

EMBARCADERO SEAWALL PROGRAM FRAMEWORK

THE SEAWALL PROGRAM, led by the Port of San Francisco in coordination with the City, will provide the tools to address current and future flood and seismic risks over time. There are three elements to the Program—**Strengthen**, **Adapt** and **Envision**—which allow the Port to respond to risks and conditions in a way that is transparent and accountable. Planning for all three elements is occurring now, implementation for each element will depend upon findings, public input, regulatory input, cost/benefit analysis, and availability of funding and financing. Implementation timeframes are estimates and subject to change.



STRENGTHEN

Objective: Immediately implement highest priority disaster response and life safety projects along the Embarcadero Seawall.
Planning and Implementation Horizon: 2018 - 2026
Priorities: Current and future seismic and flood risk
Geographic Focus: Embarcadero Seawall

integrated into city, regional, and private actions, resulting in coordinated actions to increase waterfront resilience.
Planning and Implementation Horizon: 2018 - 2050, adapt element updated every five years
Priorities: Seismic risk and future flood risk
Geographic Focus: Entire Port jurisdiction



ENVISION

Objective: Develop visions that can respond to remaining seismic risk and increasing flood risks and have ongoing stakeholder engagement about the trade-offs and 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



ADAPT

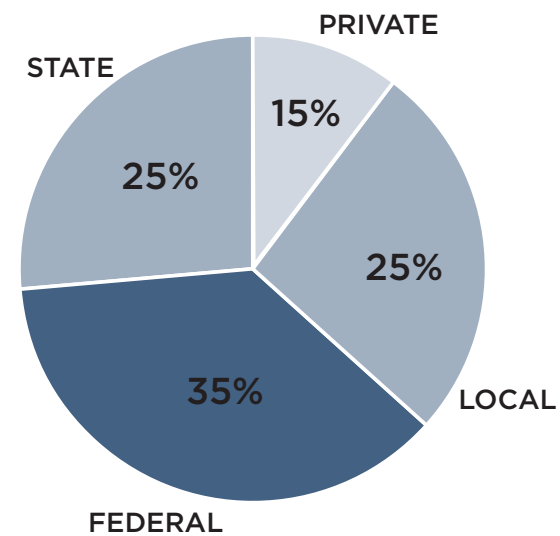
Objective: Identify policies and projects through stakeholder engagement that will result in a resilient waterfront that responds to evolving science and priorities. Projects will be

BUDGET AND SCHEDULE FOR THE SEAWALL PROGRAM

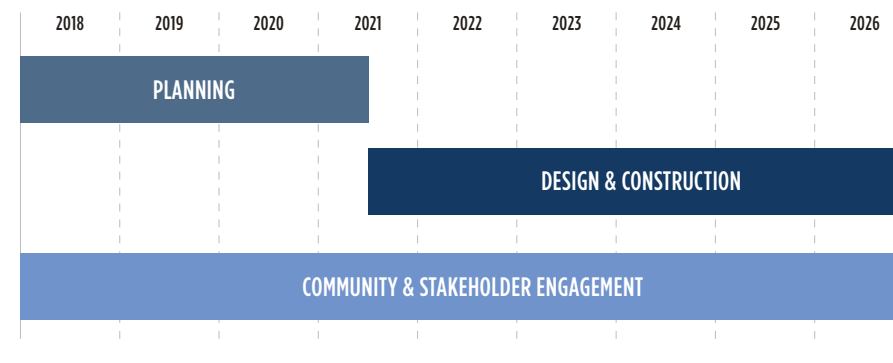
THANKS TO SAN FRANCISCO VOTERS, a \$425 million General Obligation Bond for the Program passed with 82% of the vote in the November 2018 election.

The Port is currently pursuing local, state, federal, and private funding sources to fully fund infrastructure improvements anticipated to cost up to \$5 billion.

