation related to coastal flood defenses

11. Adapt infrastructure to manage stormwater related to coastal flood defenses
12. Build green infrastructure

## WHERE ARE WE IN THE FLOOD STUDY PROCESS?



### What are the next steps?

USACE and the City are seeking public comment on the Draft Plan and Environmental Review through March 29, 2024. There are several ways that you can add a comment:

- Provide a comment while you are here. Comment cards are available for written comments and verbal comments can be provided at the Court Reporter table.
- Share written comments via email: SFWFRS@usace.army.mil
- Share written comments via mail: U.S. Army Corps of Engineers, Tulsa District ATTN: RPEC-SFWS, 2488 E81st St., Tulsa, OK 74137
- Share comments online: learn more and comment at sfport.com/wrp

Note: Dates are approximate and subject to change. Projects will occur in phases which will extend over decades.

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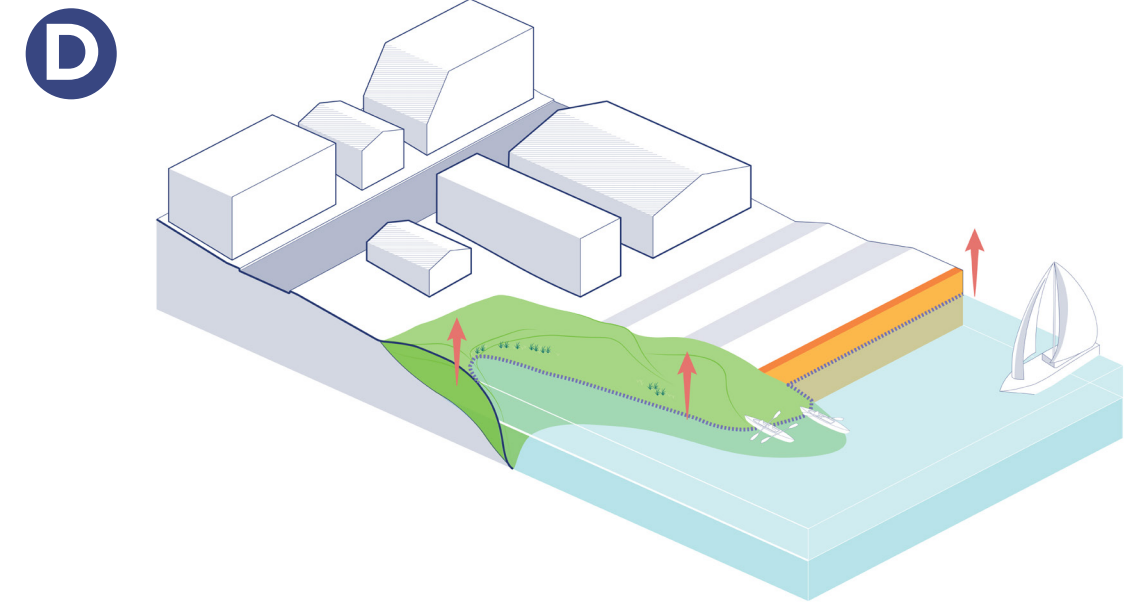


1. San Francisco Waterfront Coastal Flood Study  
2. Draft Integrated Feasibility Report and Environmental Impact Statement, January 2024

# HOW DID WE GET TO THE DRAFT PLAN?

## HIGH LEVEL APPROACHES

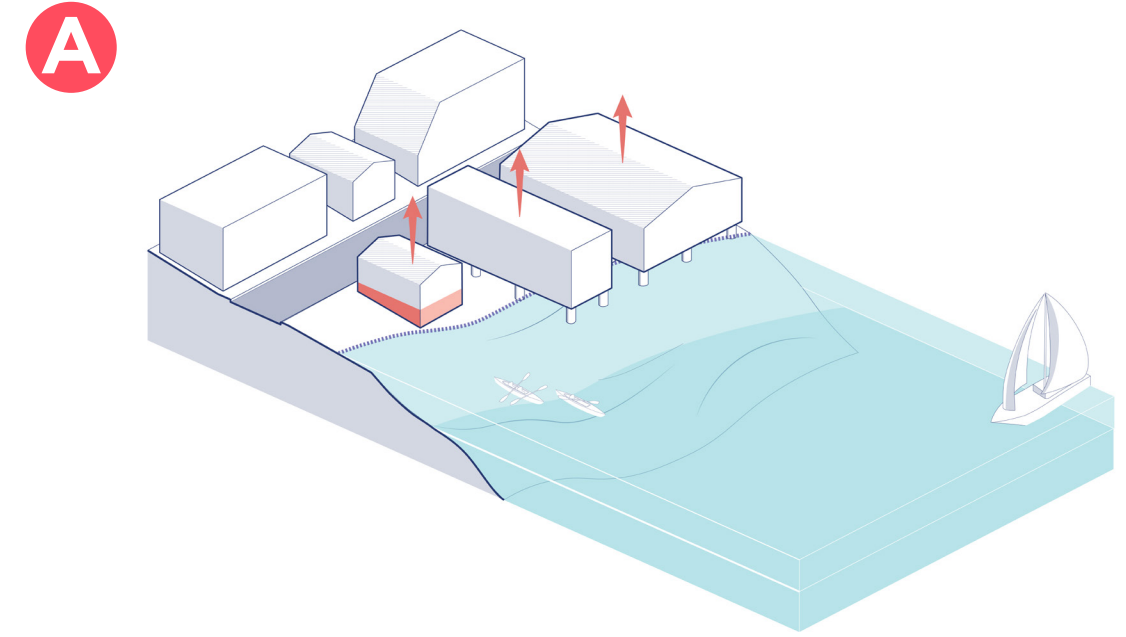
### Defend



Shanghai, China

**Defend** against floods by raising the existing shoreline to keep water out

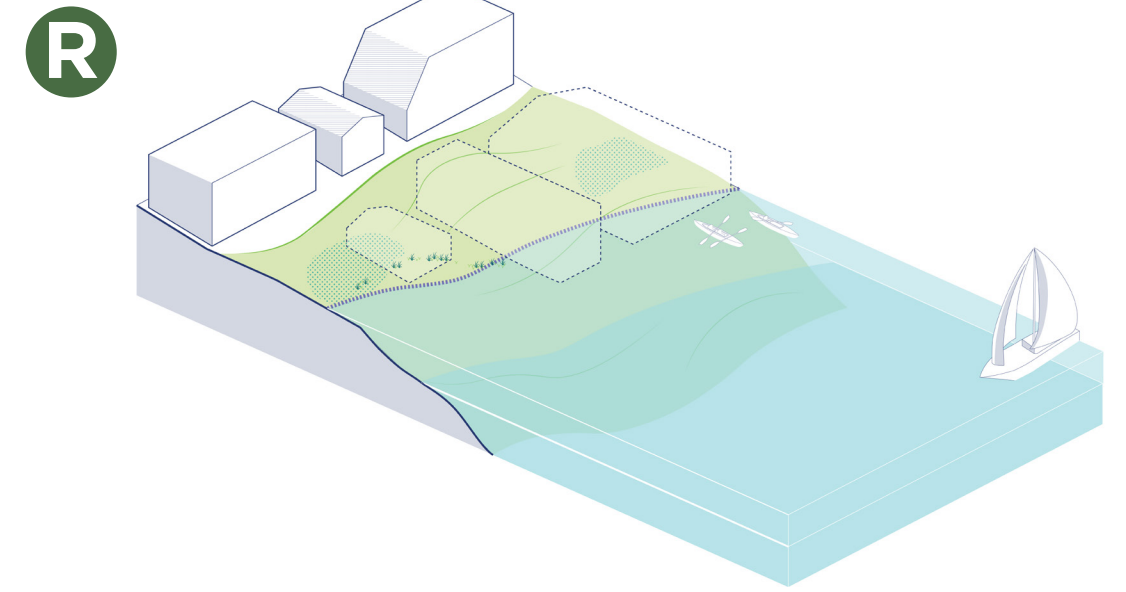
### Accommodate



Hamburg, Germany

**Accommodate** flooding by letting the water in, adapting the buildings and infrastructure in place to reduce damage from inundation

### Retreat



Christchurch, New Zealand

**Retreat** from the current shoreline by moving building infrastructure inland and out of frequently inundated areas

## MEASURES NOT CARRIED FORWARD

USACE and the Port considered the following concepts early in the plan formulation process and determined not to study them further:

### Golden Gate Barrier

This concept includes construction of a permanent or deployable barrier across the Golden Gate Bridge to reduce flood risk throughout the San Francisco Bay Area. USACE and the Port determined not to further study this approach due to extremely high anticipated cost, endangered species impacts, water quality impacts, in-Bay fill, and governance concerns.

### Offshore Wave Attenuator (Entire Study Area)

This concept included construction of a long structure parallel to the shoreline from Aquatic Park to Pier 80. It would be offshore (i.e., in the Bay) and designed to reflect, absorb, or disperse wave energy. The concept was paired with a shoreline approach from Pier 80 to Heron's Head Park and a tide gate across Islais Creek. USACE and the Port determined not to further study this approach due to extremely high anticipated cost, endangered species impacts, water quality impacts, and in-Bay fill.

### Offshore Barrier (Entire Study Area)

This concept included construction of an offshore structure enclosing the entire study area from Aquatic Park to Heron's Head Park. It included gates to support the movement of marine traffic. USACE and the Port determined not to further study this approach due to extremely high anticipated cost, endangered species impacts, water quality impacts, and in-Bay fill.

### Full Managed Retreat (Entire Study Area)

This concept included removing all people and infrastructure out of the floodplain throughout the entire study area, retreating at least as far back as the historic shoreline. USACE and the Port determined not to further study this approach based on conversations with City representatives, regional agencies, and resource and regulatory agencies.

## ADAPTATION STRATEGIES

Adaptation Strategies are different ways for the City to address flood risk. They were developed from distinct combinations of structural measures, non-structural measures, and natural and nature-based features. Each Strategy uses high level approaches (defend, accommodate, retreat) to place the coastal flood defense. The maps show the location of this line of defense (LOD) for each strategy in the mid- and long-term.

### STRATEGY A

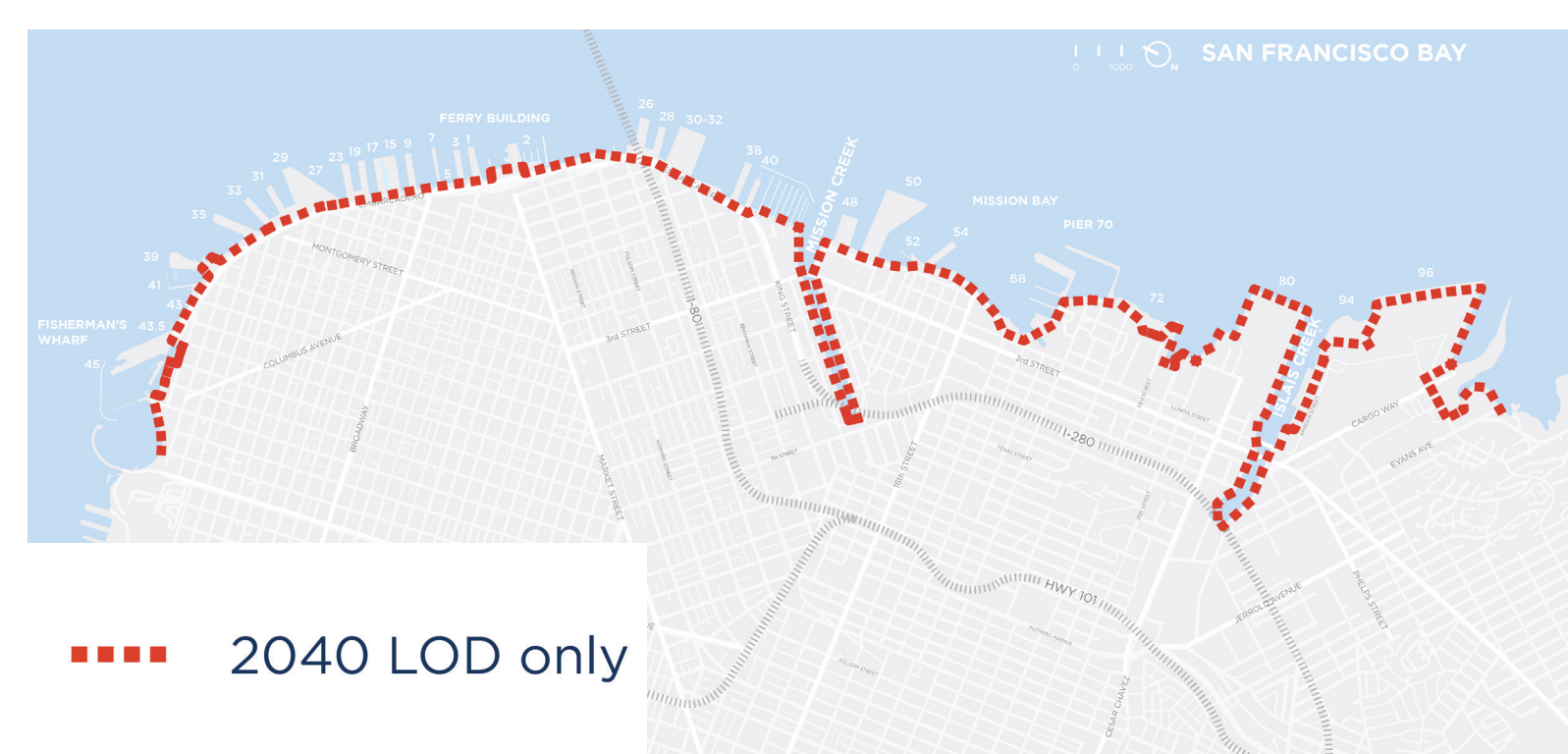
2040 **R** 2090 **R**

Takes **no actions** to reduce flood risks beyond projects that are already approved.

