

SEAWALL EARTHQUAKE SAFETY & DISASTER PREVENTION PROGRAM



Port Jurisdiction

Historic shoreline

Embarcadero Seawall

Presentation to the Capital Planning Committee
March 5, 2018

PORT OF
SAN FRANCISCO



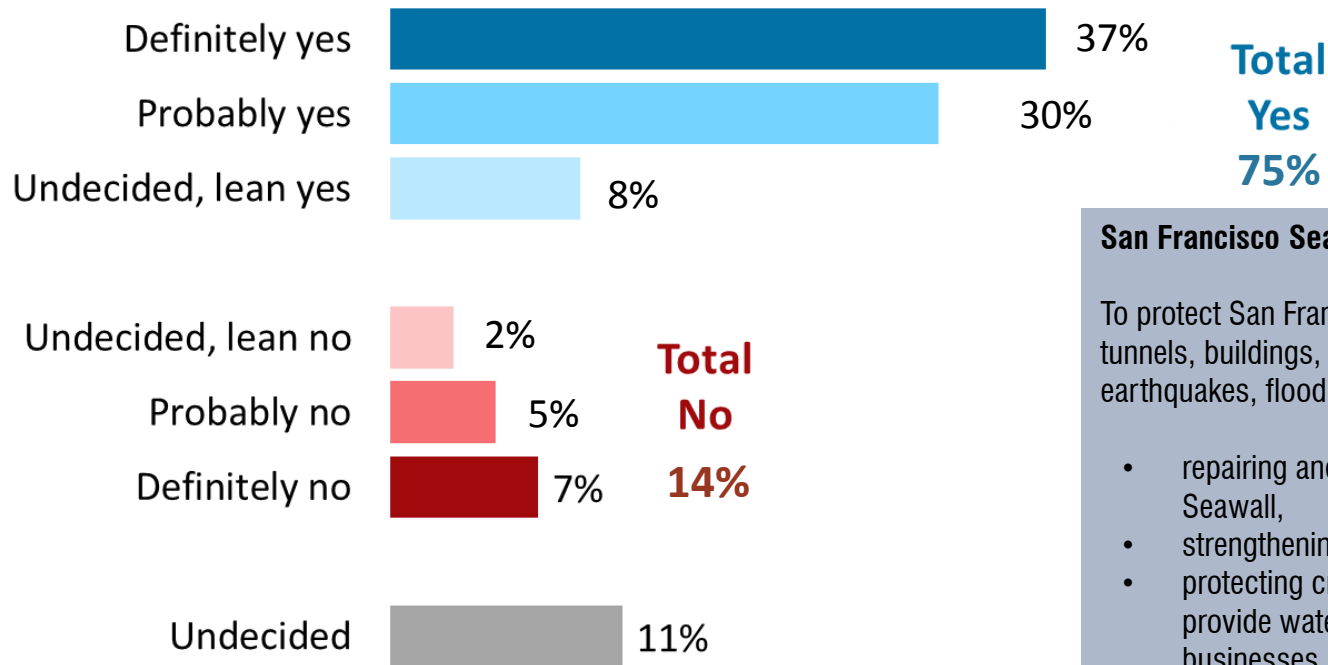
SEAWALL EARTHQUAKE SAFETY PROGRAM

ESTIMATED \$2-5 BILLION TOTAL PROGRAM COST

Per the 10-Year Capital Plan, the City and County of San Francisco is proposing a **\$350M General Obligation Bond** for the November 2018 ballot to fund improvements to the **Embarcadero Seawall** that will reduce the **significant life safety seismic risk**, improve current **flood protection** and provide a stable foundation for future **adaptation to sea level rise**.



Nearly $\frac{3}{4}$ of voters say they would vote “yes” on a bond measure to fund improvements to the Seawall.



San Francisco Seawall and Waterfront Protection Measure

To protect San Francisco’s waterfront, BART and Muni tunnels, buildings, historic piers, and roads from earthquakes, flooding and rising sea levels by:

- repairing and upgrading the City’s 100-year old Seawall,
- strengthening the Embarcadero, and
- protecting critical transit infrastructure and utilities that provide water and power to residents and businesses,

shall the City of San Francisco issue \$350 / \$500 million in bonds, subject to independent citizen oversight and regular audits, with no increase in tax rates?