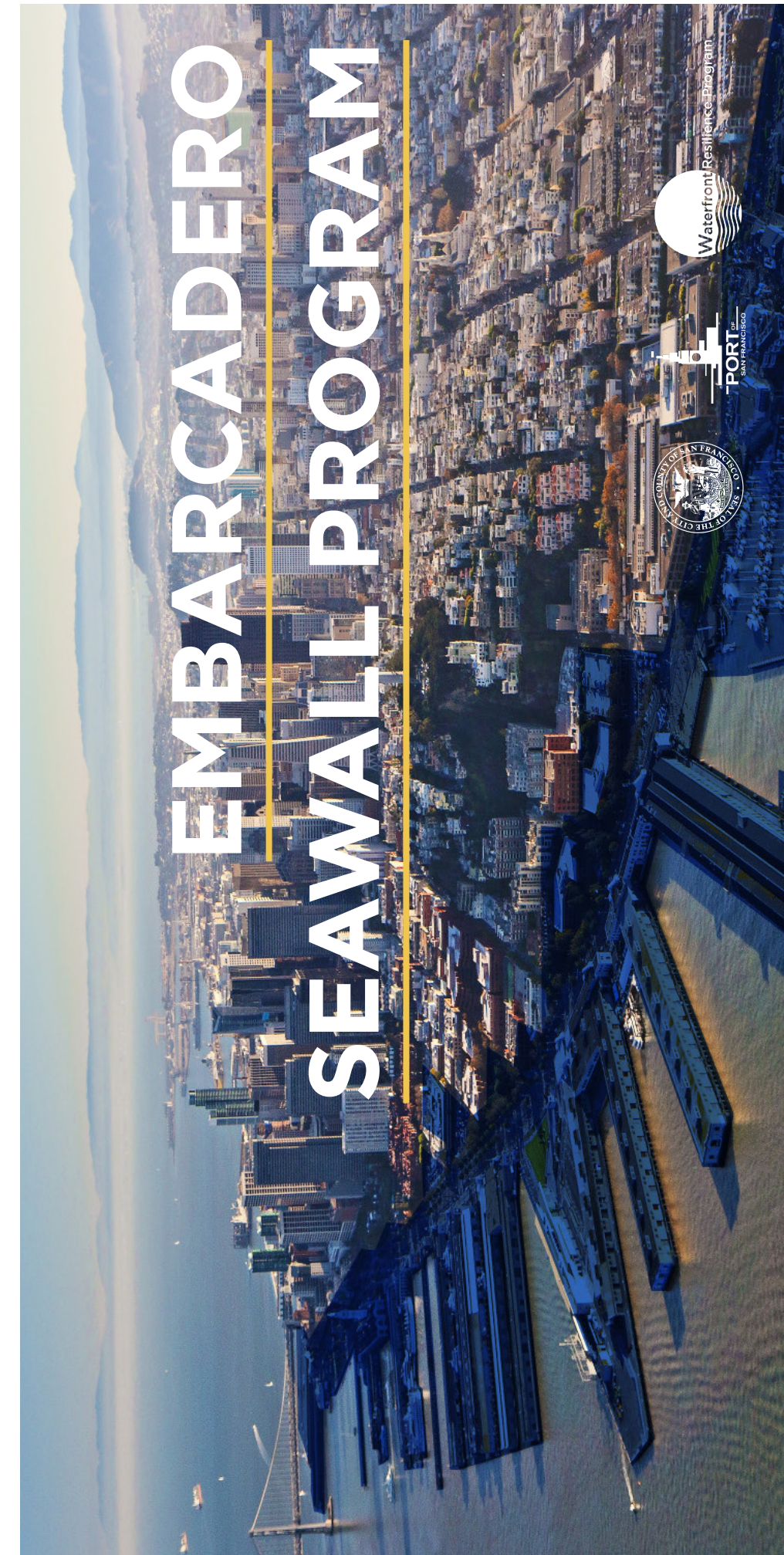
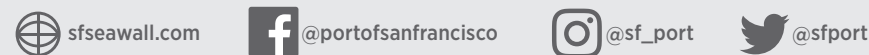
ESTIMATED SEAWALL PROGRAM FUNDING



SEAWALL PROGRAM ACTION PLAN



Learn more about the Seawall Program:



SAN FRANCISCO'S WATERFRONT AND THE EMBARCADERO SEAWALL

BEFORE THE GOLD RUSH, San Francisco was a sleepy harbor with a northeastern shoreline near today's Salesforce Tower. How times have changed! Over 100 years ago, the Port of San Francisco oversaw the construction of the Embarcadero Seawall in 23 unique rock and concrete sections, each approximately 30 feet tall and up to 100 feet wide. The Seawall transformed the city, laying the foundation for the thriving waterfront we know and love today.



**ALL OF TODAY'S
ACTIVITY ALONG
THE EMBARCADERO
WATERFRONT
IS MADE POSSIBLE
BY THE SEAWALL.**

Today, the Embarcadero Seawall is the foundation of over three miles of the city's northeastern waterfront, stretching from Fisherman's Wharf to Mission Creek, just beyond Oracle Park. The Seawall supports key utility and transportation infrastructure including BART, Muni, and ferry networks.

