



## MEMORANDUM

June 10, 2022

**TO:** MEMBERS, PORT COMMISSION  
Hon. Willie Adams, President  
Hon. Kimberly Brandon, Vice President  
Hon. John Burton  
Hon. Gail Gilman

**FROM:** Elaine Forbes  
Executive Director 

**SUBJECT:** Informational presentation on the process for developing Draft Waterfront Adaptation Strategies

**DIRECTOR'S RECOMMENDATION:** Information Only – No Action Required

---

### **EXECUTIVE SUMMARY**

The Port of San Francisco's treasured waterfront is vulnerable to hazards, including urgent seismic risk and increasing flood risks from sea level rise. The Waterfront Resilience Program ("Program" or "WRP") works to ensure the waterfront, and its critical regional and citywide assets, are resilient to hazards - and increasingly accessible to everyone it serves.

Since 2018, the WRP has achieved several key milestones towards developing a more resilient waterfront, including: completion of the Multi-Hazard Risk Assessment (MHRA), launch of the Port/USACE Waterfront Coastal Flood Study (the "USACE San Francisco Waterfront Coastal Flood Study" or "Flood Study"), development of Draft WRP program goals, development of seismic and flood measures, and identification of early projects for the Embarcadero seawall.

The WRP is at a critical juncture. Over the coming year, Port staff will develop adaptation strategies for the entire Port waterfront, conduct significant public stakeholder outreach and engagement, develop a programmatic racial and social equity strategy, complete the Initial Southern Waterfront Earthquake Assessment, and engage with city, regional, state, and federal agencies.

Today's presentation will describe the process for developing 2 to 3 Draft Waterfront Adaptation Strategies, public outreach and engagement and stakeholder feedback heard to date, and high-level approaches for addressing sea level rise and coastal flooding. The WRP team will return to present the Draft Waterfront Adaptation Strategies in fall 2022. The Draft Waterfront Adaptation Strategies will develop options to be evaluated that reduce flood and seismic risk along the waterfront in service of selecting a preferred strategy by July 2023.

## **STRATEGIC OBJECTIVES**

The Port's Waterfront Resilience Program supports the goals of the Port's Strategic Plan as follows:

### Engagement

By leading an inclusive stakeholder process to develop a shared vision, principles and goals for the Waterfront Resilience Program and Flood Study and using multiple avenues for public involvement in the development of draft adaptation strategies.

### Equity

By developing a program-wide equity strategy and evaluating waterfront adaptation strategies through an equity lens to ensure that benefits accrue to, and burdens are minimized for BIPOC communities, and by increasing the proportion of funds spent on contract services performed by LBE firms.

### Resiliency

By leading the City's efforts to address threats from earthquakes and flood risk through research and infrastructure improvements to the entire Port shoreline and adjoining buildings and other infrastructure.

### Evolution

By developing adaptation options with a long-time horizon, developing strategies to adapt the waterfront and its uses over time, and recognizing that decisions made today influence the options available to future generations who will be addressing different environmental and social conditions.

### Sustainability

By incorporating nature-based features into the Draft Waterfront Adaptation Strategies to enhance the quality of the Bay water and habitat with the improvements.

### Productivity and Economic Recovery

Through wise investment of Proposition A Seawall Earthquake Safety Bonds and other Port and public funding sources, and by developing strategies to defend or floodproof Port maritime and industrial facilities to extend their useful life and reduce their risk from coastal flooding and sea level rise.

## **WATERFRONT HAZARDS**

San Francisco faces earthquake and coastal flood risks today. These flood risks will increase in the future due to sea level rise and extreme storms, threatening buildings, small businesses, jobs, and critical services such as BART and MUNI. To defend San Francisco from current and future flood risks, there is a need to adapt shoreline elevations to address the 3 to 7 feet of sea level rise expected by 2100.

Recent storm modeling indicates that San Francisco will start experiencing potentially costly coastal flood damages in the period between 2030-2040. We face urgent earthquake risks today. San Francisco will need to make key decisions about how to adapt the waterfront and protect critical assets from flooding to reach a locally endorsed Waterfront Adaptation Strategy by July 2023.

One of the many benefits of reaching this milestone is that we will have increased opportunities to access federal and state funding. Significant changes to defend the waterfront against coastal flooding are expected in 2030 or later, but we must make initial planning choices now to access funding opportunities and plan for projects because major infrastructure projects can take 10+ years to design and build.