COMPLETED VULNERABILITY ASSESSMENTS & SCOPING

City sea level rise modeling identifies near-term flood risk, and maps rising tide and storm surge scenarios for years 2050 and 2100.



Sea Level Rise Inundation Analysis

April 2014

San Francisco establishes aggressive agenda for further sea level rise analysis, adaptation planning, and implementation.

Mayor's Sea Level Rise Action Plan



Army of Corps of Engineering issues federal interest determination under its flood hazard mitigation authority.

Federal Interest Determination

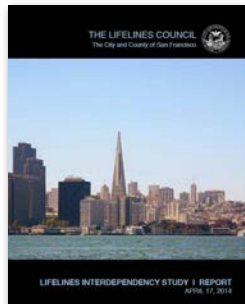


November 2017

June 2012

March 2016

November 2016

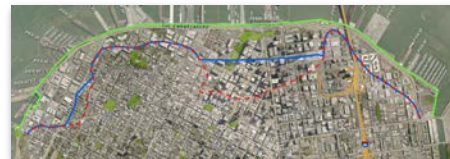


Lifelines Council Interdependency Study

Seawall identified as one of the City's Top 5 most critical lifeline safety assets. Seismic and sea level rise vulnerabilities identified for further multi-hazard risk assessment to inform investment prioritization.

Seawall Earthquake Vulnerability Study

Seawall is found vulnerable to seismic hazards, posing risk to the City's critical emergency response and lifeline assets.



Port's Seawall Planning, Engineering, and Construction Project Commences Planning

Port launches Seawall Earthquake Safety and Disaster Prevention Program.

SEAWALL EARTHQUAKE SAFETY & DISASTER PREVENTION PROGRAM GOALS

1

**ACT QUICKLY
TO IMPROVE
DISASTER
PREPAREDNESS**

2

**REDUCE
EARTHQUAKE
DAMAGE**

3

**IMPROVE
FLOOD
RESILIENCE**

4

**ENHANCE THE
CITY
& THE BAY**

5

**PRESERVE
HISTORIC
RESOURCES**

6

**ENGAGE THE
COMMUNITY**

THE SEAWALL CREATED 500+ ACRES OF NEW LAND



WHY PRIORITIZE THE EMBARCADERO SEAWALL NOW?

THE SEAWALL IS A CRITICAL PART OF THE CITY'S NETWORK OF EMERGENCY RESPONSE

In the event of a major earthquake, the waterfront must be available for emergency response access. Ensuring the seismic reliability of the Seawall will allow the City to respond to a major disaster.



THE SEAWALL IS KEY TO REGIONAL TRANSPORTATION



440,000

people arrive daily by boat at the Ferry Building or through the Transbay Tube on BART

In addition, the Muni Metro system registers over **half a million** daily boardings on routes that terminate downtown.

THE SEAWALL SUPPORTS AND PROTECTS IMPORTANT UTILITY INFRASTRUCTURE

This includes major wastewater, water, auxiliary water system, and power utilities.