### STRATEGY C

2040 **D** 2090 **R**

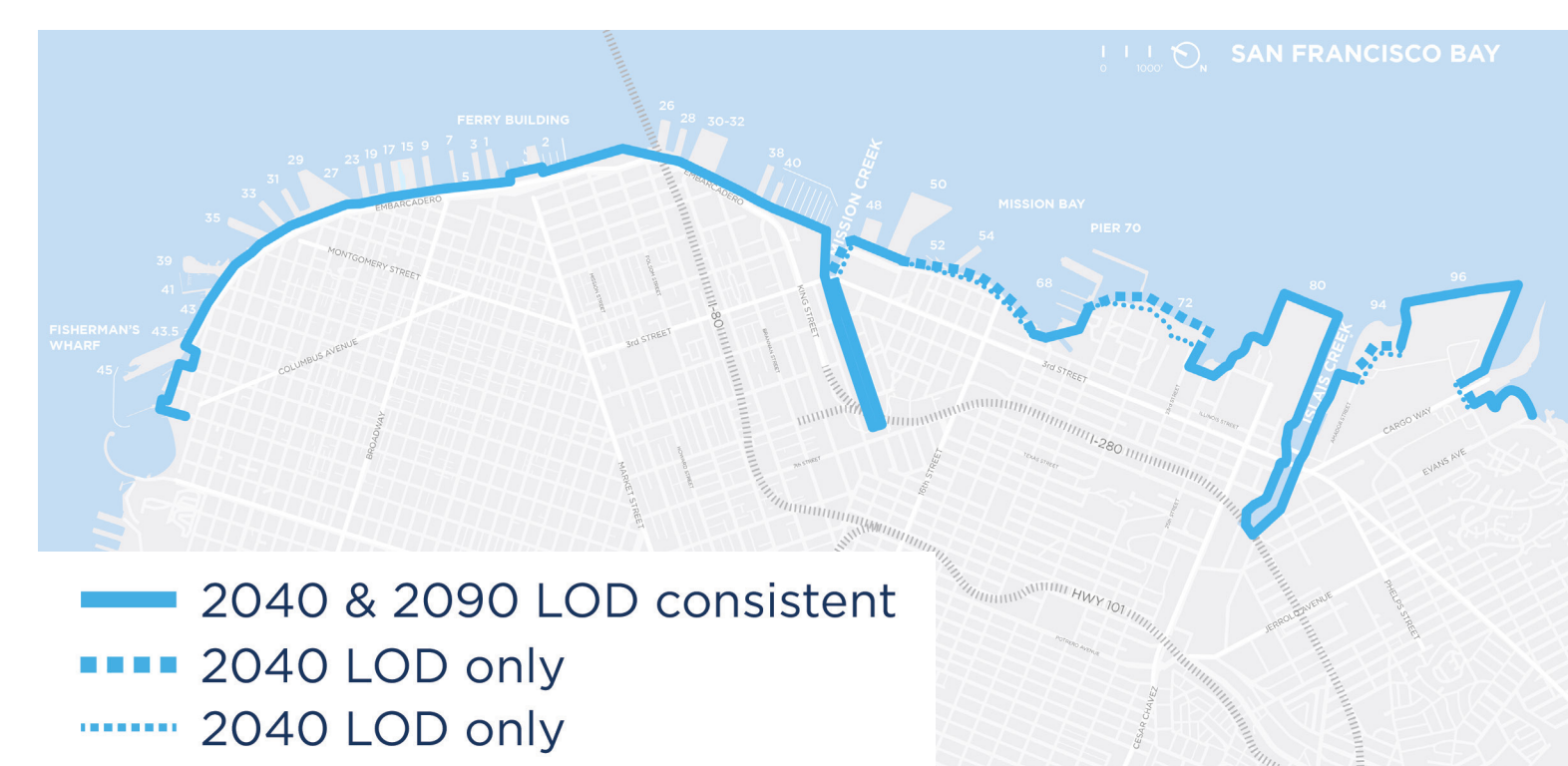
Adapts the shoreline to withstand **1.5' of sea level change** using a combination of structural and nonstructural measures.



### STRATEGY E

2040 **D** 2090 **D**

Raises the shoreline, predominately with a **system of seawalls and levees**, to withstand **3.5' of sea level change** with the possibility of building to withstand **7' of sea level change** closer to 2090.



### STRATEGY G

2040 **D A R** 2090 **D R**

Works with natural flooding patterns, through **systems of seawalls and berms/levees combined with water management structures at the creeks**, to withstand **3.5' of sea level change**. Possibility to adapt to **7' of sea level change**.



### STRATEGY B

2040 **A R** 2090 **A R**

Moves people and assets away from the risk, by **non-structural measures** (such as floodproofing) to reduce risks, and allows water to go where it wants rather than constructing traditional structural solutions.

- Methods include:
- Warning systems
  - Floodproofing buildings
  - Buyouts



### STRATEGY D

2040 **D** 2090 **D**

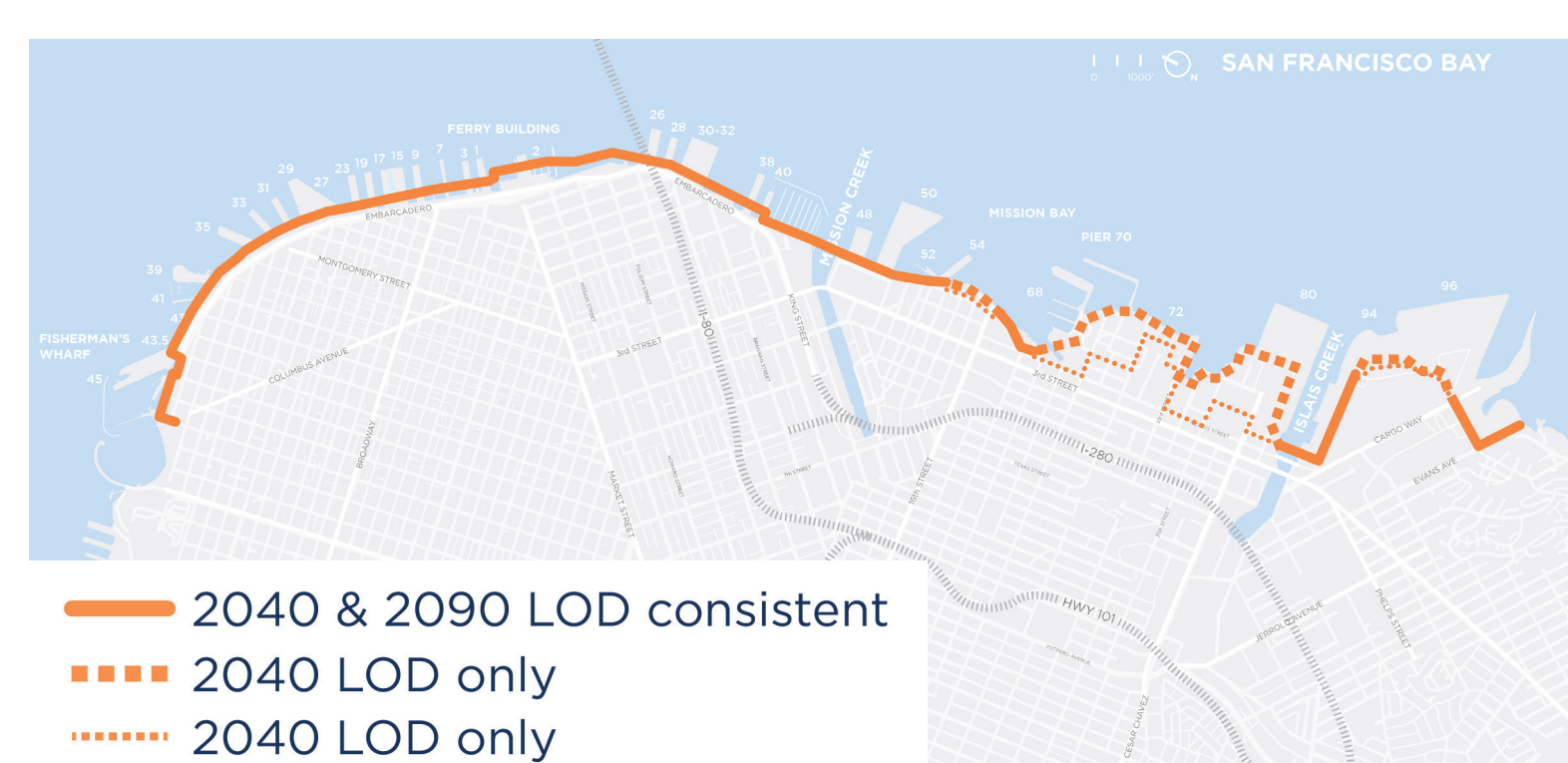
Adapts the shoreline to withstand **1.5' of sea level change**, with the possibility of building **higher** closer to 2090.



### STRATEGY F

2040 **D A** 2090 **D R**

Manages flooding by heavily relying on **mechanical water management structures** to withstand **3.5' of sea level change** with the possibility of building to withstand **7' of sea level change** closer to 2090.



### TOTAL NET BENEFITS PLAN (TNBP)

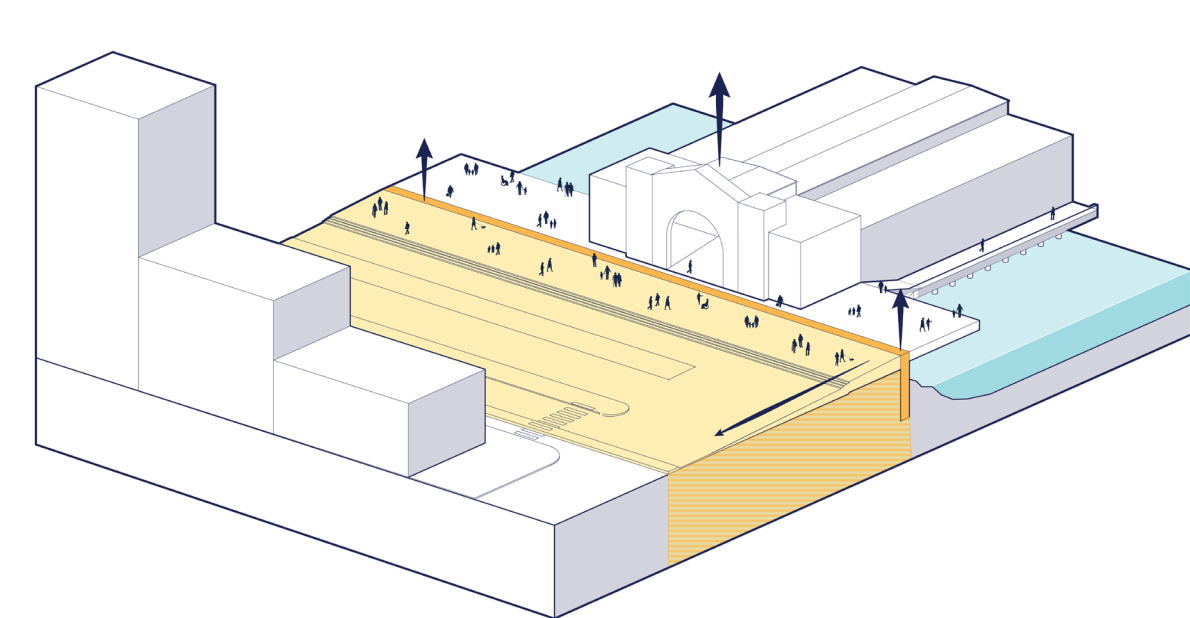
2040 **D A** 2090 **D A**

The TNBP identifies a combination of different flood defenses, such as floodproofing, seawalls, berms/levees, floodwalls and nature-based features, which could be used to defend our waterfront. It brings together approaches from the Draft Waterfront Adaptation Strategies A through G to balance flood risk management with the Flood Study objectives.



## MEASURES EXPLANATION

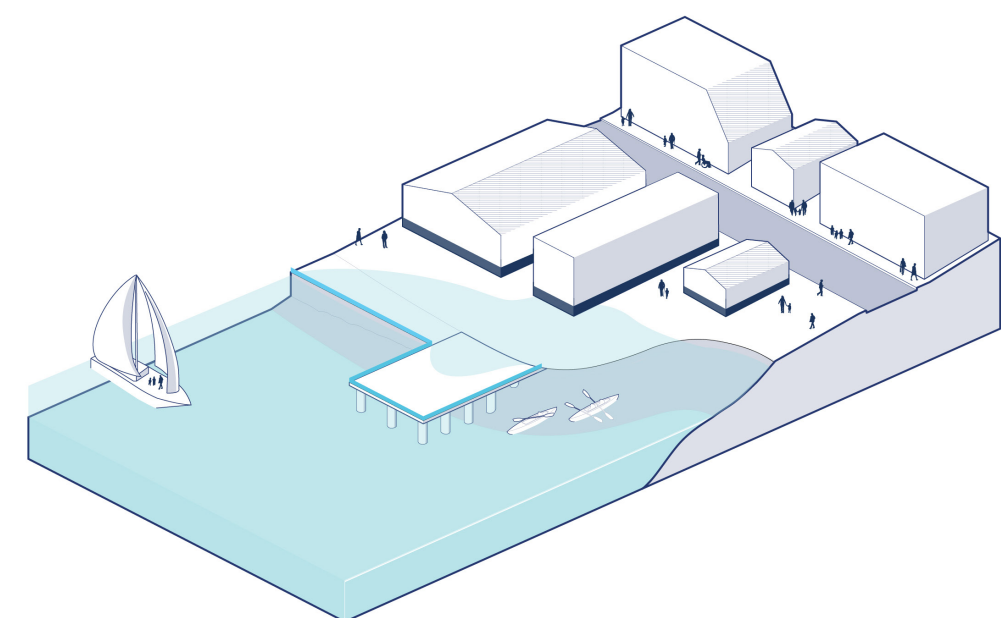
### Structural



**Structural measures** are physical features designed to reduce the frequency of damaging levels of flood inundation. They may be used alone or in combination with other measures.

