

# DRAFT Port of San Francisco Recommendations for City Coastal Flood Risk Reduction

Capital Planning Committee

October 3, 2022



Waterfront Resilience Program

# AGENDA



- **Draft Waterfront Adaptation Strategies Purpose & Process**
- **Draft Recommendations for City Coastal Flood Risk Reduction**



# Draft Waterfront Adaptation Strategies Purpose & Process

LADY FISH

SAN FRANCISCO, CA

BESHA II  
SAN FRANCISCO



Waterfront Resilience Program

# WATERFRONT RESILIENCE PROGRAM VISION STATEMENT

Affirmed through Robust Community Engagement

The Port's Waterfront Resilience Program will take actions to **reduce seismic and climate change risks** that support a safe, equitable, sustainable, and vibrant waterfront.



# RIISING TO THE CHALLENGE

## San Francisco Faces Urgent Seismic, Coastal, and Inland Flood Risks Today

### SEISMIC RISKS



Embarcadero, 1906



Marina, 1989

### COASTAL FLOODING

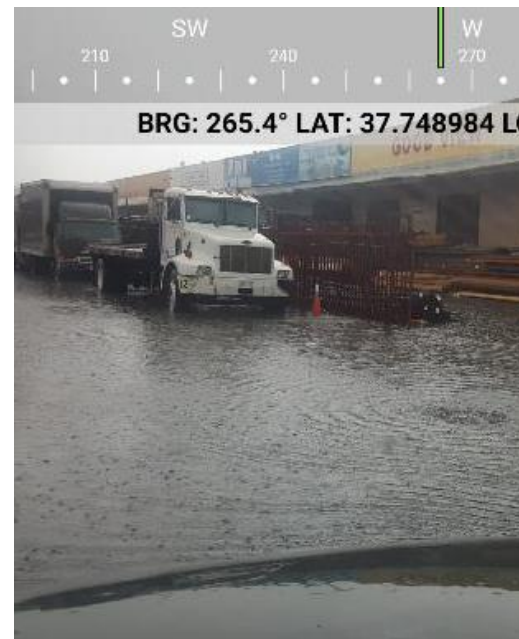


Recology



The Embarcadero

### INLAND FLOODING



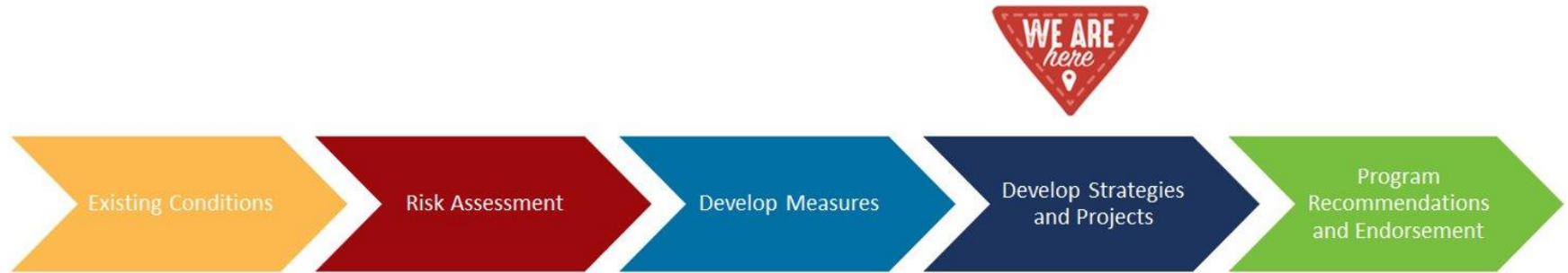
Islais Creek outfall and Marin St.

# RISING TO THE CHALLENGE

Adaptation should preserve and reimagine San Francisco's waterfront



# PATH TO ESTABLISH DRAFT WATERFRONT ADAPTATION STRATEGIES

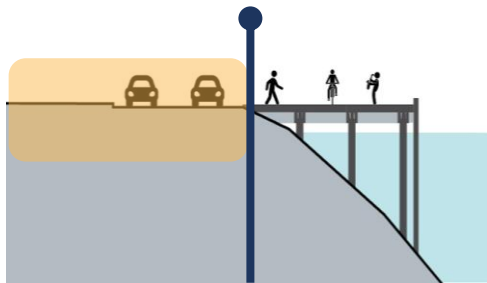


The Port of San Francisco has developed seven high-level Draft Waterfront Adaptation Strategies through a collaborative interagency process and over five years of public engagement.