\$24.6B OF TOTAL ECONOMIC ACTIVITY AND \$102.1B OF PROPERTY VALUE IS AT RISK FROM FAILURE OF THE SEAWALL

The value of assets at risk is

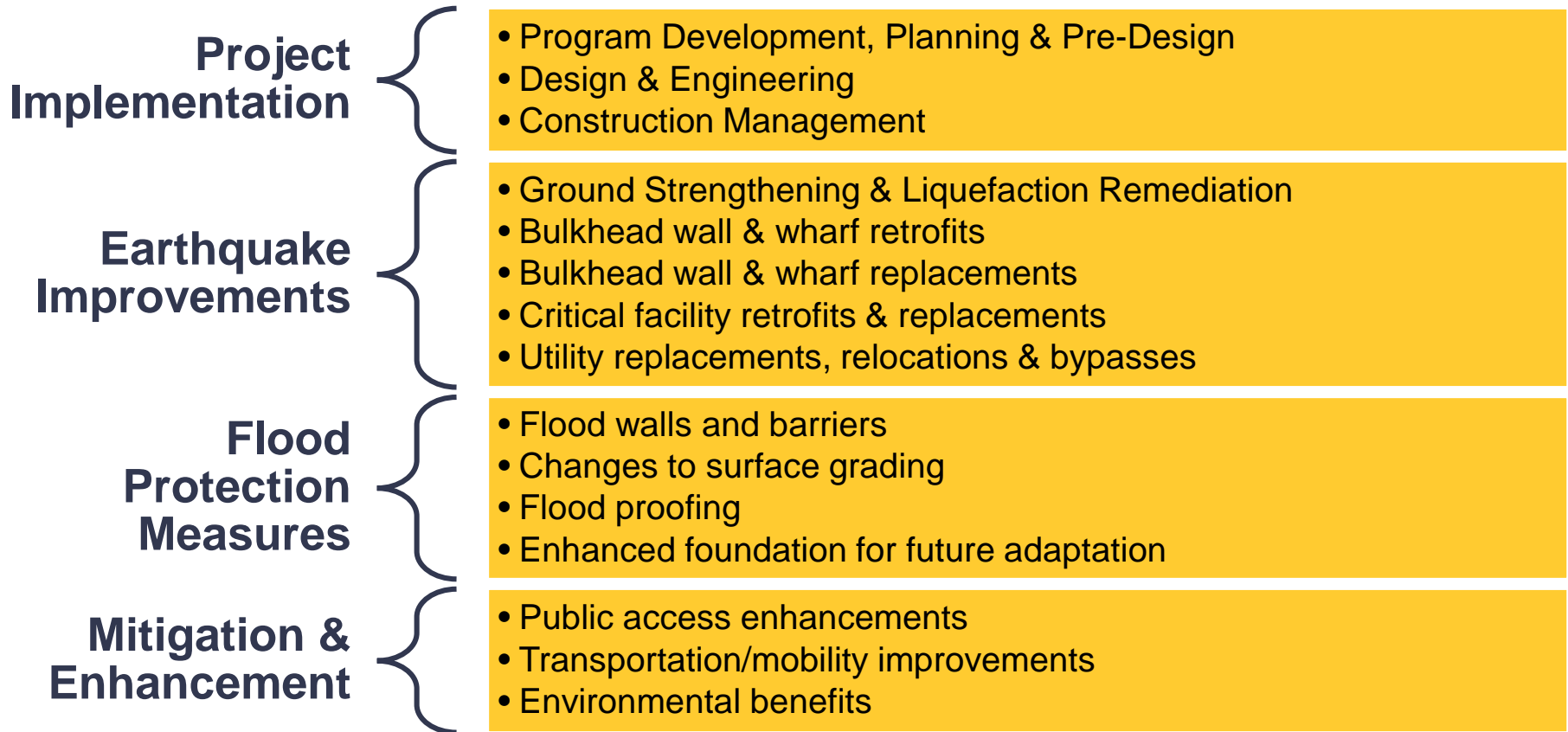
10–40x greater

than the investment needed to strengthen the Seawall.