- Examples include:
- Seawalls and floodwalls
  - Berms/levees
  - Raised wharves
  - Water management structures such as tide gates

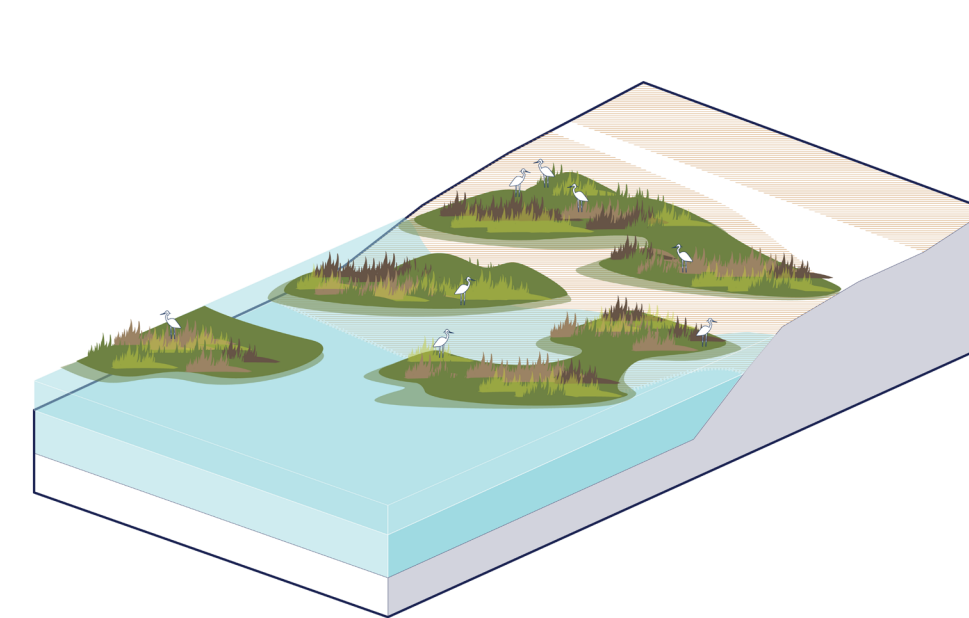
### Nonstructural



**Nonstructural measures** prevent or reduce damage from flooding. They can modify existing property or structures, or focus on behaviors and plans to reduce damage from flooding

- Examples include:
- Floodproofing
  - Retreat
  - Buy-outs
  - Emergency preparedness plans

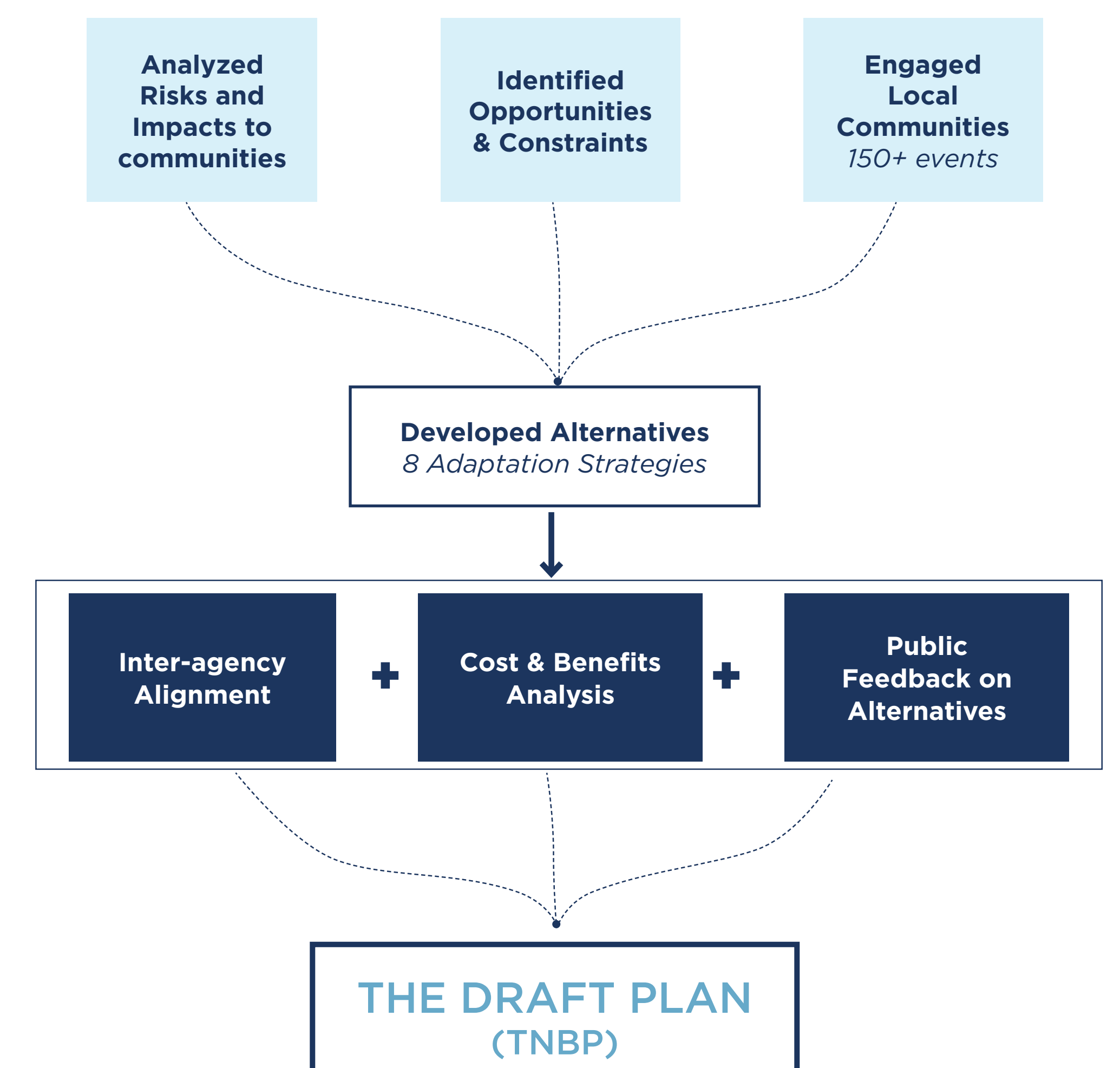
### Natural and Nature-Based



**Natural and Nature-Based Features (NNBFs)** (NNBFs) refer to landscape features used to reduce flood risk while restoring natural processes and providing ecosystem benefits. They can be used alone, in combination with each other, and in combination with conventional engineering measures such as levees, floodwalls, and other structures.

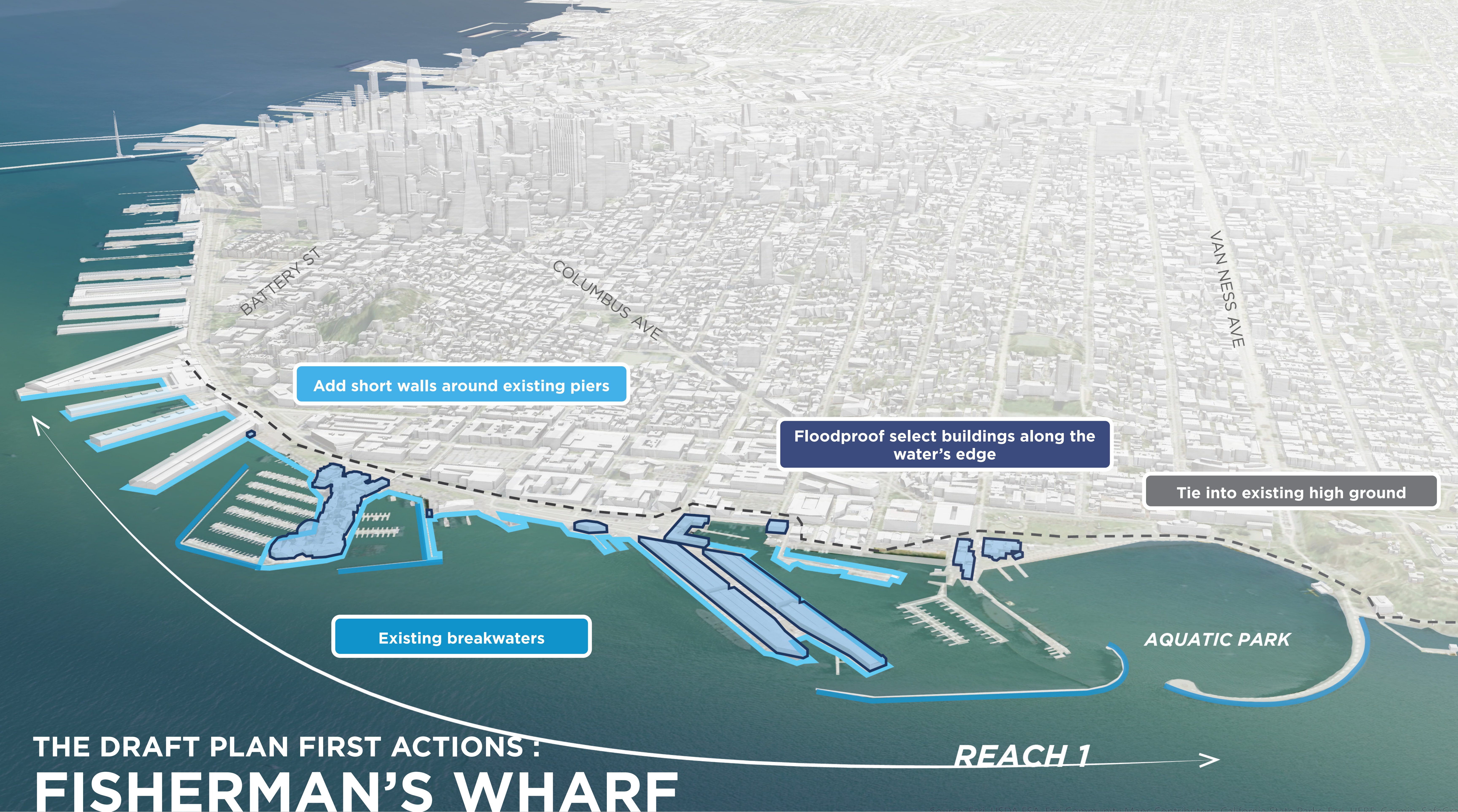
- Examples include:
- Wetlands
  - Beaches
  - Living seawalls
  - Ecotone levees

## PROCESS



Use QR Code for Storymaps





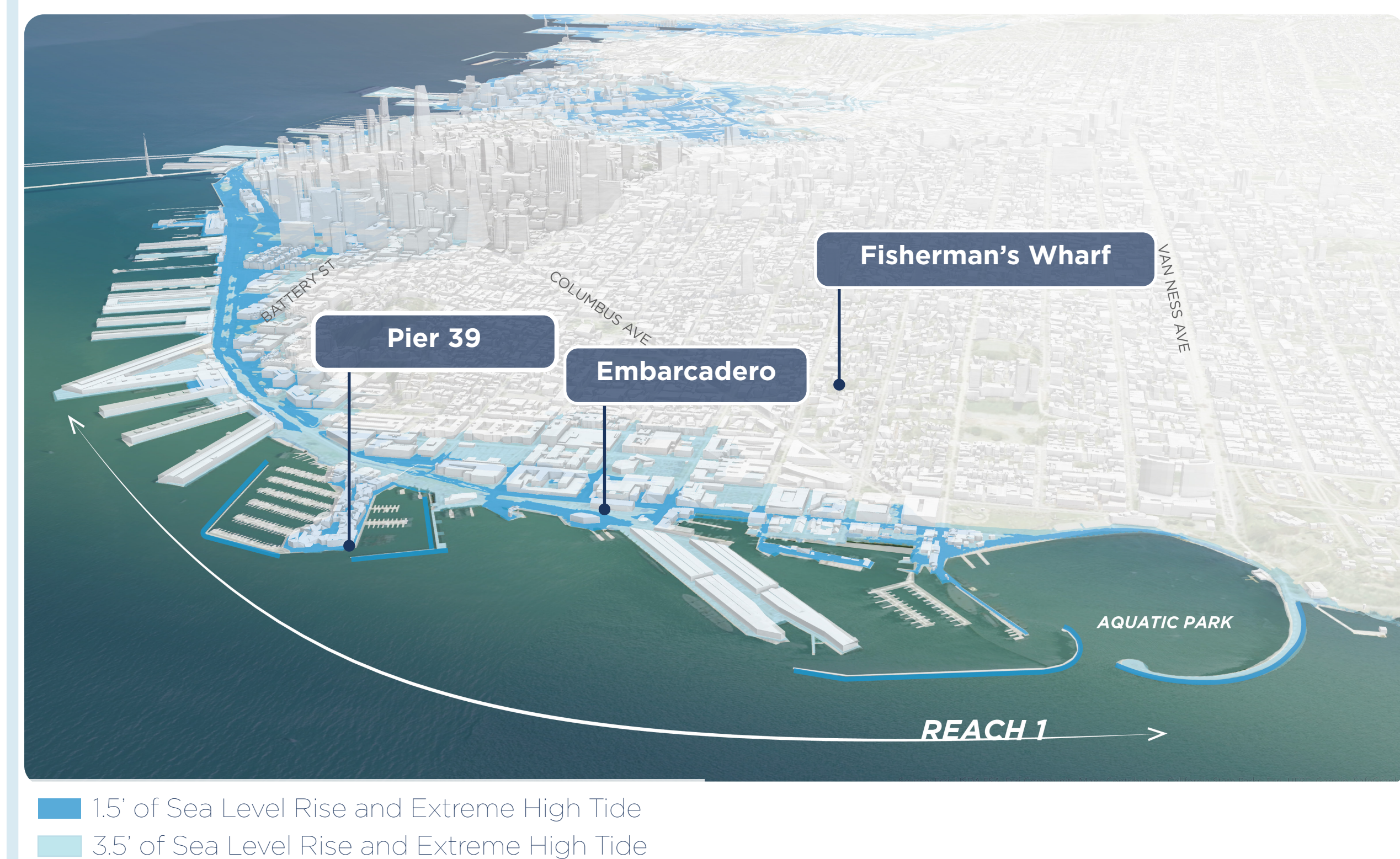
# THE DRAFT PLAN FIRST ACTIONS: FISHERMAN'S WHARF

## WHAT'S IN THE DRAFT PLAN?

The Draft Plan in Fisherman's Wharf takes advantage of existing higher ground. It recommends floodproofing and short floodwalls on piers and wharves as first actions to reduce damage to lower-lying buildings and assets. Floodproofing in Fisherman's Wharf is anticipated to reduce risk in the near term. The shoreline would be raised through future adaptation actions as sea level rise increases over time.

### Potential SLR by 2100 if no action is taken

Fisherman's Wharf is located on a higher area that modeling shows will encounter lower flood damages than other areas of the waterfront.



### First Actions



#### Coastal Flood Defense

Floodproofing to withstand near-term flood risk



#### Connection to the Waterfront

Visual and physical connections maintained, with 2' walls along piers



#### Asset and System Defense

At-risk buildings are defended. Transit and utility networks do not have near-term risk.