In addition to coastal flooding, the waterfront and inland areas within the Sea Level Rise Vulnerability Zone face stormwater and emergent groundwater hazards that threaten public infrastructure and private homes and businesses. Any adaptation strategies that increase shoreline resilience to coastal flooding will need to consider these other flood sources as well. Additionally, any effort aimed at long-term sea level rise resilience will also need to strengthen the waterfront against urgent earthquake risks.

## **DRAFT WATERFRONT ADAPTATION STRATEGIES - PROCESS**

The Port is working closely with partner agencies, the U.S. Army Corps of Engineers (USACE), resource and regulatory agencies, and community stakeholders to develop Draft Waterfront Adaptation Strategies, which will be presented to the Port Commission and the general public in Fall 2022. The Draft Waterfront Adaptation Strategies will develop 2 to 3 options to reduce flood and seismic risk along the Port's entire waterfront jurisdiction, from Heron's Head Park to Fisherman's Wharf, through a combination of phased large and small projects, new policies, such as flood defenses, structure elevation, floodproofing, city infrastructure adaptations (e.g., wastewater and stormwater management, transportation system), flood-resilient building codes, and land use changes.

Concurrently, the Port is collaborating with the U.S. Army Corps of Engineers ("USACE") on a general investigation of flood risks to the Port's entire 7½ mile jurisdiction (the "USACE San Francisco Waterfront Coastal Flood Study" or "Flood Study"). The Flood Study is a planning-level feasibility study that will analyze coastal flood risk through 2100, identify and evaluate adaptation strategies, and recommend a preferred alternative based on qualitative and quantitative criteria by 2025. If the project is approved by the U.S. Congress, the Federal government will contribute up to 65% of the overall project cost, resulting in potentially billions of

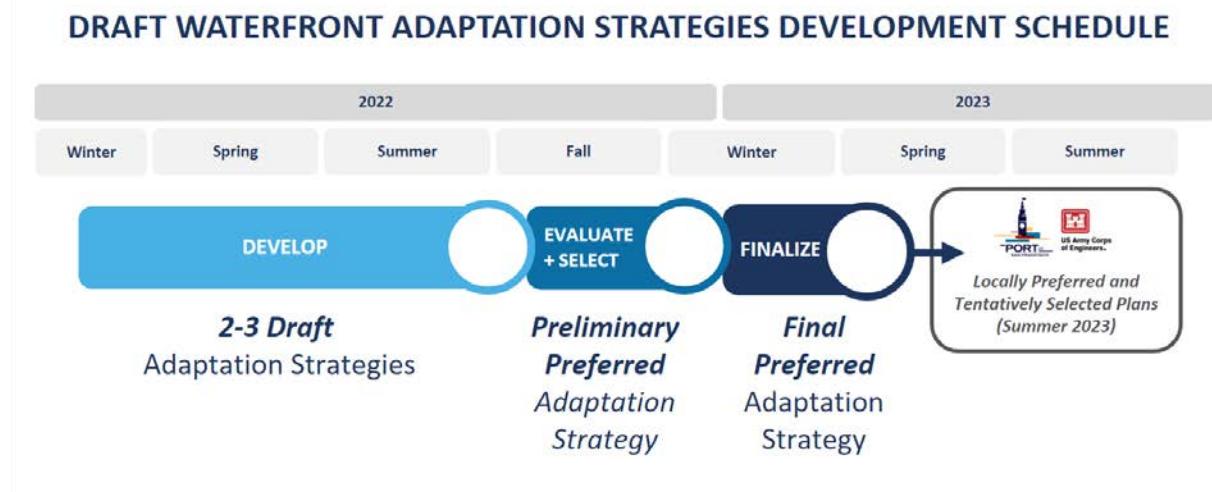
dollars in Federal investment in San Francisco's waterfront. The Port Commission approved a Feasibility Cost-Sharing Agreement for the Flood Study on October 12, 2021.