The draft Strategies are ready for public feedback, with a goal of reaching a Draft Waterfront Adaptation Plan by Summer 2023.

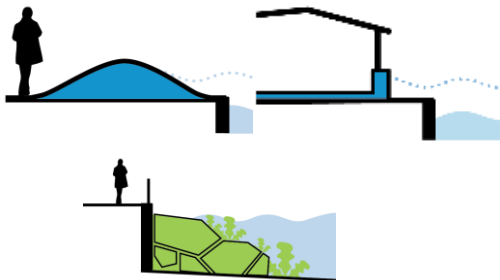
# DRAFT WATERFRONT ADAPTATION STRATEGIES

## Key Components



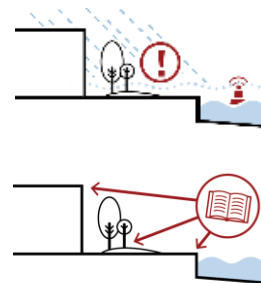
### Coastal Flood Defense Location + Height

*And area of elevation  
change*



### Physical Changes

*Such as earthquake-  
resilient berms,  
floodproofing, and  
nature-based features*



### Policy Changes

*Such as resilient codes,  
warning systems, and land  
use changes*

# HIGH LEVEL ADAPTATION APPROACHES



## DEFEND

Keep coastal water out,  
stay in place



## ACCOMMODATE

Let coastal water in,  
stay in place



## RETREAT

Move out of the area  
over time

# DRAFT WATERFRONT ADAPTATION PLAN SCHEDULE



# Draft Recommendations for City Flood Risk Reduction



# DRAFT RECOMMENDATIONS FOR CITY COASTAL FLOOD RISK REDUCTION

## Purpose



- Sea Level Rise is increasing risk of coastal flooding, the Port and City must invest in new flood protection infrastructure including O&M.
- Current SLR Capital Planning Guidance is focused on assets. This new guidance is focused on coastal flood defenses and takes a system approach to reduce coastal flooding impacts.
- While this guidance is proposed for the Port's 7-1/2 miles of bayside waterfront, it is also intended to help move Citywide discussion forward.

# DRAFT RECOMMENDATIONS FOR CITY COASTAL FLOOD RISK REDUCTION

Intended to:



Solicit City input on flood risk tolerance and desired level of performance of coastal flood resilience infrastructure



Guide development of long-term adaptation strategies for coastal flood resilience infrastructure



Inform USACE Flood Study, including defining initial design elevations for coastal flood resilience infrastructure



Provide Port the flexibility to adapt over time and establishing its own flood risk tolerance for Port assets outside City flood defense system

# DRAFT RECOMMENDATIONS FOR CITY COASTAL FLOOD RISK REDUCTION

Not Intended to Convey



Development of lines of defense and adaptation strategies

In process through City engagement and USACE Flood Study



A Port commitment to provide and maintain City coastal flood defenses

Need to identify capital and maintenance funding for long-term operations



Asset-level flood protection for finger piers

To be developed by the Port

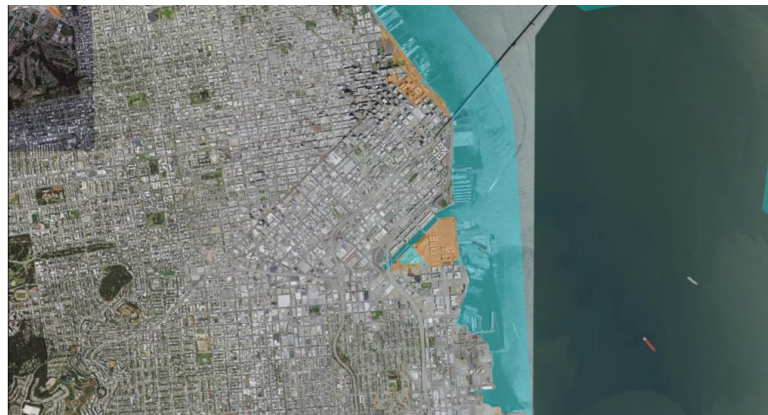
*Further collaboration and efforts are needed to define these elements of long-term coastal flood risk reduction*