#### Seismic Resilience of Flood Defenses

Partially addressed outside Flood Study. Draft Plan does not include seismic ground improvements given no new defense structure in Reach 1



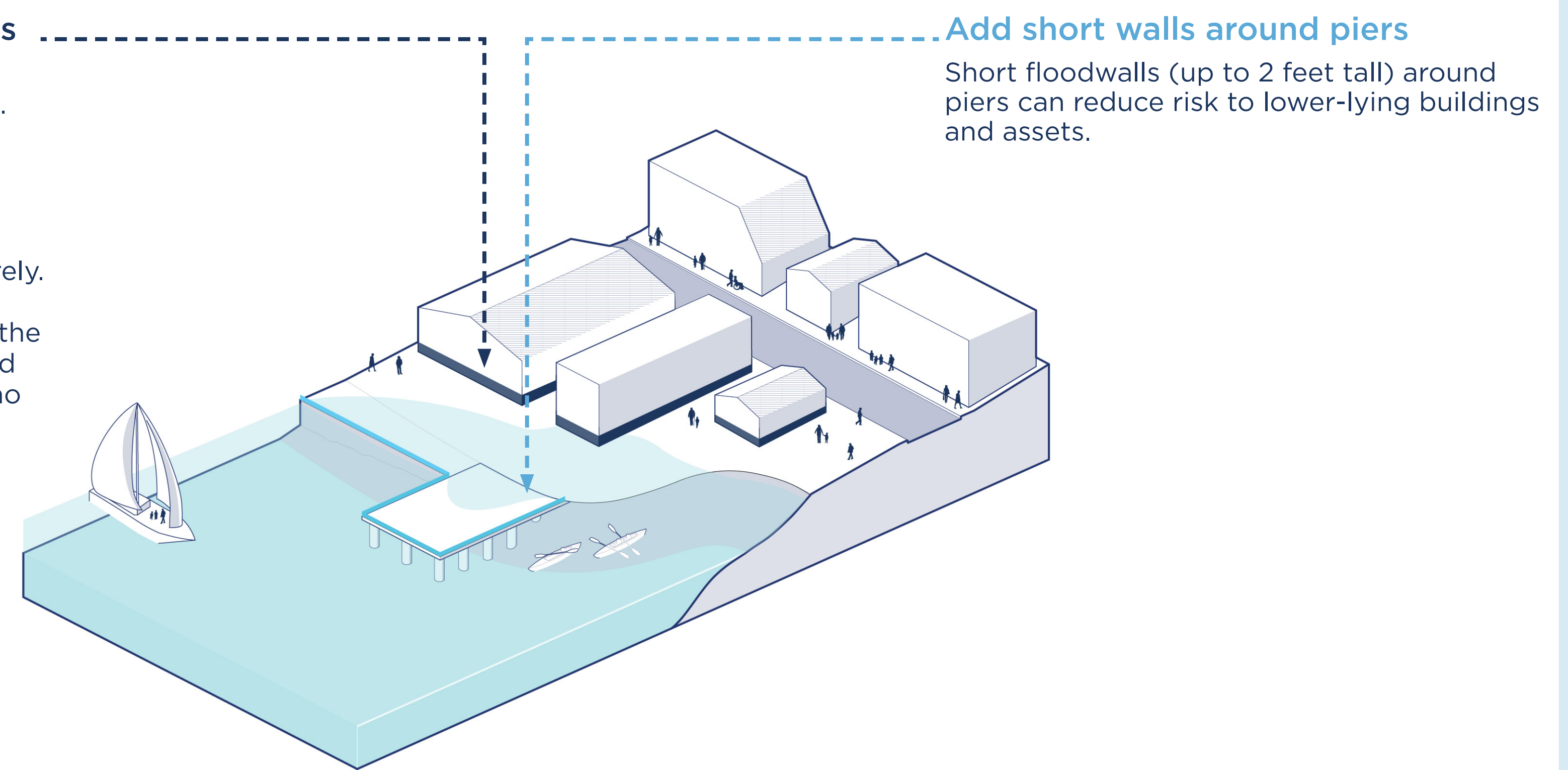
#### Nature Based Features

No feasible options that also maintain maritime functions in this reach

#### Floodproof select buildings

Floodproofing is a targeted approach to flood risk reduction. It focuses on reducing risk of a particular asset or building.

Some facilities - like most commercial buildings - could be modified to keep water out entirely. Others - like some industrial facilities - could be modified on the inside to allow water to enter and exit the facility causing little or no lasting damage.



### How did community feedback shape the Draft Plan?

These actions are recommended for Fisherman's Wharf because they:

- Minimize disruption from construction, especially to public transit and business until higher flood risks are evident
- Provide a more cost-efficient way to reduce near-term damages where there are lower flood risks based on sea level rise modeling
- Defend and preserve historic and maritime resources
- Ensure public access to the waterfront and historic places and an inviting waterfront for all
- Enhance and sustain economic opportunities

### Early Projects

*Not included in Flood Study*

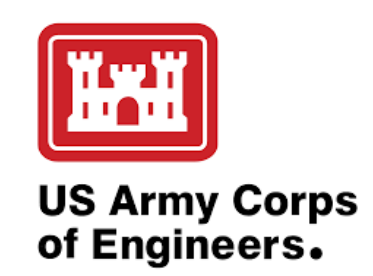
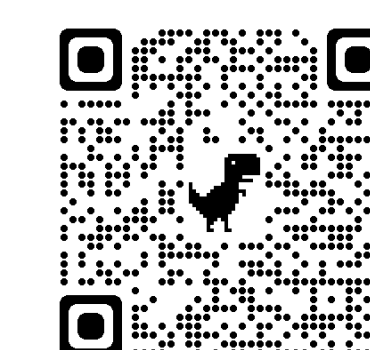
Wharf J9, adjacent to the outer lagoon in Fisherman's Wharf, will replace the seawall and wharf and incorporate seismic retrofits in 2027

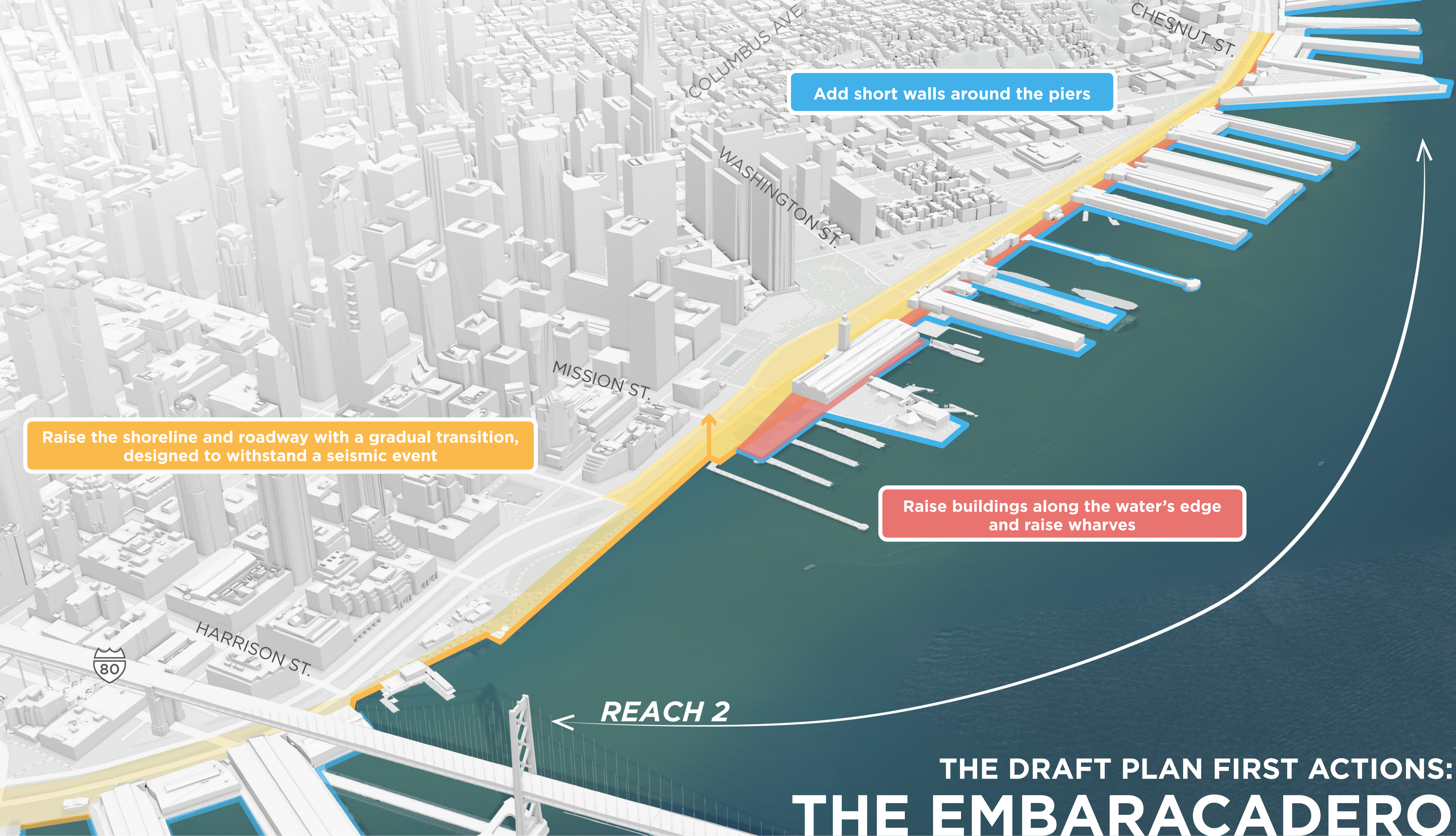
### Subsequent Actions

*Included, but dependent on monitoring*

- Elevate the shoreline, wharves and historic buildings
- Seismic ground improvements
- Defend utility/transportation networks

Use QR Code for Storymaps





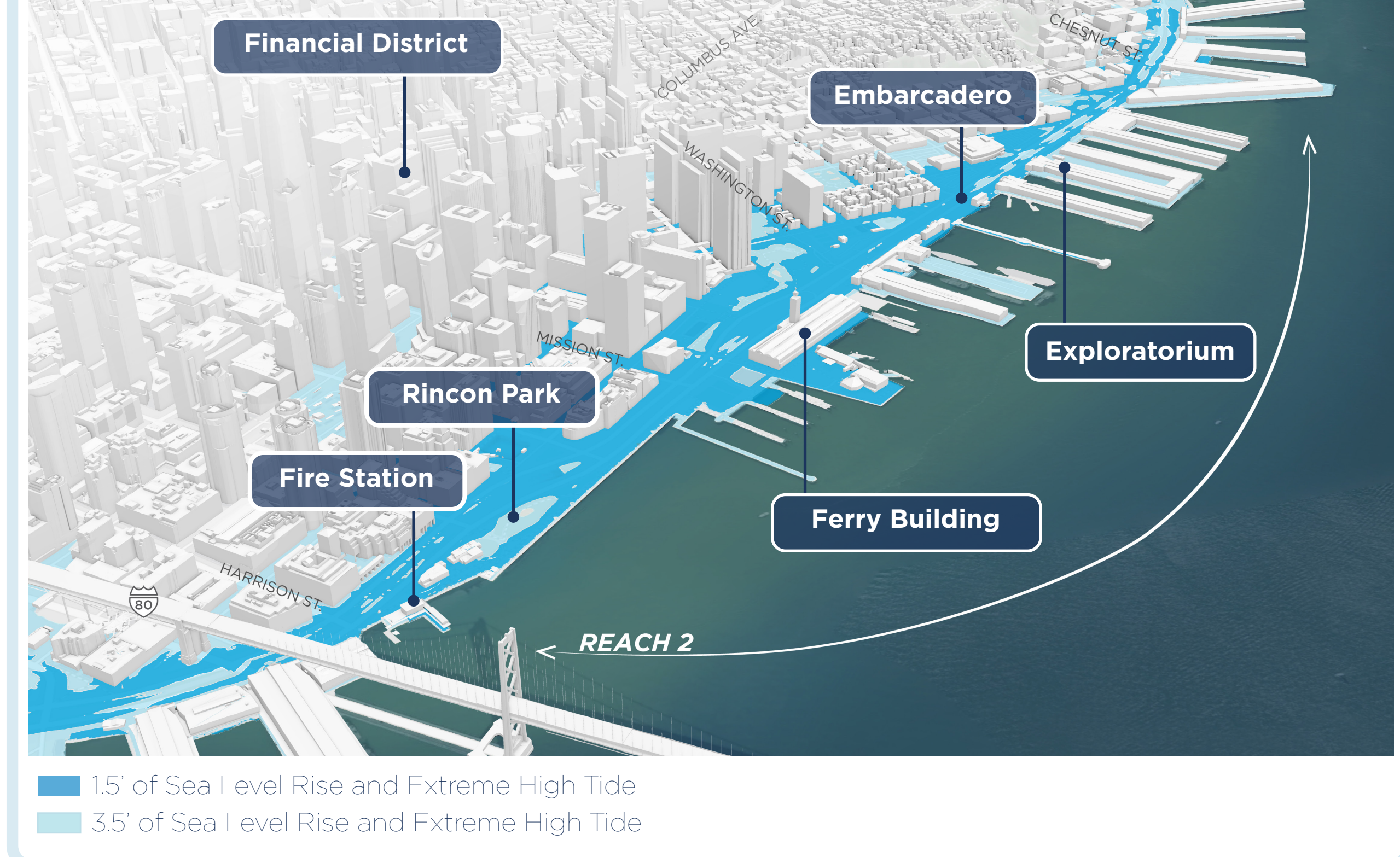
# THE DRAFT PLAN FIRST ACTIONS: THE EMBARACADERO

## WHAT'S IN THE DRAFT PLAN?

The Draft Plan focuses on raising the seawall at the shoreline edge to defend against 3.5 feet of sea level rise. A gradual transition, coupled with seismic ground improvements related to the flood defense project, would connect the shoreline to the existing city elevation across the Embarcadero, maintaining the city's connection to the waterfront. The Draft Plan proposes to raise buildings along the water's edge, including the Ferry Building and historic bulkhead buildings, and the Embarcadero Roadway.