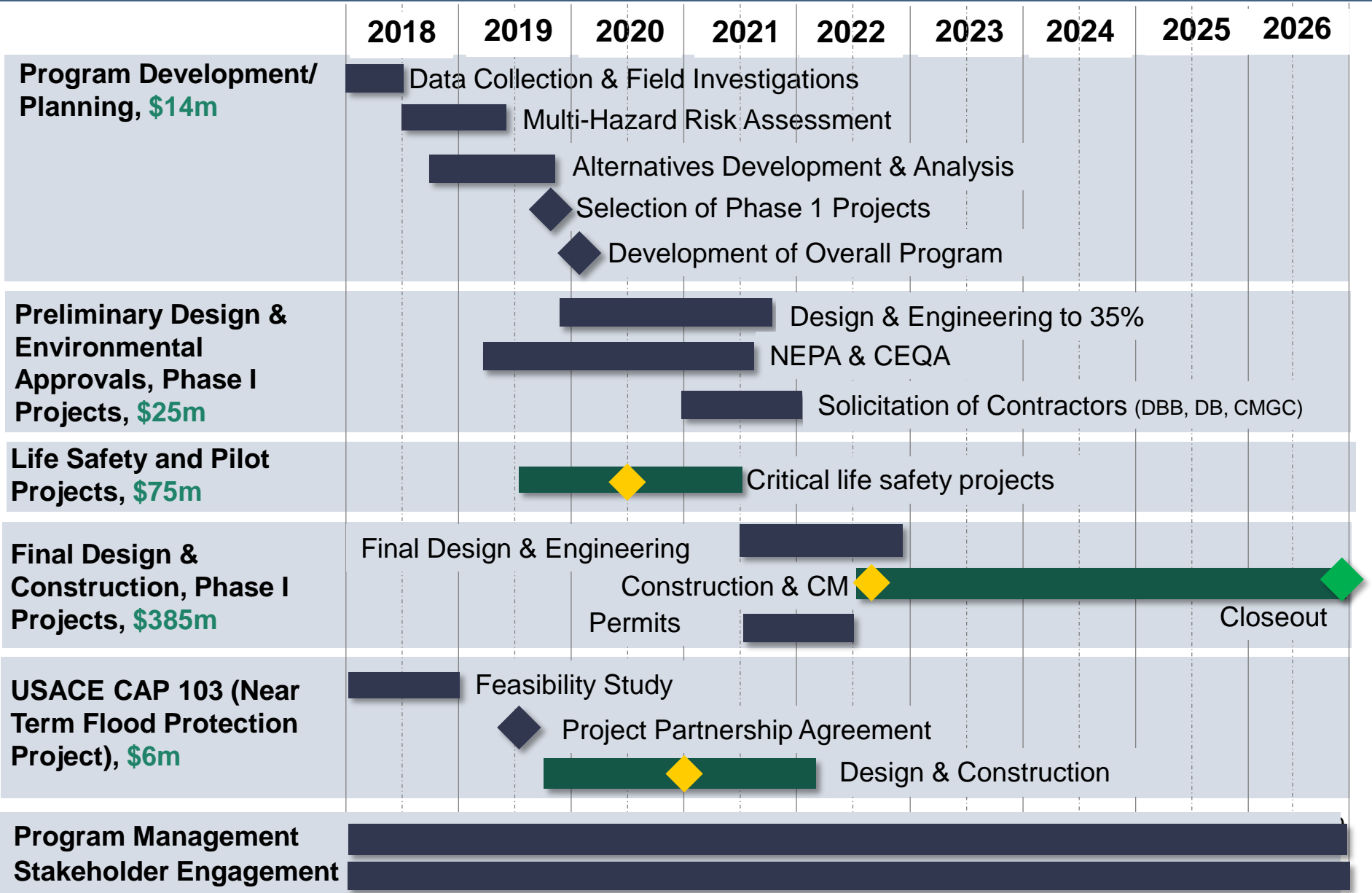
ELIGIBLE PROGRAM COSTS AND PROJECTS

Address the most significant seismic and near-term flood risks to the most critical assets.