# FILL CURRENT POLICY GAP RELATED TO COASTAL FLOOD RISK REDUCTION



## CPC SEA LEVEL RISE GUIDANCE

- Adopted in 2014, updated in 2020
- Asset level guidance
- Shoreline flood defenses not addressed

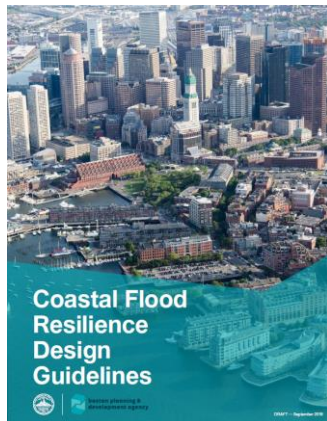
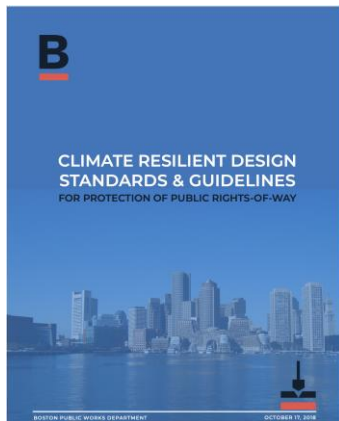


## NATIONAL FLOOD INSURANCE PROGRAM

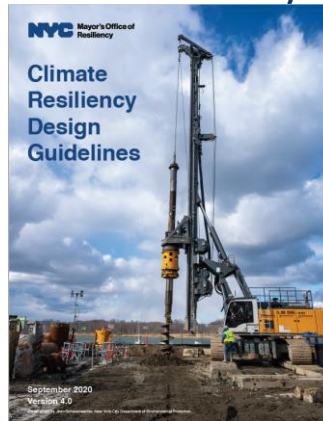
- Recently finalized FEMA Flood Insurance Rate Maps (Effective March 2021)
- Modifications to City's Floodplain Management Ordinance
- FEMA accredited flood protection structures can remove hazard designations