### Potential SLR by 2100 if no action is taken

Given the significant concentration of infrastructure located on the Embarcadero, including critical disaster response assets and services, the Draft Plan proposes that coastal flood defenses in the first action in this area be built at a higher initial elevation to limit the need for further disruptions in subsequent adaptation phases



### First Actions



**Coastal Flood Defense**  
Elevated shoreline to withstand 3.5' of Sea Level Rise



**Connection to the Waterfront**  
Visual and physical connections maintained, with 2' walls along piers



**Asset and System Defense**  
Transit and utility networks are defended



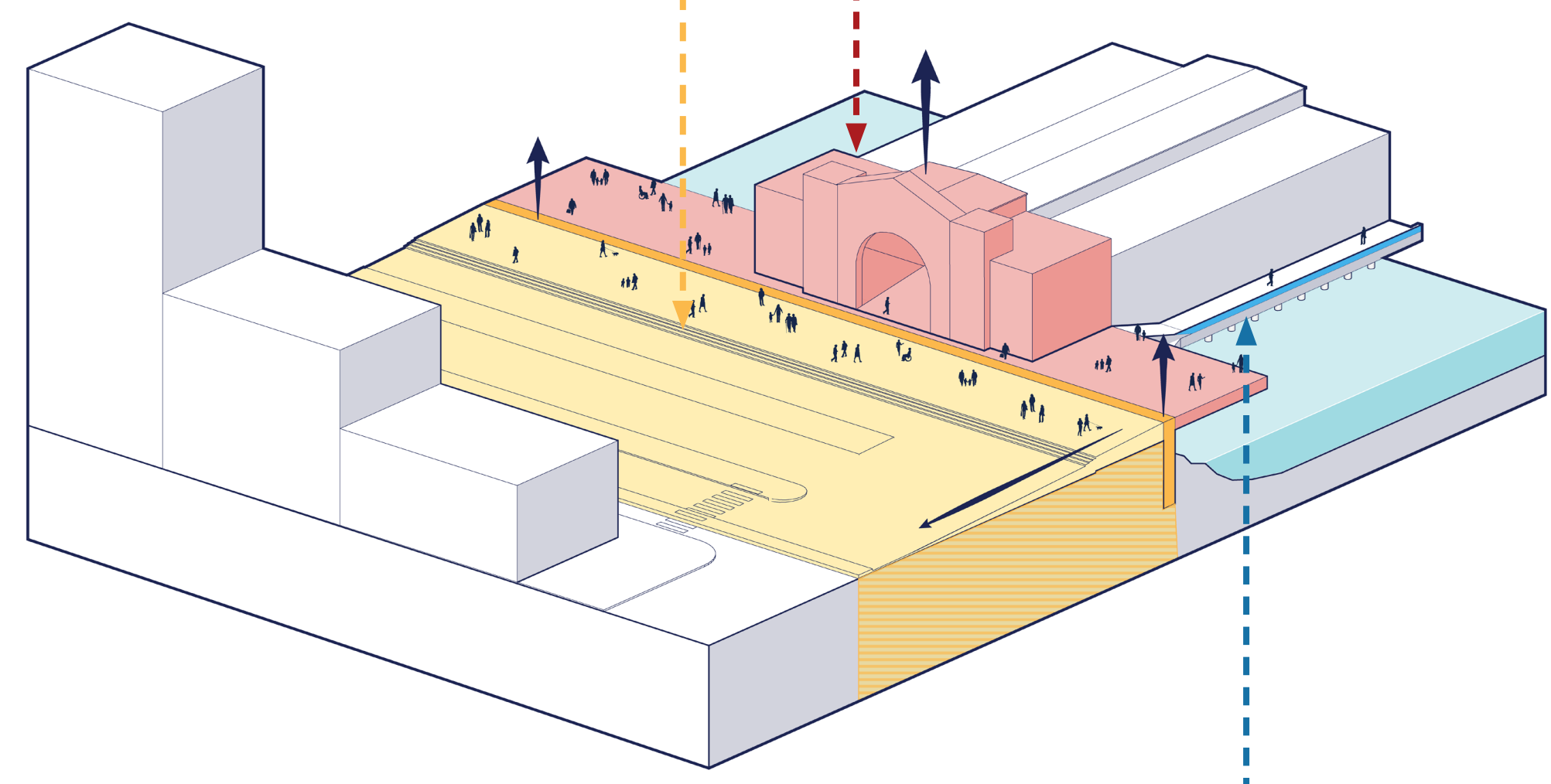
**Seismic Resilience of Flood Defenses**  
Ground improvements under roadway, structural improvements on wharf and bulkhead buildings



**Nature Based Features**  
Included as optional elements

#### Raise the shoreline

This action will elevate the shoreline at the roadway edge and gradually slope back to existing city elevation. It will also address seismic issues through ground improvements. The proposed elevation of the shoreline is higher in Embarcadero because the dense concentration of underground infrastructure - including critical disaster response assets and services - makes it more difficult to phase in coastal flood defenses incrementally.



**Elevate buildings and wharves**  
Elevate buildings and wharves along the water's edge, including the Ferry Building and historic bulkhead buildings.

#### Add short walls around piers

Build 2-foot floodwalls around piers to defend against intermittent high water.

## How did community feedback shape the Draft Plan?

These actions are recommended for the Embarcadero because they:

Prioritize life safety and emergency response by defending the Ferry Building, one of San Francisco's and the Bay Area's key emergency response sites, and the Embarcadero Roadway, a key thoroughfare for delivery emergency supplies, staff, and services.

Defend and preserve historic and maritime resources

Ensure public access to the waterfront and historic places and an inviting waterfront for all, including future opportunities to increase the connection between the Ferry Building, waterfront, and Market Street

## Early Projects

*Not included in Flood Study*

Piers 9 & 15 Seawall Earthquake Safety Project will retrofit the bulkhead walls and wharves

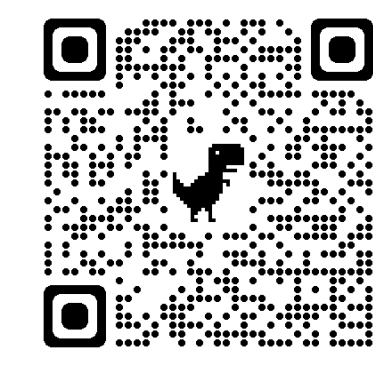
Downtown Coastal Resilience Project will improve flood defenses and earthquake resilience in the Ferry Building area where flood risk exists today

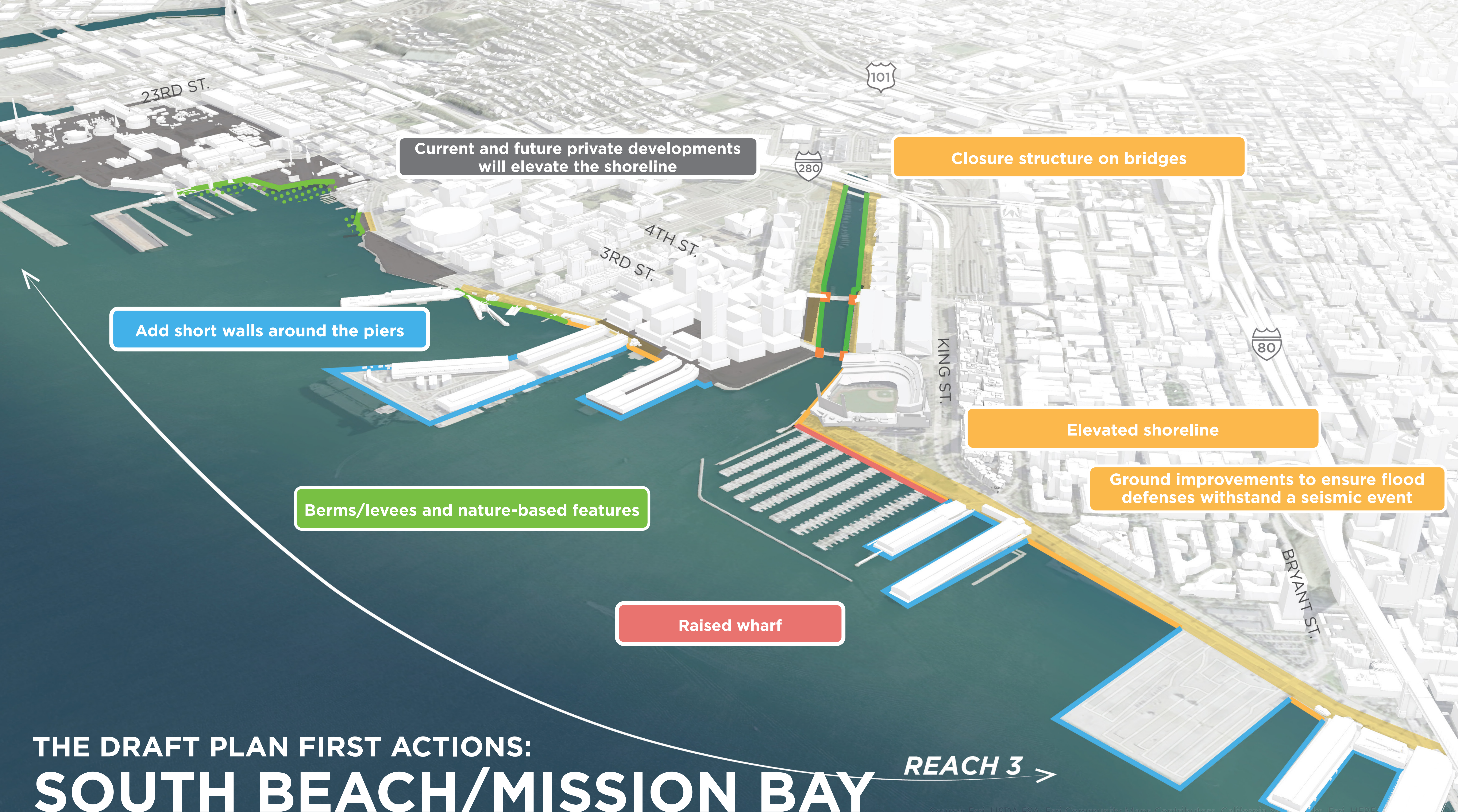
## Subsequent Actions

*Included, but dependent on monitoring*

No subsequent action currently anticipated to be needed to withstand 3.5' of sea level rise, but subject to change depending on actual rate of sea level rise

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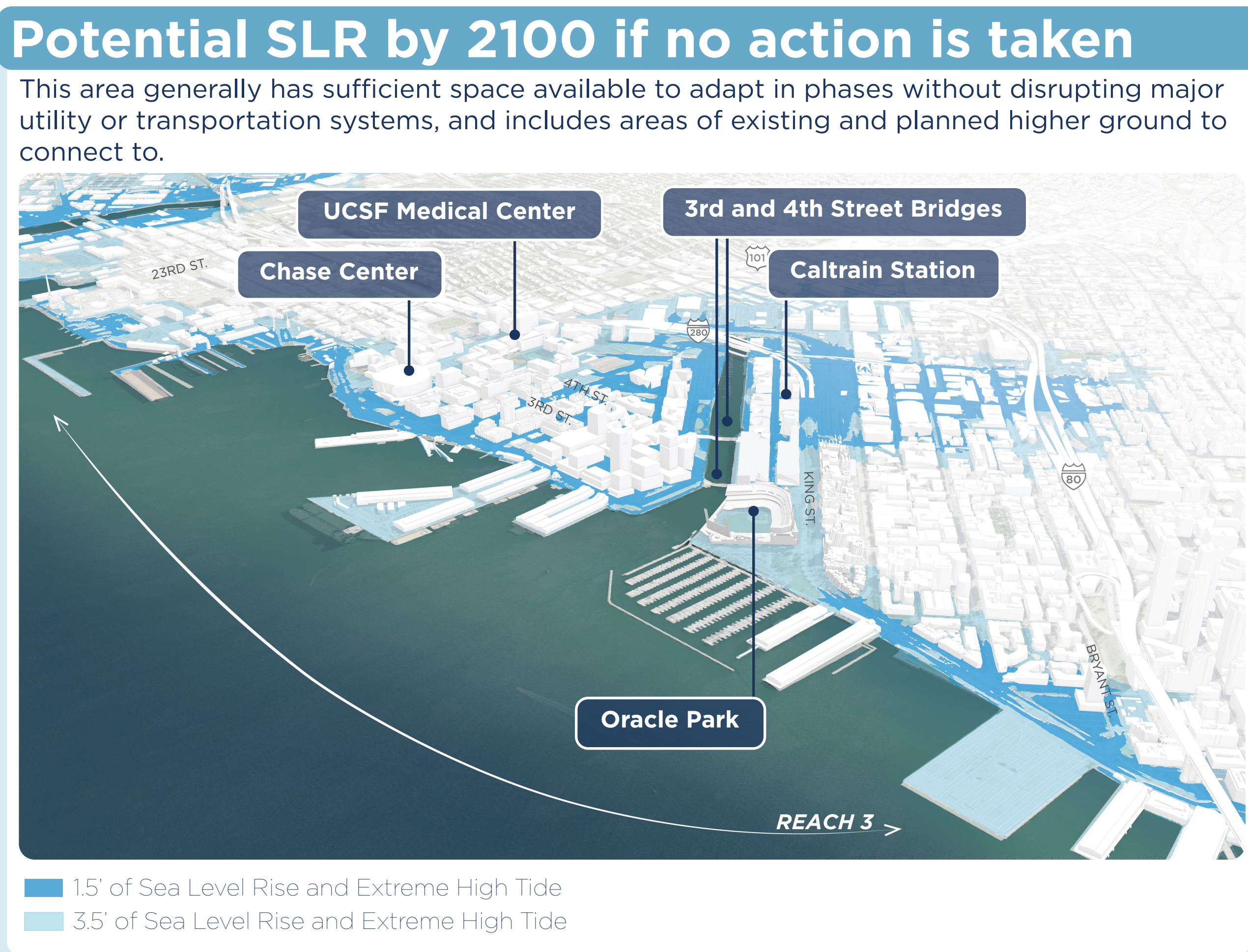




# THE DRAFT PLAN FIRST ACTIONS: SOUTH BEACH/MISSION BAY REACH 3 >

## WHAT'S IN THE DRAFT PLAN?

The Draft Plan proposes shoreline improvements in this part of the waterfront to defend against 1.5 feet of sea level rise. The Draft Plan uses a combination of berms, seawalls, nature based features such as living berms, and closure structures for the bridges. Berms, areas of raised ground that can help prevent flooding while maintaining waterfront access, are proposed on both banks of Mission Creek and at Terry Francois Boulevard. Seismic ground improvements are proposed for both banks of Mission Creek and along the Bay shoreline.



## First Actions



- |   |  |  |   |  |
|---|--|--|---|--|
| <p><b>Coastal Flood Defense</b></p> <p>Elevated shoreline to withstand 1.5' of Sea Level Rise</p> | <p><b>Connection to the Waterfront</b></p> <p>Visual and physical connections maintained, opportunities to access water on berms</p> | <p><b>Asset and System Defense</b></p> <p>Transit and utility networks are defended, bridges remain in place</p> | <p><b>Seismic Resilience of Flood Defenses</b></p> <p>Ground improvements under roadways, shoreline promenades and open space buildings</p> | <p><b>Nature Based Features</b></p> <p>Berms/levees with naturalized shorelines along Mission Bay and creek enhancements along Mission Creek</p> |
|---|--|--|---|--|

**Closure structure on bridges**

The closure structures at each end of the Third and Fourth Street Bridges will protect the surrounding neighborhoods from flooding entering across the bridges. It is anticipated that these closures would be infrequent (less than once a year) and used only in anticipation of a large storm or tide event.

**Add short walls around piers**

Build two-foot walls around piers to manage flood risks and defend against intermittent high water

Seismic ground improvements (not pictured) are proposed for both banks of Mission Creek and along the Bay shoreline where flood management structures are located

**Berms/levees and nature-based features**

Berms are areas of raised ground that can help prevent flooding while maintaining waterfront access. They can include public space, such as walking or biking paths, and they can incorporate vegetation that support habitats.