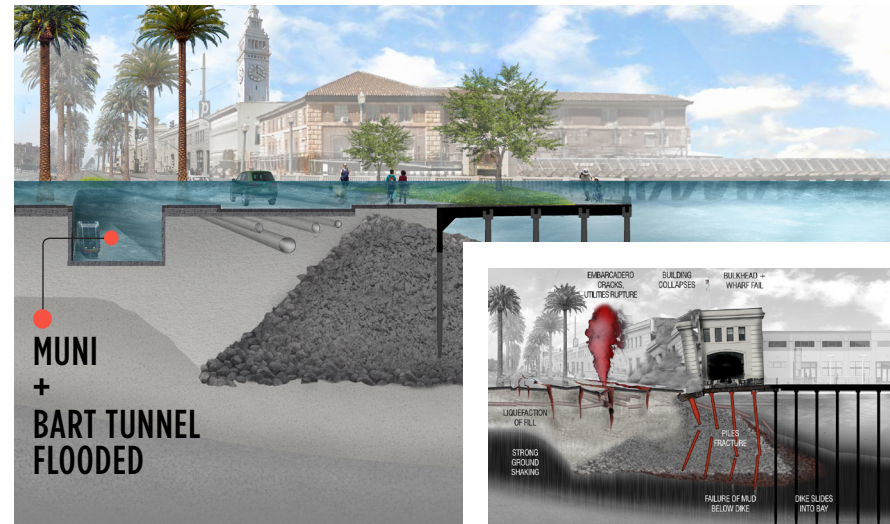
The Seawall also serves as a critical emergency response and recovery area. Over 50 key emergency assets depend on the Seawall. These assets will be critical to move first responders, people, and supplies in and out of the city after a disaster.

With over \$100 billion in assets and annual economic activity along the waterfront supported by the Seawall, it truly is San Francisco's economic backbone. The Seawall also underpins the Historic Embarcadero Promenade and many of the city's iconic destinations, parks, and local businesses, attracting more than 24 million people each year. If our Seawall were to fail, it would impact the entire city.

THREATS TO THE EMBARCADERO SEAWALL AND SAN FRANCISCO

WHILE A REMARKABLE engineering feat at the time, the Seawall is now over 100 years old and in desperate need of repair. It was built in earthquake country without today's seismic standards and atop "young bay mud," a soft, weak mud that makes for a poor foundation and can amplify earthquake shaking. The Seawall also was built without the knowledge we have today about flood risk from sea level rise.

We know that San Francisco is vulnerable to urgent seismic risks and increasing flood risks. The Port of San Francisco is taking steps to improve the safety of the Embarcadero Seawall to support life safety and protect transportation networks, utility infrastructure, and other vital resources.



FLOODING RISK

Sea level rise is a major, and increasing, threat to the city's safety. Today, the Embarcadero Promenade floods intermittently. As sea levels continue to rise, there will be additional flooding risks to the BART Transbay Tube, Muni light rail, key utility infrastructure, and waterfront businesses and neighborhoods.

EARTHQUAKE RISK

Since 1906, the Bay Area has enjoyed a historically quiet period of seismic activity, but the U.S. Geological Survey estimates a 72% chance of a major earthquake happening between now and 2043. A major earthquake could cause most of the Embarcadero Seawall to settle and move outward toward the Bay, likely proving devastating to life, property, and the San Francisco economy.

EMBARCADERO SEAWALL PROGRAM

THE PORT OF SAN FRANCISCO is leading the Embarcadero Seawall Program, a citywide effort to create a more sustainable and resilient waterfront.

Part of the Port's Waterfront Resilience Program, the Seawall Program was developed to address current, urgent seismic and flood risks, and plan ahead for future risks. The Program is dedicated to robust community and stakeholder engagement, along with fiscal responsibility, accountability, and transparency.

The Program is currently in the planning stage, following an extensive Vulnerability Study. Phase I seismic and flood protection upgrades, which will include critical life safety projects, are targeted for completion by 2026.

SEAWALL PROGRAM ACTIVITIES TO DATE:

DATA COLLECTION

The Port is collecting information on existing assets with City agencies, partners, and community stakeholders.

FIELD WORK

Bathymetric & Laser Survey:

The Bathymetric Survey measured the water depth along the Embarcadero Seawall. Survey results will inform the seismic and flood analysis modeling for the Seawall.

Geotechnical exploration:

The Port completed approximately 100 exploratory borings along the Embarcadero Seawall. Borings help to better understand subsurface conditions and evaluate potential earthquake effects.

EARTHQUAKE AND FLOOD RISK ASSESSMENT

The Port is determining the extent of lateral spreading and liquefaction hazards to estimate possible damage, along with the extent of possible damage from flooding.

COMMUNITY AND STAKEHOLDER ENGAGEMENT

The Port is conducting a robust community engagement effort, including educational outreach, strategic partnerships, community meetings, and more.

FUNDING FOR PHASE I

The Port has identified most funding sources for Phase I to address immediate life safety improvements.