# PRECEDENTS FROM OTHER JURISDICTIONS

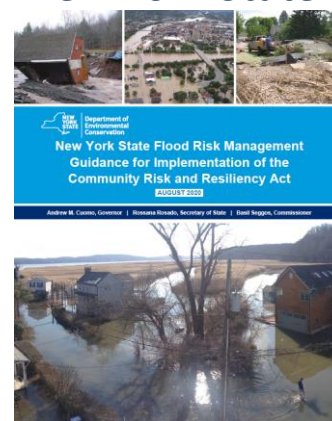
## Climate Ready Boston



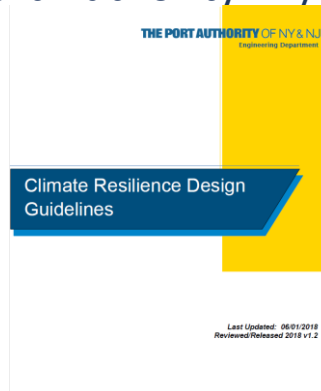
## New York City



## New York State



## Port Authority NY/NJ



# UNCERTAINTY FROM SEA LEVEL RISE PROJECTIONS

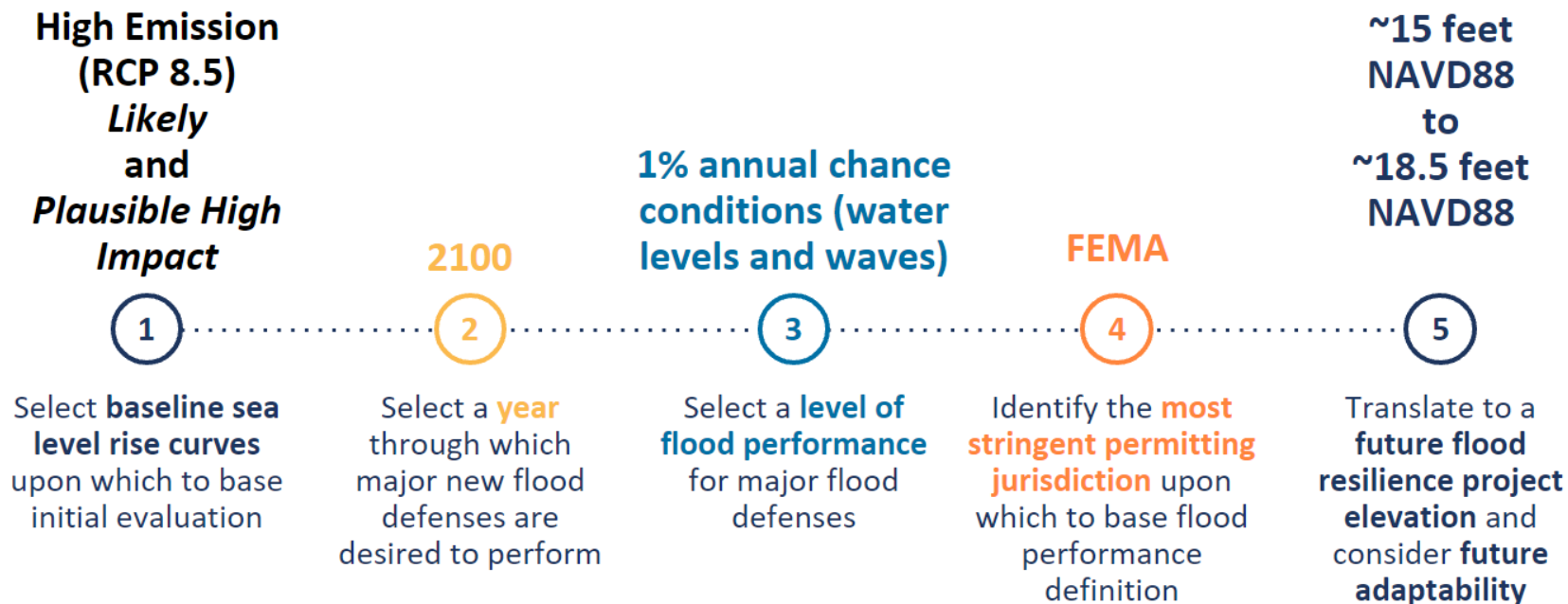
## Existing Local and State Guidance

Source	2100 Likely	2100 Plausible, High- impact
San Francisco (local)	3.4 feet	6.9 feet
State of California (regional)	3.4 feet	6.9 feet to 10.2 feet
Stage Agencies (regional)	3.5 feet	7.0 feet
IPCC 2021 (global)	3.3 feet	6.2 feet

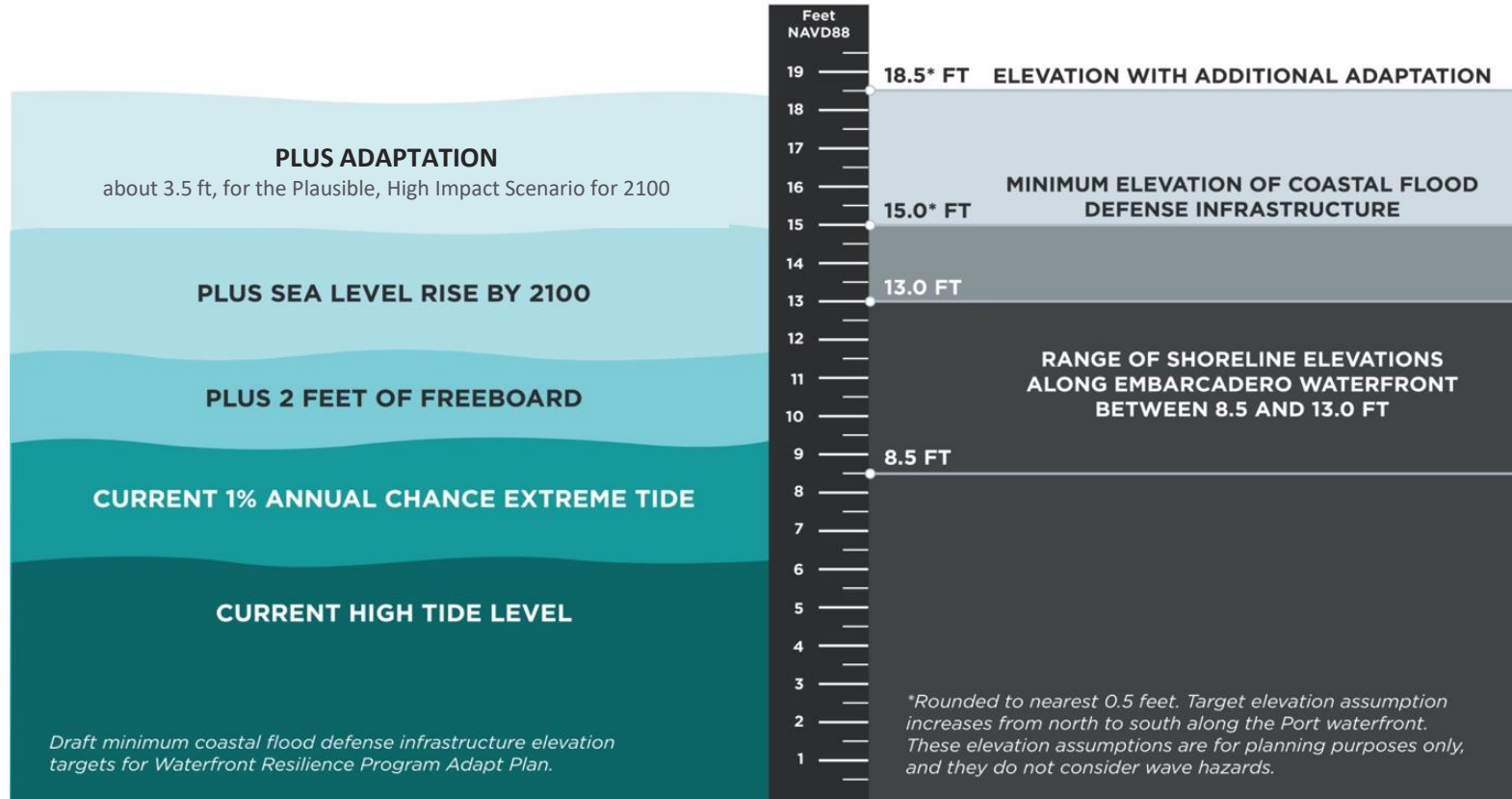
\* Current State and Local Guidance based upon IPCC 2014, expected to be updated to align with IPCC 2021 over the next year.