## How did community feedback shape the Draft Plan?

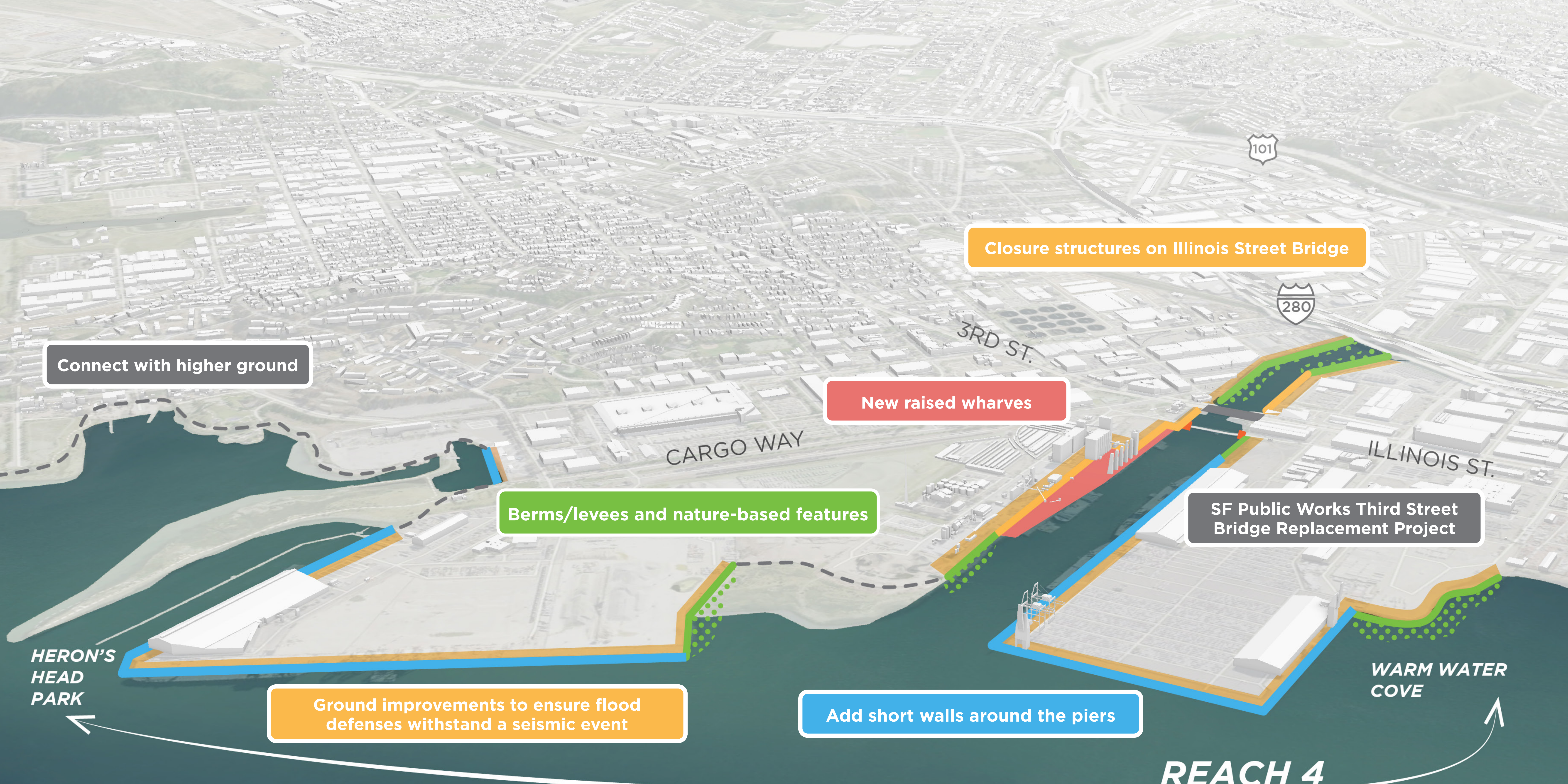
- These actions are recommended for South Beach/ Mission Bay because they:
- Prioritize life safety and emergency response by protecting the Embarcadero Roadway, a key thoroughfare for delivering emergency supplies, staff, and services
  - Defend and preserve historic and maritime resources
  - Ensure public access to the waterfront and historic places and an inviting waterfront for all
  - Safeguard public transit to keep connections throughout the city

## Early Projects

- Not included in Flood Study*
- Pier 50 Earthquake Improvement Project Seismic risk assessment of existing pier and shed structures
  - Pier 24 to Pier 28 1/2 Seawall Earthquake Safety Project

## Subsequent Actions

- Included, but dependent on monitoring*
- Elevate the shoreline to withstand 3.5' of sea level rise
  - Incorporate additional nature-based features along the creek and Bay shoreline



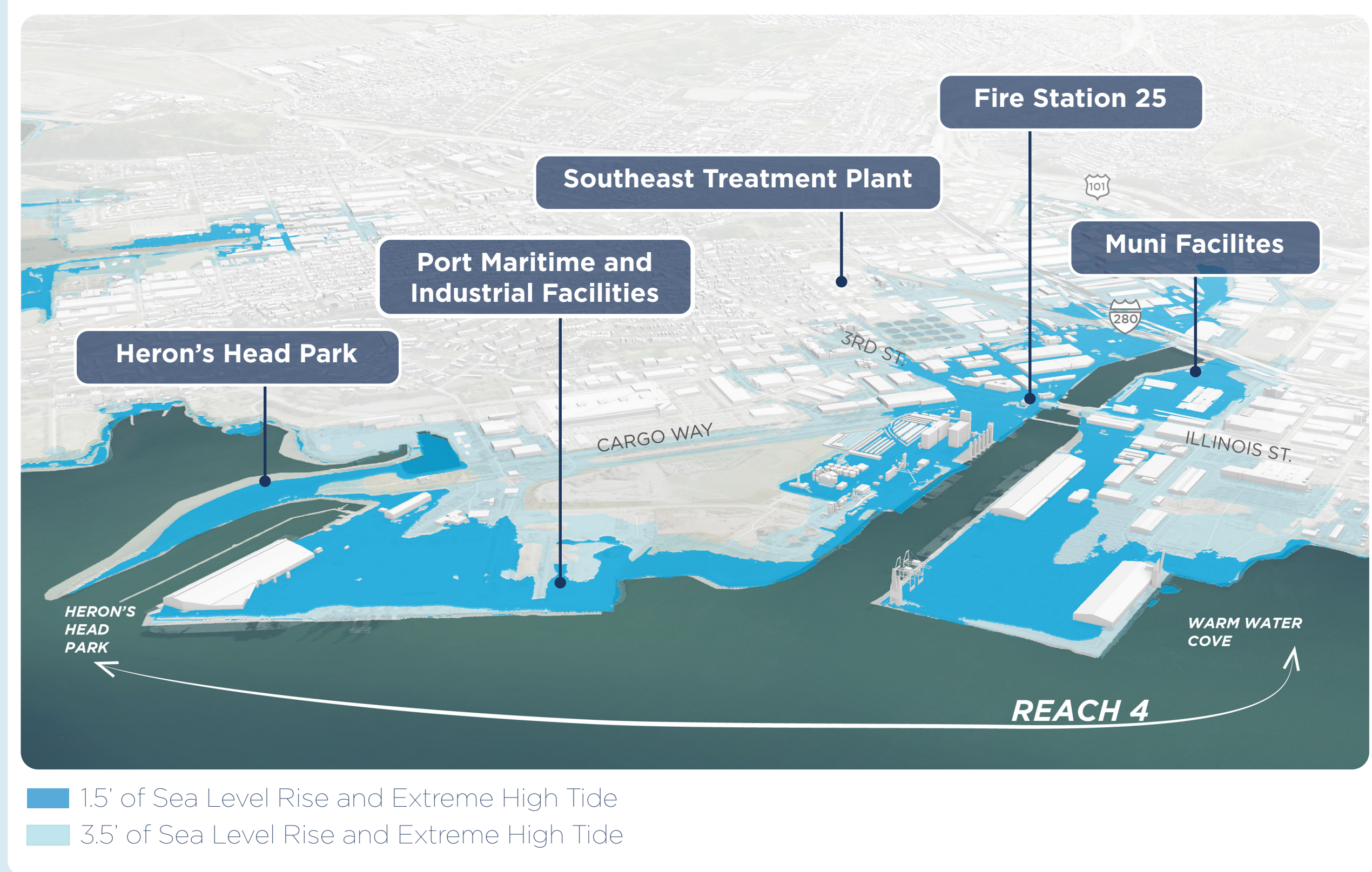
# THE DRAFT PLAN FIRST ACTIONS: ISLAIS CREEK/ BAYVIEW

## WHAT'S IN THE DRAFT PLAN?

The Draft Plan proposes actions in this part of the waterfront to defend against 1.5 feet of sea level rise. The Draft Plan proposes a combination of berms, nature-based features such as living berms and wetland preservation, and closure structures for the bridges. The closure structures at each end of the Illinois Street Bridge would defend the surrounding neighborhoods from flooding entering across the bridge. It is anticipated that these closures would be infrequent (less than once a year) and used only in anticipation of a large storm or tide event. Port cargo facilities would be adapted with raised floodwalls and seismic ground improvements.

### Potential SLR by 2100 if no action is taken

This area generally has sufficient space available to adapt in phases without disrupting major utility or transportation systems.



## First Actions



**Coastal Flood Defense**  
Elevated shoreline to withstand 1.5' of Sea Level Rise



**Connection to the Waterfront**  
Visual and physical connections maintained, opportunities to access water on berms/levees



**Asset and System Defense**  
Transit and utility networks are defended, bridges remain in place

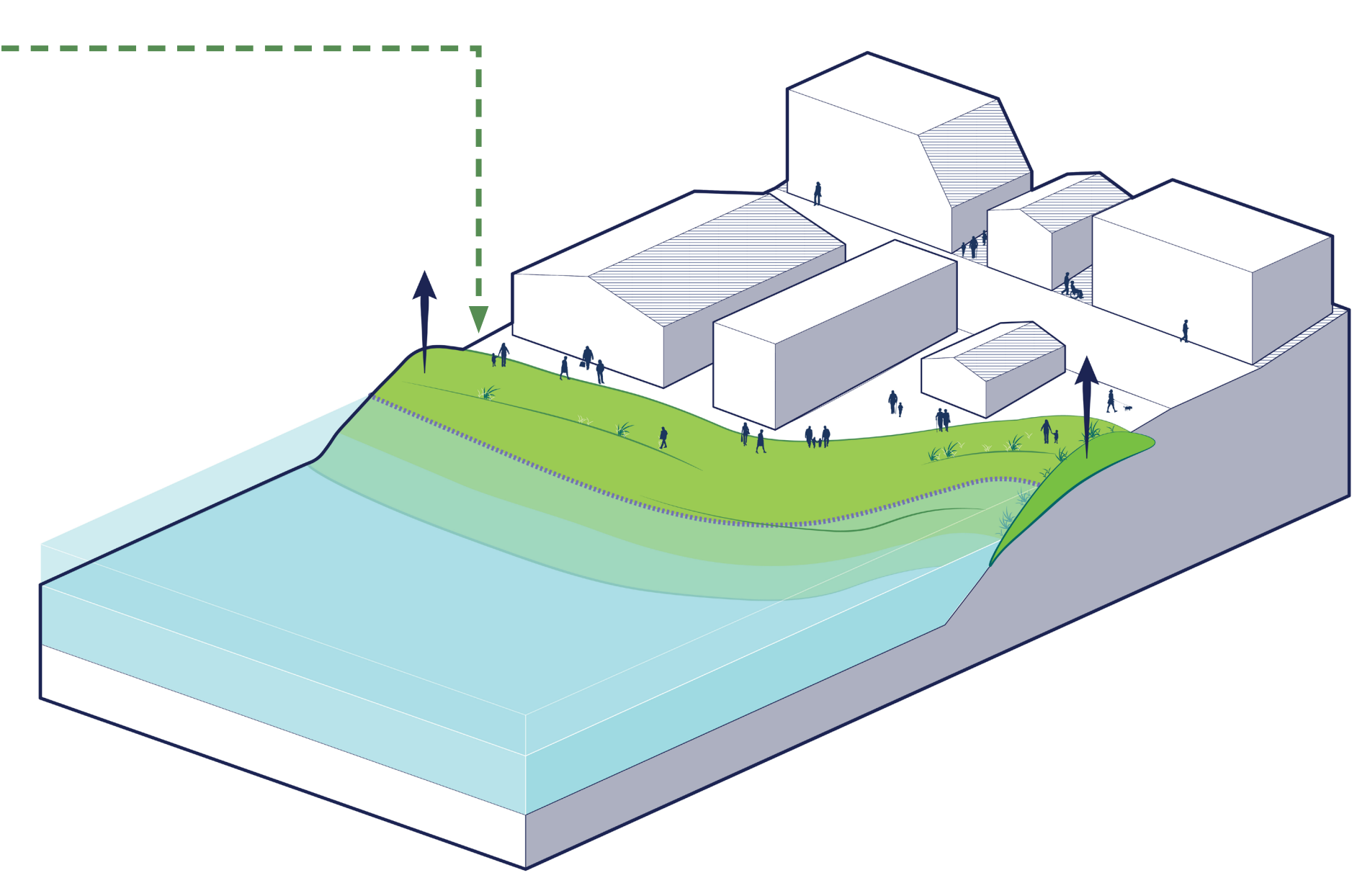


**Seismic Resilience of Flood Defenses**  
Ground improvements under roadways, shoreline promenades and open spaces



**Nature Based Features**  
Habitat enhancements along Islais Creek, Pier 94 wetlands, and Warm Water Cove

**Berms/levees and nature-based features**  
Berms are areas of raised ground that can help prevent flooding while maintaining waterfront access. They can include public space, such as walking or biking paths, and they can incorporate vegetation that support habitats.  
Citywide Muni facilities would be defended by a berm connected to a floodwall along the north side of Islais Creek. A berm would be placed on the south side of the creek, raising the shoreline while maintaining waterfront access.