To work with the schedule set out by the Flood Study Agreement, the program team will develop alternatives and select a preferred plan through the following steps (see Figure 1: Draft Waterfront Adaptation Strategies Development Schedule):

1. **Develop 2 to 3 Strategies (Spring/Summer 2022):** Develop two to three alternative Draft Waterfront Adaptation Strategies to bring to public and stakeholder engagement in fall 2022.
2. **Evaluate and Select (Fall 2022):** Evaluate the 2 to 3 Draft Waterfront Adaptation Strategies through qualitative and quantitative tools. Conduct robust public outreach and engagement to get public feedback on the 2 to 3 Strategies. Based on evaluation and public feedback, select one Preliminary Preferred Adaptation Strategy to move forward with.
3. **Refine and Endorse (Winter/Spring 2023):** Through continued public engagement and evaluation, refine the Preliminary Preferred Adaptation Strategy for inclusion as the "Tentatively Selected Plan" (TSP) for the Flood Study, by July 2023.

The TSP will be developed to a greater level of design and engineering detail and will undergo environmental review (NEPA/CEQA) and USACE review and approvals by Flood Study completion in 2025. The Final Project will be presented to U.S. Congress for potential federal funding of up to 65% of the project cost.

Figure 1: Draft Waterfront Adaptation Strategies Development Schedule



The 2 to 3 Draft Waterfront Adaptation Strategies will identify projects, policies, and actions to protect the City from sea level rise and coastal flooding. At this alternative development stage of the process, we are identifying key features at a high level of detail. Further detail, refinement, and environmental analysis will be done in subsequent

phases as described above. At this stage, the 2 to 3 Draft Waterfront Adaptation Strategies will include:

- The approximate location and height of the proposed coastal flood defense system
- Measures that the flood defense would be built out of, such as a seawall, levee, or nature-based feature
- The approximate area needed to gain elevation to reach the top of the coastal flood defense system, and implications on adjacent infrastructure, such as roadways, rail lines, utilities, and adjacent buildings
- Asset-specific strategies such as floodproofing or elevating buildings or infrastructure
- Policies such as new or updated emergency plans and warning systems, flood-resilient code updates, and land use and zoning changes.

At the November 2020 Port Commission hearing, the Port Commission recommended that the WRP team work closely with other City agencies who plan, own, operate, and manage infrastructure and assets in the Sea Level Rise Vulnerability Zone. Over the past several months, the Port has been working closely with these City agencies, including the San Francisco Municipal Transportation Agency (SFMTA), San Francisco Public Utilities Commission (SFPUC), San Francisco Public Works (SFPW), Planning Department, and the Office of Resilience and Capital Planning (ORCP). Port WRP staff have been meeting weekly with staff from each of these agencies to co-develop Draft Waterfront Adaptation Strategies and bring in feedback from other agencies.

## **COMMUNITY ENGAGEMENT**

The Waterfront Adaptation Strategies development process builds off 5+ years of public outreach and engagement through the WRP. Since 2017, the WRP has connected with tens of thousands of San Franciscans through community meetings, event tabling, waterfront boat, bike, and walking tours, mixers, online engagement like surveys and mapping exercises, and much more. Community input has helped the WRP develop its guiding vision, principles, goals and evaluation criteria. The community has also shared what waterfront assets are key priorities as the WRP takes action to reduce seismic and climate change risks.

Community feedback has strongly affirmed the Port's key focus on life safety and disaster response. The WRP heard "put people first" loud and clear. The assets and services most prioritized: housing, disaster recovery facilities, utilities, and businesses. Community members also shared a key focus on protecting transportation assets.

## **ADAPTATION APPROACHES**

In developing the Draft Waterfront Adaptation Strategies, we are looking to other cities around the world to identify approaches to coastal adaptation. These adaptation approaches fall into three primary categories: defend, accommodate, and retreat.

- **Defend** against floods by raising the existing shoreline to prevent flooding from coastal water.
- **Accommodate** flooding by letting the coastal water in, adapting buildings and infrastructure in place.
- **Retreat** from the current shoreline by moving buildings and infrastructure inland, typically over a long period of time.

Waterfront adaptation strategies will require a mix of all three adaptation approaches, depending on the local hazards and conditions. Approaches may also be used in combination with one another to provide redundancy and increased resilience.

As part of the WRP's ongoing community engagement efforts, staff developed and circulated a citywide survey between May 19 and June 6 to understand what community members think about each of these general approaches. The Waterfront Resilience Program Survey presented five examples of how other cities made changes to address the flood risks they faced. We asked respondents to consider how these approaches could work in San Francisco and followed with open ended questions asking for reasons why respondents liked or disliked each example.