# PROCESS FOR DEFINING FLOOD RISK REDUCTION ELEVATION

Example for 2100 planning horizon with corresponding elevations



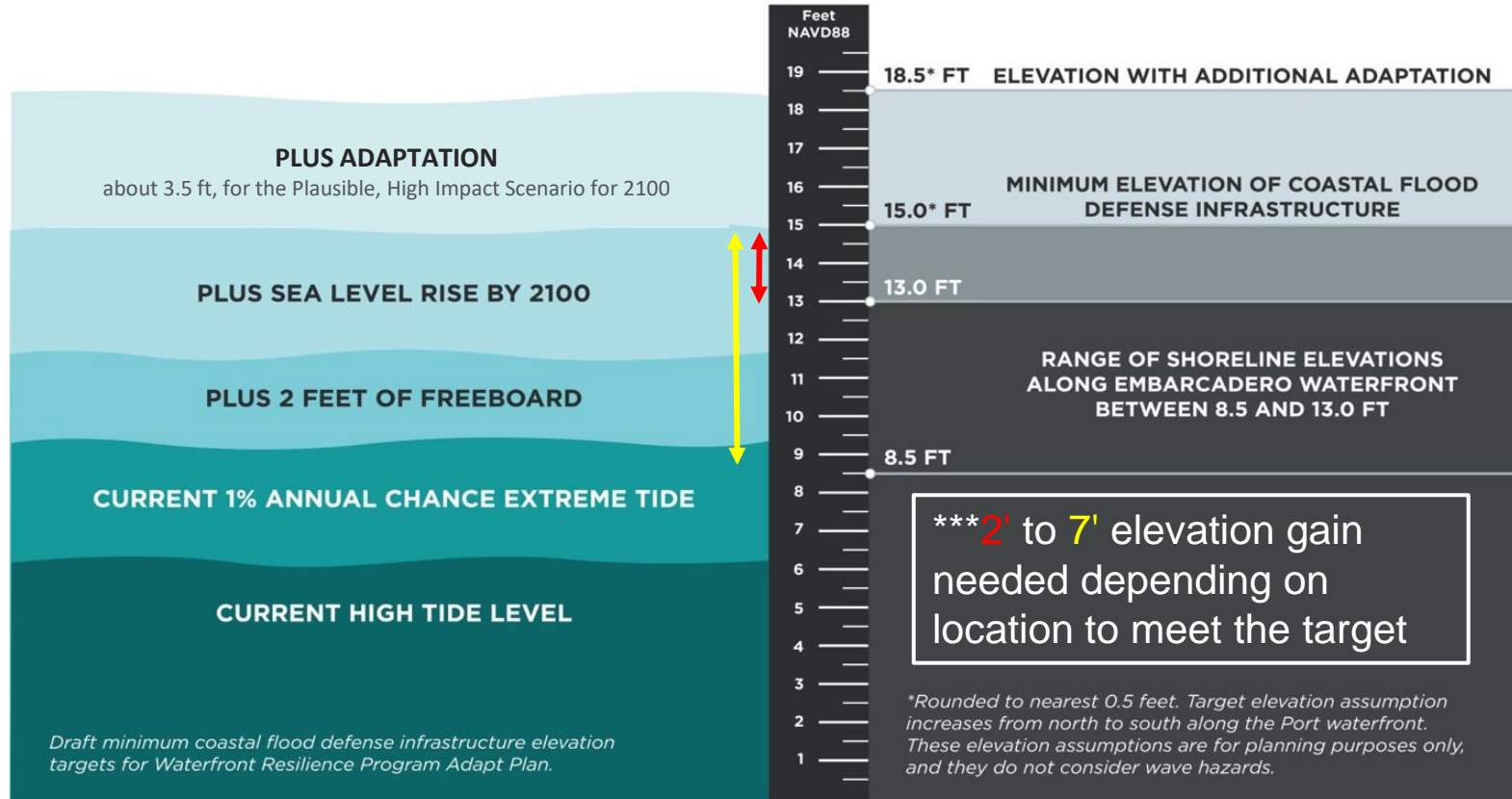
# UNDERSTANDING COASTAL FLOOD DEFENSE INFRASTRUCTURE ELEVATION TARGETS ALONG THE EMBARCADERO WATERFRONT