Seismic ground improvements (not pictured) are proposed for both banks of Mission Creek and along the Bay shoreline where flood management structures are located

## How did community feedback shape the Draft Plan?

These actions are recommended for Islais Creek/ Bayview because they:

- Protect life safety and emergency response by defending key staging sites
- Defend and preserve jobs and maritime resources
- Safeguard public transit to keep connections from Bayview to the rest of the city
- Ensure public access to the waterfront and important historic and cultural places and an inviting waterfront for all
- Closure structures respond to community feedback to avoid tide gates, which can have a greater impact on Bay life and neighboring communities

## Early Projects

*Not included in Flood Study*  
SF Public Works Third Street Bridge project

## Subsequent Actions

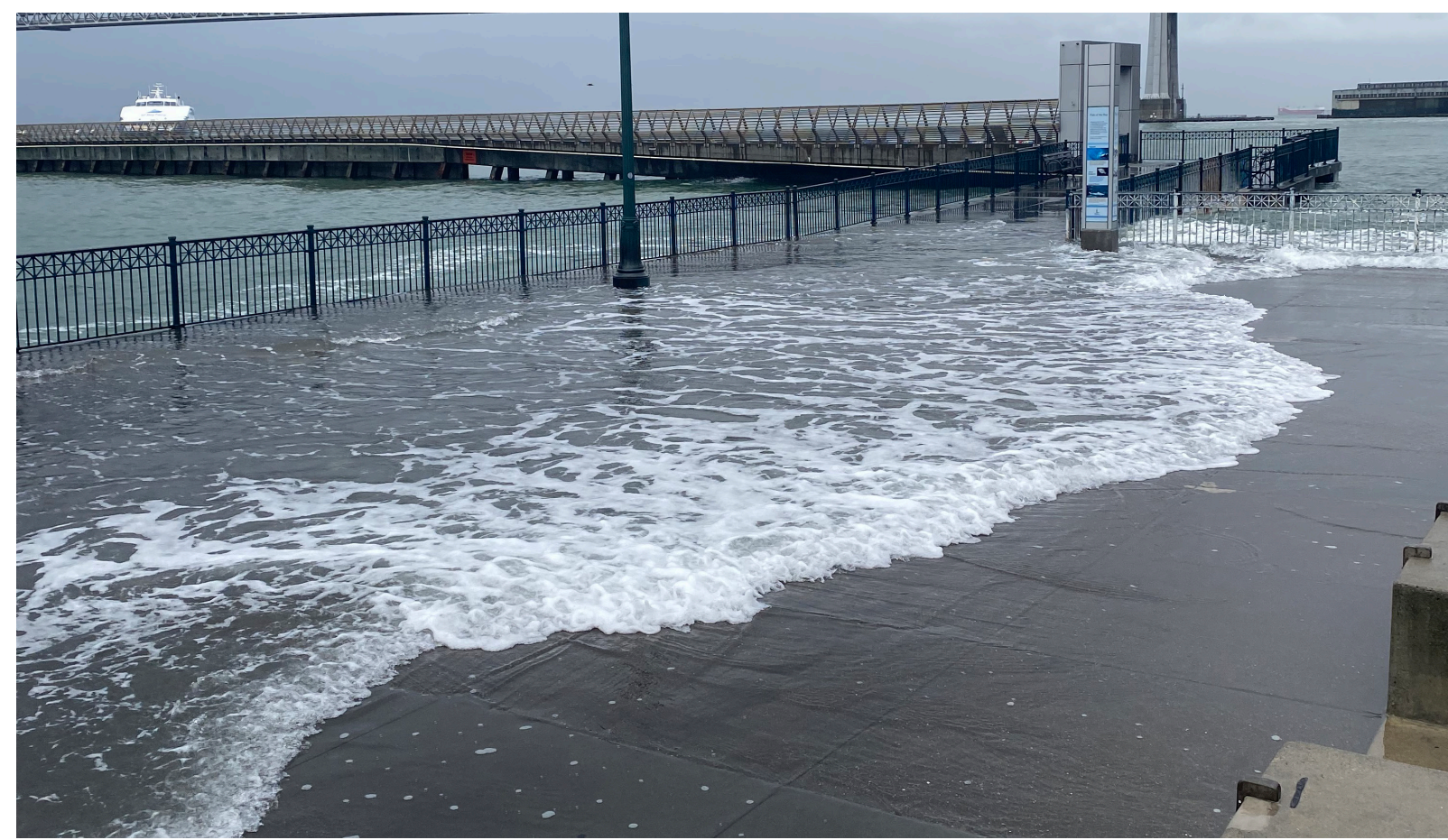
*Included, but dependent on monitoring*  
Elevate the shoreline to withstand 3.5' of sea level rise  
Incorporate additional nature-based features along the creek and Bay shoreline

# ADAPTING FOR SEA LEVEL RISE AND COASTAL FLOODING

## WHAT DOES FLOOD RISK LOOK LIKE TODAY?



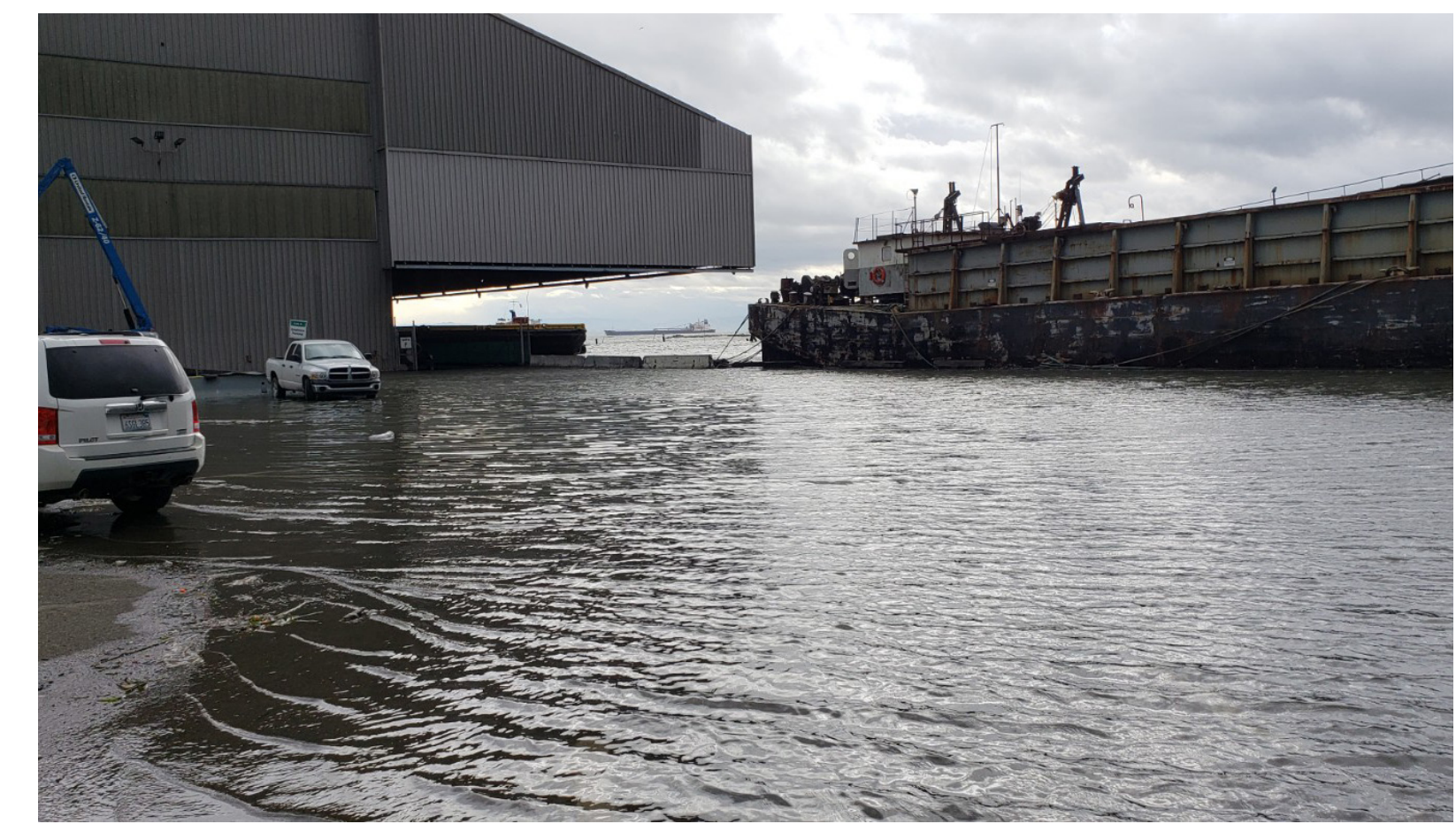
Fisherman's Wharf



The Embarcadero



Mission Creek / Mission Bay



Islais Creek / Bayview

By 2100, flooding may increase by 3.5 to 7 feet of sea level change.

## COASTAL FLOODING IF NO ACTION IS TAKEN BY...

2040



2090



2140

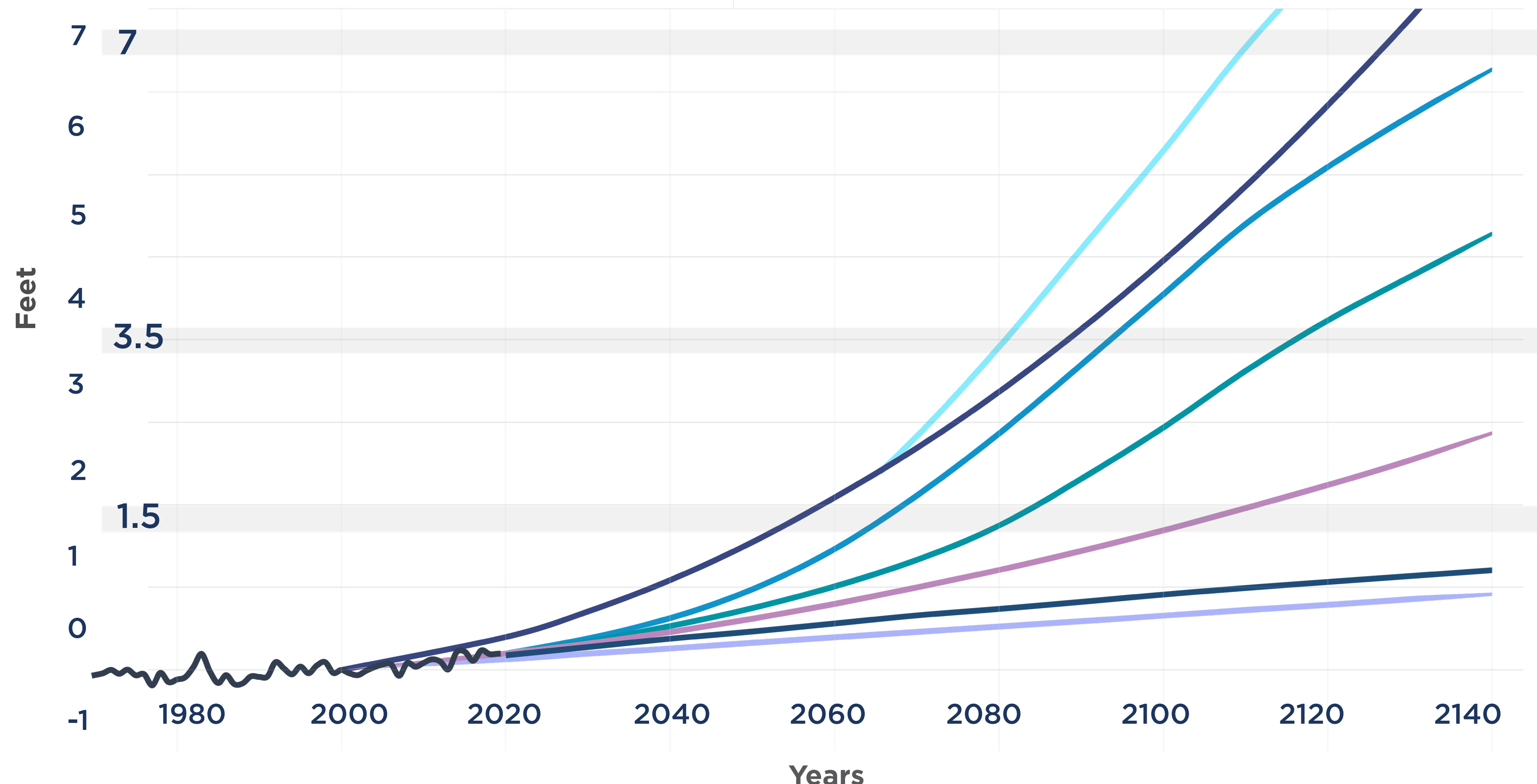


- USACE Low Curve
- USACE Intermediate Curve
- USACE High Curve

## MONITORING SEA LEVEL RISE: ADAPTING THE DRAFT PLAN OVER TIME

Sea level rise is a major component of climate change that affects coastal communities around the globe including San Francisco. Best available climate science provides a range of sea level rise projections. As sea levels are projected further into the future, the level of uncertainty grows, due primarily to uncertainties in global greenhouse gas emissions and the potential for rapid ice sheet melt and ice sheet disintegration. The Flood Study manages uncertainty by balancing the risks and timing of sea level rise with the cost and adaptability of the flood defense system across a range of sea level rise scenarios.

### Sea Level Rise Projections



- Legend**
- SW High
  - SW Intermediate High
  - SW Intermediate
  - SW Low
  - USACE High
  - USACE Intermediate
  - USACE Low
  - Tide Gauge Observations

### Tide Gauge Observations

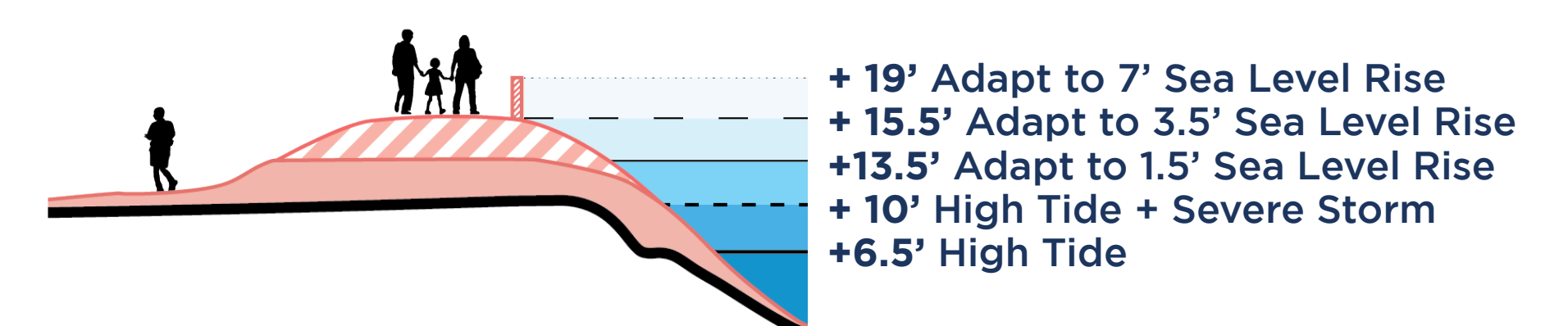
The black line on the above figure shows tide gauge measured water levels from 1980 until the present. This line represents historical, groundtruthed observations of past and current sea levels.

### Sea Level Rise Projections

The curved lines on the figure represent sea level rise projections based on global future greenhouse gas (GHG) emissions. The projections used by the U.S. Army Corps of Engineers (USACE) are represented by the X lines and are identified in the legend as USACE Low, USACE Intermediate and USACE High. Recently developed federal projections (2022) for the southwest (SW) U.S. are also included and are identified in the legend as SW Low, SW Intermediate, SW Intermediate High, SW High. These 2022 federal projections are in line with the draft State of California sea level rise guidance.