As early feedback, by June 6, 942 surveys were completed, 43 in Spanish, 65 Chinese, 2 Filipino, and 832 English. Less than half of respondents choose to answer the optional racial identity question, but of those who did 63% of respondents identified as White/Caucasian, 16% Asian/Pacific Islander, 6% Latinx, 3% Black/African American, 4% Multiple Ethnicities, 1% American Indian/Alaskan Native, and 7% Other.

31% of respondents live in the northern waterfront, 16% in the central/southern waterfront, 37% in the rest of San Francisco, and 16% outside of San Francisco. Each approach example received over 500 comments, showing respondents were very engaged.

Overall, the two examples of “Defend” approaches (Shanghai, China and Auckland, New Zealand) received positive feedback. Respondents liked that the approach would protect existing buildings, maintain aspects of the current look and feel of the waterfront, and prioritize areas for pedestrians, bikes, and public transit. Respondents disliked the potential disconnection from the water, potential high cost, blocked views, and long periods of construction.

The two examples of “Accommodate” (Queens, NY and Hamburg, Germany) also received positive feedback. Respondents liked increased space for nature and public use, that the approach feels practical, reasonable, and flexible, and shared a desire to know more about the specific applications of this approach. Respondents disliked potential impacts to wildlife, construction disruptions, potential loss of public access during storm events, and the potential high cost.

The “Retreat” example (Christchurch, New Zealand) received fairly neutral feedback. Respondents liked that there could be more open space and room for nature. Respondents disliked that the approach feels unrealistic to San Francisco because of spatial considerations and questioned who would be displaced.

Overall respondents were open to the approaches and understood that each would come with tradeoffs. Respondents wanted more information about where along the waterfront each approach would be used.

WRP staff is organizing a series of focus groups through partnering community-based organizations, with a focus on the southeast neighborhoods and other underrepresented communities of the city, to get further community feedback during the development of Draft Waterfront Adaptation Strategies.

## **NEXT STEPS**

Port staff, working with City agencies and USACE and building on previous community engagement, is developing and refining the Draft Waterfront Adaptation Strategies in partnership with City agencies, to be complete by end of Summer 2022. In addition, staff is developing and vetting concepts with public stakeholders and experts, including community-based organizations, resource and regulatory agencies, and Engineering with Nature and historic preservation experts. The feedback from these forums will help to refine and enrich the Draft Waterfront Adaptation Strategies. Staff will present Draft Waterfront Adaptation Strategies to the Port Commission and the public in fall 2022.

Through fall 2022 and winter 2023, working closely with the USACE process, we will evaluate the costs and benefits of each draft strategy. We will also hold a robust community engagement process to garner public feedback on the draft strategies. Through the evaluation and public feedback, we will work towards a preliminary preferred adaptation strategy and a refined strategy that will form the basis for the Tentatively Selected Plan (TSP) and Locally Preferred Plan (LPP) by July 2023 to be carried forward through the USACE process through refinement, environmental review, and local and federal approvals by 2025. The Final Project will be presented to U.S. Congress for potential federal funding up to 65% of the project cost.

Throughout the process, the project team will be conducting community engagement to get feedback on the Draft Strategies and refinement into a preferred strategy to become the LPP. Additionally, staff will conduct detailed race and social equity assessment to center community voices, ensure that benefits accrue, and burdens are minimized to BIPOC communities, and that the preferred strategy considers community input. The equity assessment will develop criteria by which to evaluate the strategies as to how they benefit and burden BIPOC and other equity communities (such as seniors, youth, LGBTQ populations, and people with disabilities). The Project Team will develop these criteria over summer 2022 in collaboration with community-based organizations and an Equity Working Group made up of a breadth of equity practitioners from the Port, City Agency leadership, and Consultant team. The team will bring this assessment to the Port Commission in fall 2022 with the Draft Waterfront Adaptation Strategies.

Today staff seeks feedback from the Port Commission on the process and high-level adaptation approaches described in this report. We are eager to advance the Draft Waterfront Adaptation Strategies to meet the Commission's goals under the Port's Strategic Plan and to ensure the waterfront is resilient to flood and other hazards.