Draft minimum coastal flood defense infrastructure elevation targets for Waterfront Resilience Program Adapt Plan.

\* SLR adaptation study elevations include 2' of freeboard to meet FEMA accreditation requirements

## UNDERSTANDING COASTAL FLOOD DEFENSE INFRASTRUCTURE ELEVATION TARGETS ALONG THE EMBARCADERO WATERFRONT



\* SLR adaptation study elevations include 2' of freeboard to meet FEMA accreditation requirements

# NEAR-TERM FLOOD RISK REDUCTION PROJECTS

Recommendations not intended to constrain near-term flood risk reduction projects

- Scale of change and funding to construct this long-term system requires decades to fully plan and build, therefore near-term flood risk projects will need to be implemented to mitigate areas of current risk
- Near-Term Flood Risk Reduction Projects implemented as Early Projects may not meet the recommendations for City Coastal Flood Risk Reduction
- These projects will reduce near-term flood risk or opportunistically elevate segments of the shoreline and be valuable steps along an adaptation pathway the builds toward the Recommendation
- Early Projects will be evaluated on a project basis to align level of flood risk reduction provided with other factors, such as opportunities, impacts, functional lifespan, cost and schedule.

# DRAFT RECOMMENDATIONS FOR CITY COASTAL FLOOD RISK REDUCTION

## Key Assumptions that Guide the Development of Adaptation Strategies



**The Port recommends a consistent, reliable level of coastal flood risk reduction wherever long-term flood risk reduction actions are planned.**

*Recommended Criteria for Long-Term Flood Risk Reduction System:*

- Provide City defense against the 100-year coastal event (1% chance in any year)
- Meet FEMA accreditation requirements at end of functional life
- Build for "Likely" sea level rise, but add adaptive capacity
- Inland assets (e.g., Muni) can add additional asset-based flood protection

# DRAFT RECOMMENDATIONS FOR CITY COASTAL FLOOD RISK REDUCTION

## Next Steps

Sea Level Rise challenges will require the Port and City to make considerable investments to build, operate, and maintain coastal flood protection infrastructure. This requires discussion regarding:

- Governance – Which department(s) should serve as the owner and operator of this infrastructure, with responsibility for maintenance and liability?
- Funding – What sources are available for funding of ongoing maintenance and capital improvements for this infrastructure?
- Timing – By what point in time does the City want to have a FEMA accredited system built?
- Geography – Should this Guidance become a city-wide standard that is applied to all City coastal flood defense projects, regardless of agency ownership?



Thank You