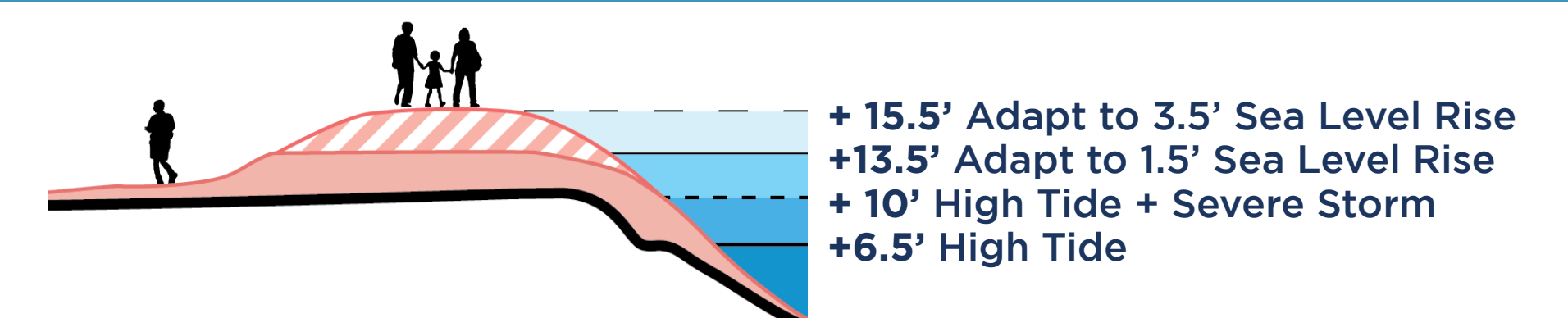
### 7 Feet Sea Level Rise

Subsequent Actions adapt to 7 ft of sea level rise



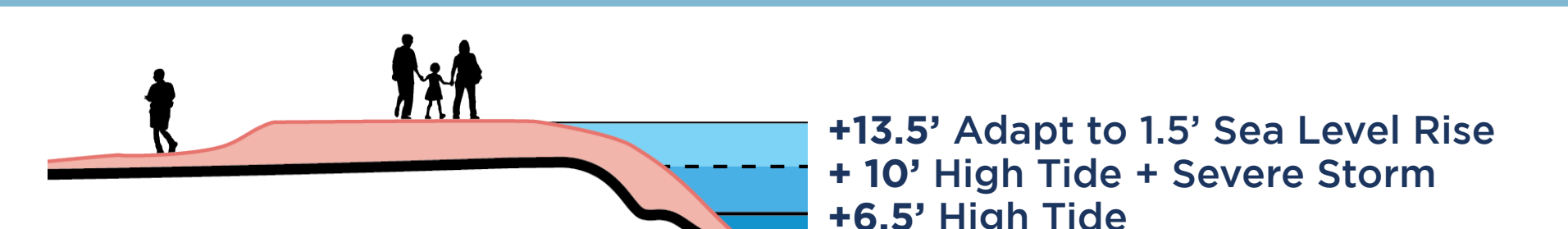
### 3.5 Feet Sea Level Rise

Draft Plan First Actions adapt to at least 3.5 ft for less easily adapted shoreline  
Subsequent Actions adapt to 3.5 ft or higher for more easily adapted shoreline



### 1.5 Feet Sea Level Rise

Draft Plan First Actions adapt to at least 1.5 ft with potential for future adaptation actions for more easily adapted shoreline



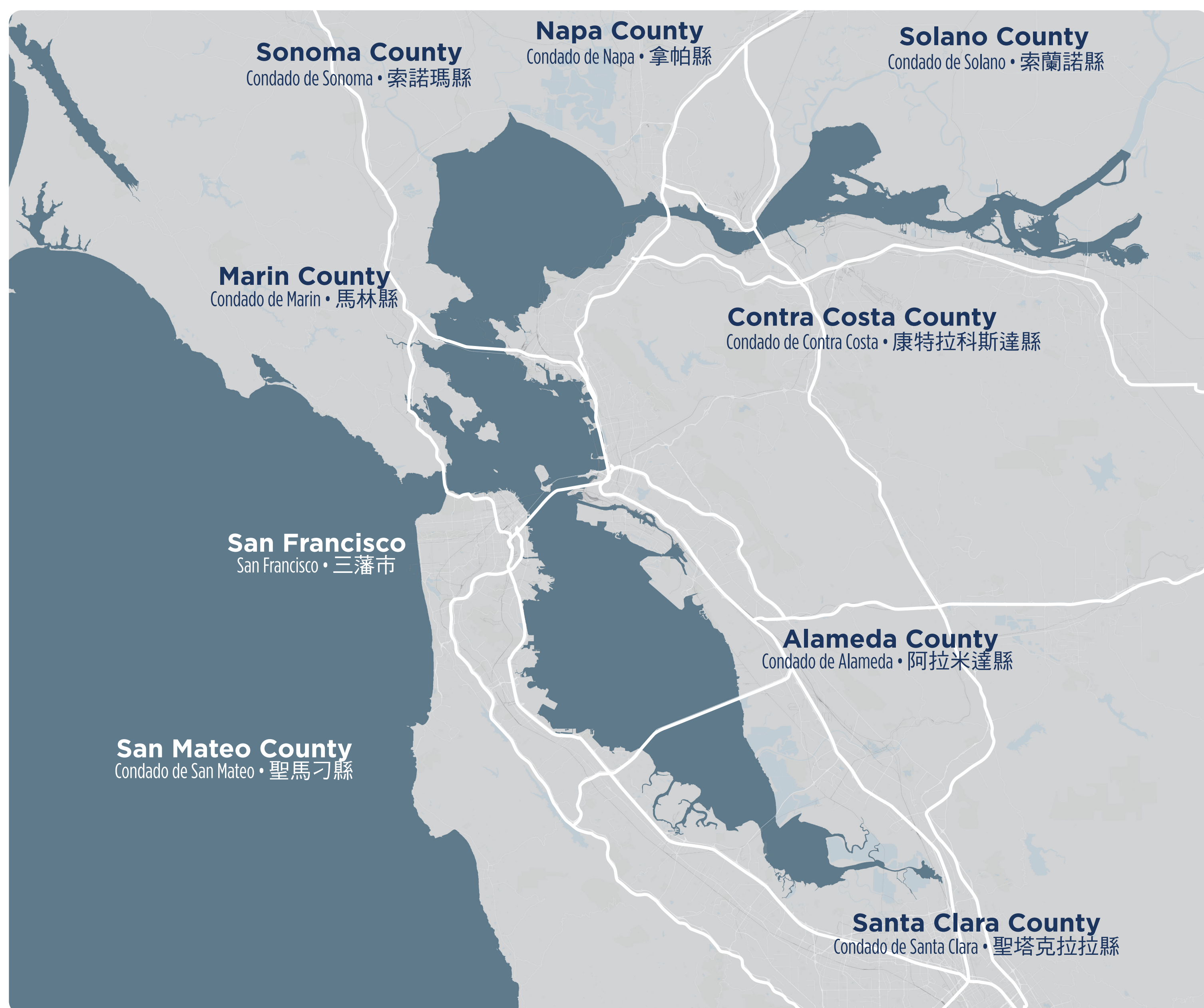
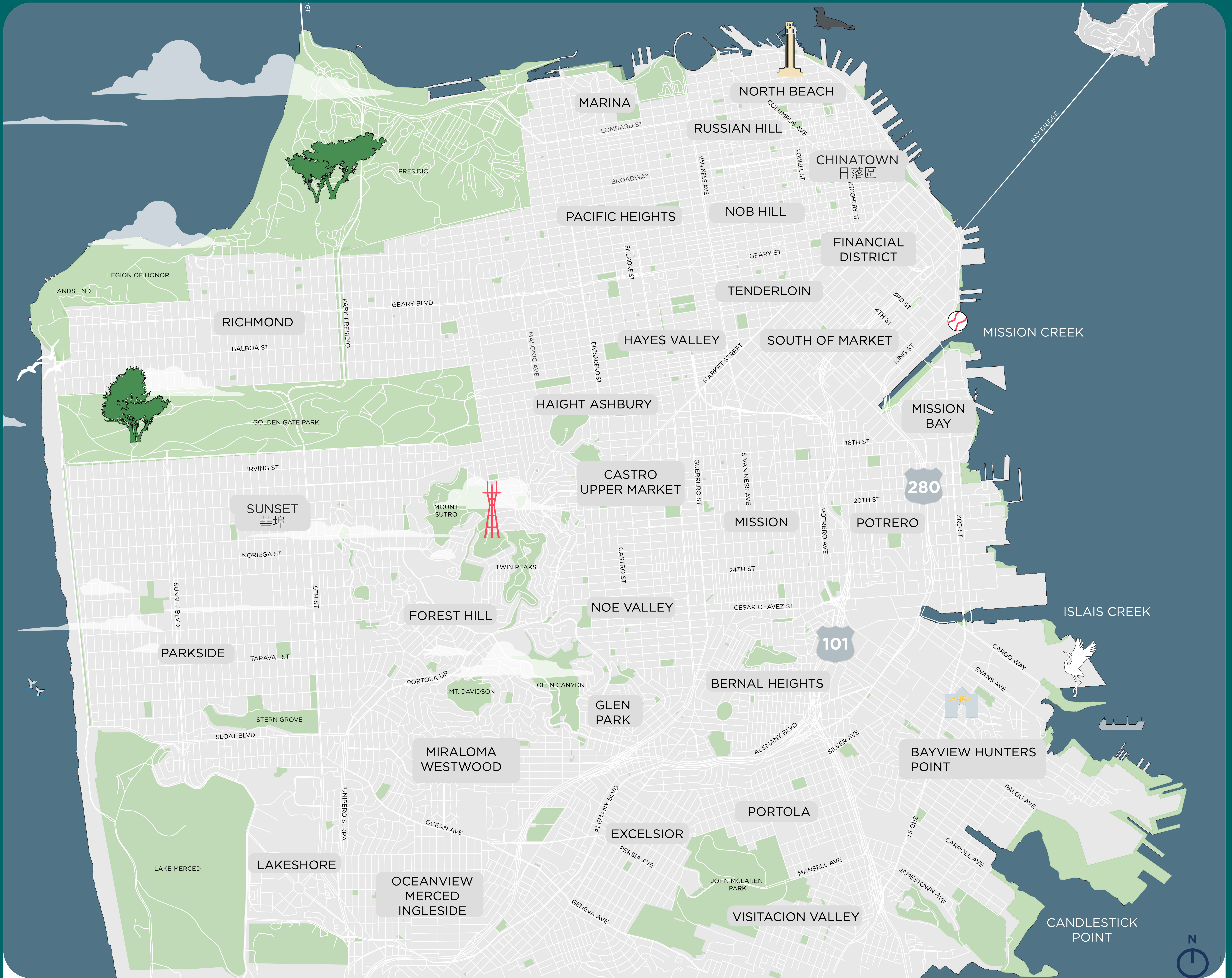
## Reach by Reach

- Waterfront Wide** Line up costs and benefits in time
- Fisherman's Wharf:** Existing risk is low; address with nonstructural measures (e.g. floodproofing buildings), prepare to build structural measure if risk increases
- Embarcadero:** Build big initially to provide additional resilience and not require multiple interruptions of Embarcadero
- South Beach/ Mission Bay, Islais Creek/ Bayview:** Build adaptable structures that can be retrofit if risk changes

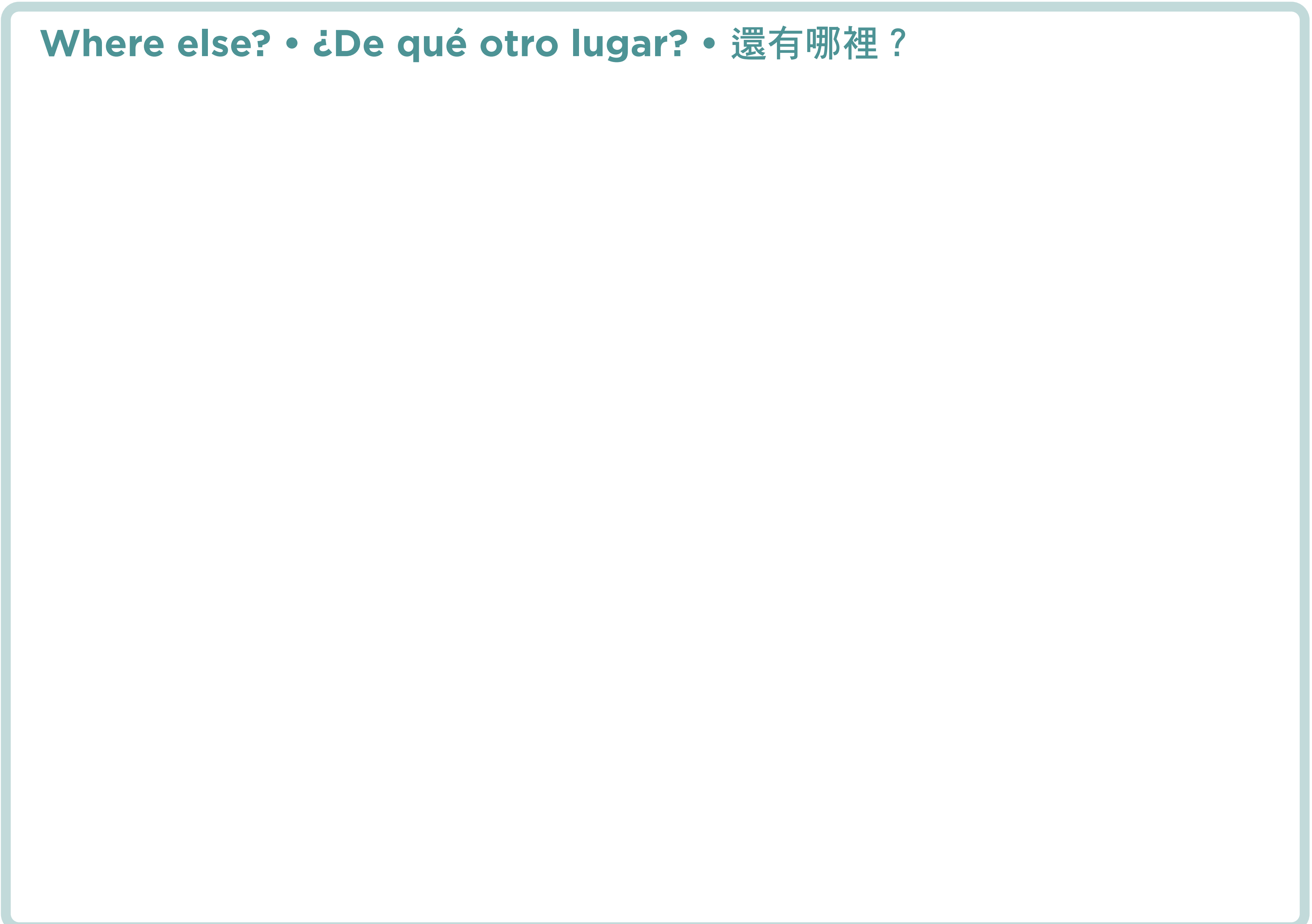
Use QR Code for Storymaps



# WHERE DID YOU COME FROM TODAY? ¿DE DÓNDE VINO HOY? • 您來自何處?



## Where else? • ¿De qué otro lugar? • 還有哪裡?



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