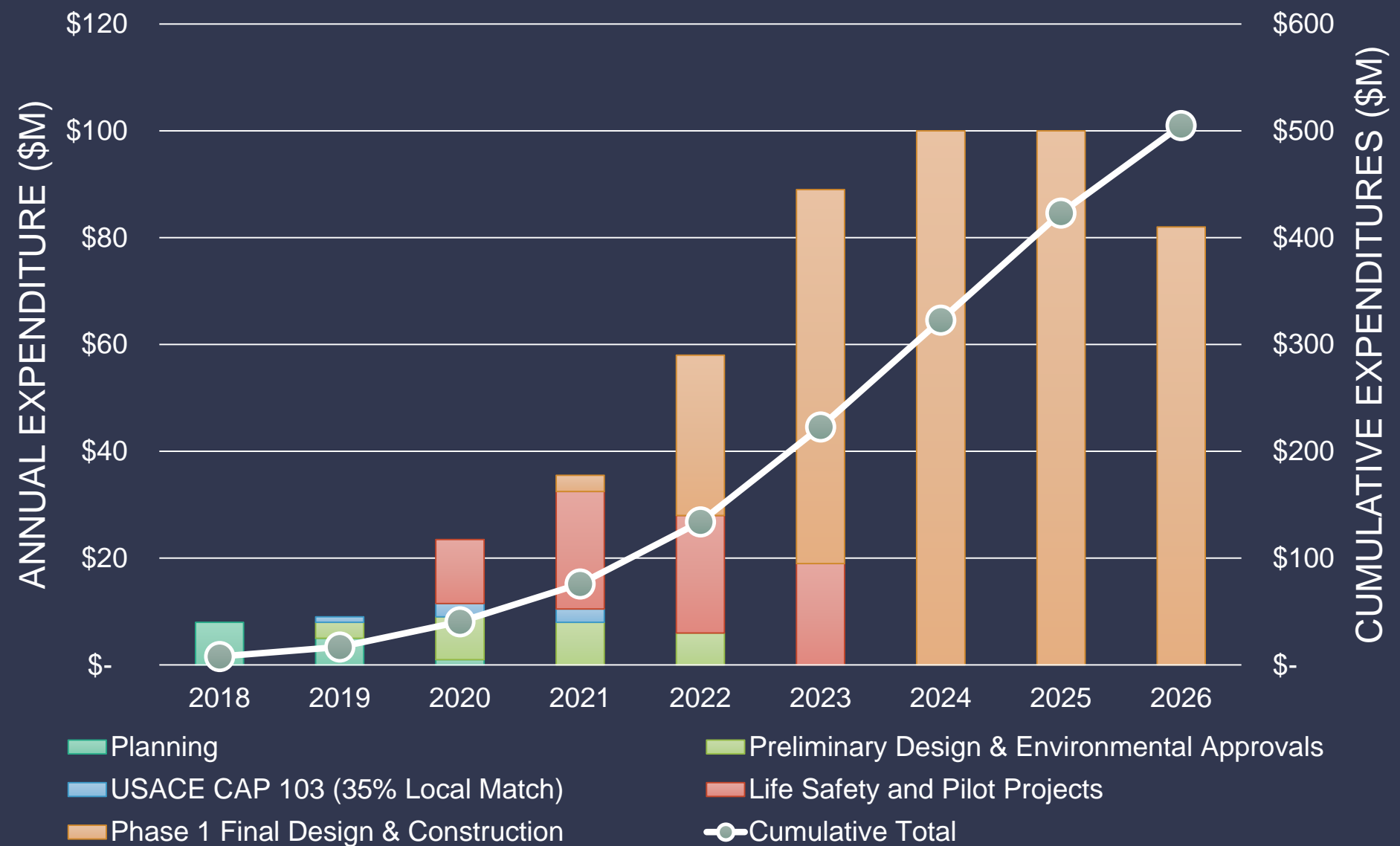
Estimated design/construction costs for seismic and near term flood control improvements = **\$575 million per mile**