Prepared by: Adam Varat, Deputy Waterfront Resilience Program Manager – Planning  
Brad Benson, Waterfront Resilience Director

**Exhibits**

Exhibit A: Waterfront Resilience Program Background and Work to Date

Exhibit B: Waterfront Resilience Program Vision and Principles

## **Exhibit A: Waterfront Resilience Program Background and Work to Date**

The Port of San Francisco's treasured waterfront is vulnerable to hazards, including urgent seismic risk and increasing flood risks from sea level rise. To protect this resource - from the iconic landmarks, cultural and art destinations, and beautiful open spaces connected to the Bay, to the diverse maritime industries and businesses, and key emergency, transportation and utility infrastructure, the Port has established the Waterfront Resilience Program ("Program" or "WRP"). The Program works to ensure the waterfront, and its critical regional and citywide assets, are resilient to hazards - and increasingly accessible to everyone it serves.

In 2018, the San Francisco Board of Supervisors proposed Proposition A Seawall Earthquake Safety Bonds. San Francisco voters approved this bond with a margin of 83-17% at the November 6, 2018 election. At the time, the Port and the City acknowledged that Proposition A was a vital down payment to address seismic and flood risks along the waterfront.

In 2020, the Port released the results of the Embarcadero Seawall Multi-Hazard Risk Assessment (MHRA) to examine the impacts to Port, City, regional and privately-owned assets and infrastructure from a variety of potential seismic and flood events for the 3 miles of Embarcadero Seawall, from Fisherman's Wharf to Mission Creek. The MHRA was presented to the Port Commission on September 22, 2020<sup>1</sup>.

At the November 10, 2020 Port Commission Meeting, the Program team presented the Port's strategy for developing adaptation strategies. The presentation included a proposed decision framework<sup>2</sup>, including a Program goal statement, principles, draft evaluation criteria, draft flood and seismic standards, and draft Proposition A funding guidelines. Port Commission Vice President Kimberly Brandon guided the Commission through a series of questions posed by Program staff. The Commission made changes to the Program principles, a copy of which is included in Exhibit B.

The WRP has developed 23 early projects for the Embarcadero seawall to address the most urgent earthquake safety, disaster response, and coastal flood risks. The program team present these early projects to the Port Commission on December 14, 2021<sup>3</sup>. These early projects are near-term investments such as seismic retrofits, improvements to disaster response facilities, shoreline stability and near-term flood risk reduction projects. Early projects can be delivered with Proposition A funding, federal and state grants, investments by long-term tenants or through public-private partnerships, City agencies capital programs, and the Port through its Capital Improvement Program.

---

<sup>1</sup> September 22, 2020 Staff Report:  
<https://sfport.com/meetings/san-francisco-port-commission-september-22-2020>

<sup>2</sup> November 10, 2020 Staff Report:  
<https://sfport.com/meetings/san-francisco-port-commission-november-10-2020>

<sup>3</sup> December 14, 2021 Staff Report:  
<https://sfport.com/meetings/san-francisco-port-commission-december-14-2021>

The Port is finalizing an Initial Southern Waterfront Earthquake Assessment, which compiled existing information, highlighted information gaps, and identified potential seismic hazards and vulnerabilities based upon limited analysis and professional judgment. The findings of the Initial Southern Waterfront Earthquake Assessment will be presented to the Port Commission later this year, along with early projects for the southern waterfront.

## **Exhibit B: Waterfront Resilience Program Vision and Principles**

Exhibit B includes the Waterfront Resilience Program Vision and Principles, with additions to respond to Port Commission direction in underline.

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Vision</b>     | Take actions to reduce seismic and climate change risks that support a safe, equitable, sustainable, and vibrant waterfront.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Principles</b> | <p><b>Prioritize</b> life safety and emergency response</p> <p><b>Advance</b> equity throughout the Waterfront Resilience Program, including through community and stakeholder engagement, planning, contracting, jobs and decision-making</p> <p><b>Enhance</b> and sustain economic, <u>financial</u> and ecological opportunities</p> <p><b>Inspire</b> an adaptable waterfront that:</p> <ul style="list-style-type: none"><li>• Improves the health of the Bay and neighboring communities</li><li>• Ensures public access to the waterfront and historic places and an inviting waterfront for all</li><li>• Protects and preserves historic and maritime resources</li><li>• Provides opportunities for diverse families, businesses, and neighborhoods to thrive</li></ul> <p><b>Lead</b> a transparent, innovative, collaborative, and adaptive Resilience Program</p> |