PHASE I DETAILED SCHEDULE

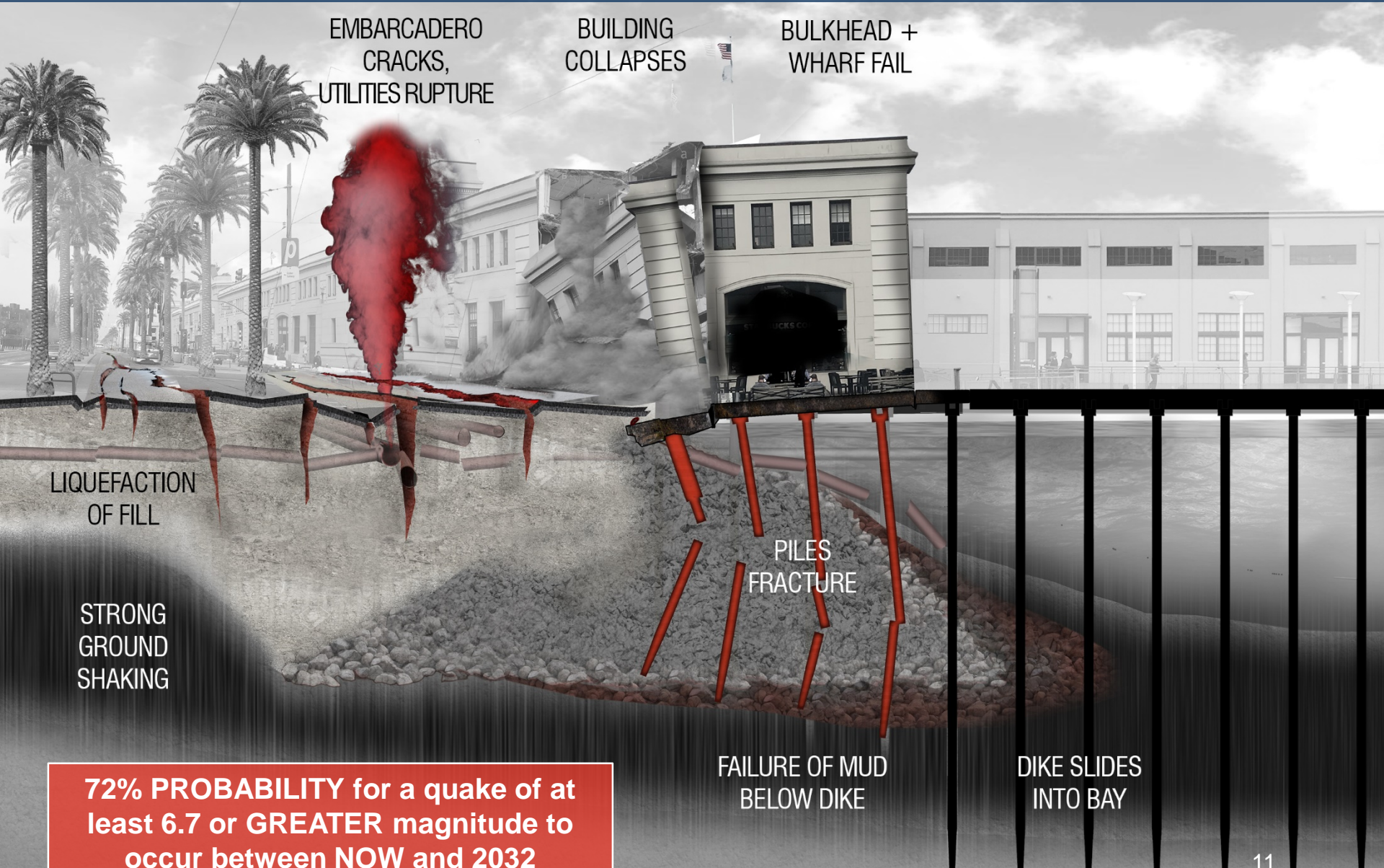


PROGRAM BUDGET AND SCHEDULE

Estimated Expenditures



CRITICAL RISK: EARTHQUAKE SAFETY



Current Condition



CRITICAL RISK: CURRENT AND FUTURE FLOODING

- Seawall supports the Embarcadero and provides flood protection
- Existing Embarcadero closures during king tide
- Muni and BART tunnels subject to flood risk
- CCSF sea level rise guidance:

SLR Risk



12"-24" by 2050
36"-66" by 2100

SAMPLE EVALUATION CRITERIA

Life Safety

Emergency Response

Implementation
Timeframe

Risk Avoided

Community and
Social Benefits

Environmental
Benefits

Minimize Disruption and Construction Impacts

EARTHQUAKE RETROFIT CONCEPTS

OPTION 1 GROUND IMPROVEMENT



OPTION 2 GROUND IMPROVEMENT UNDER SEAWALL



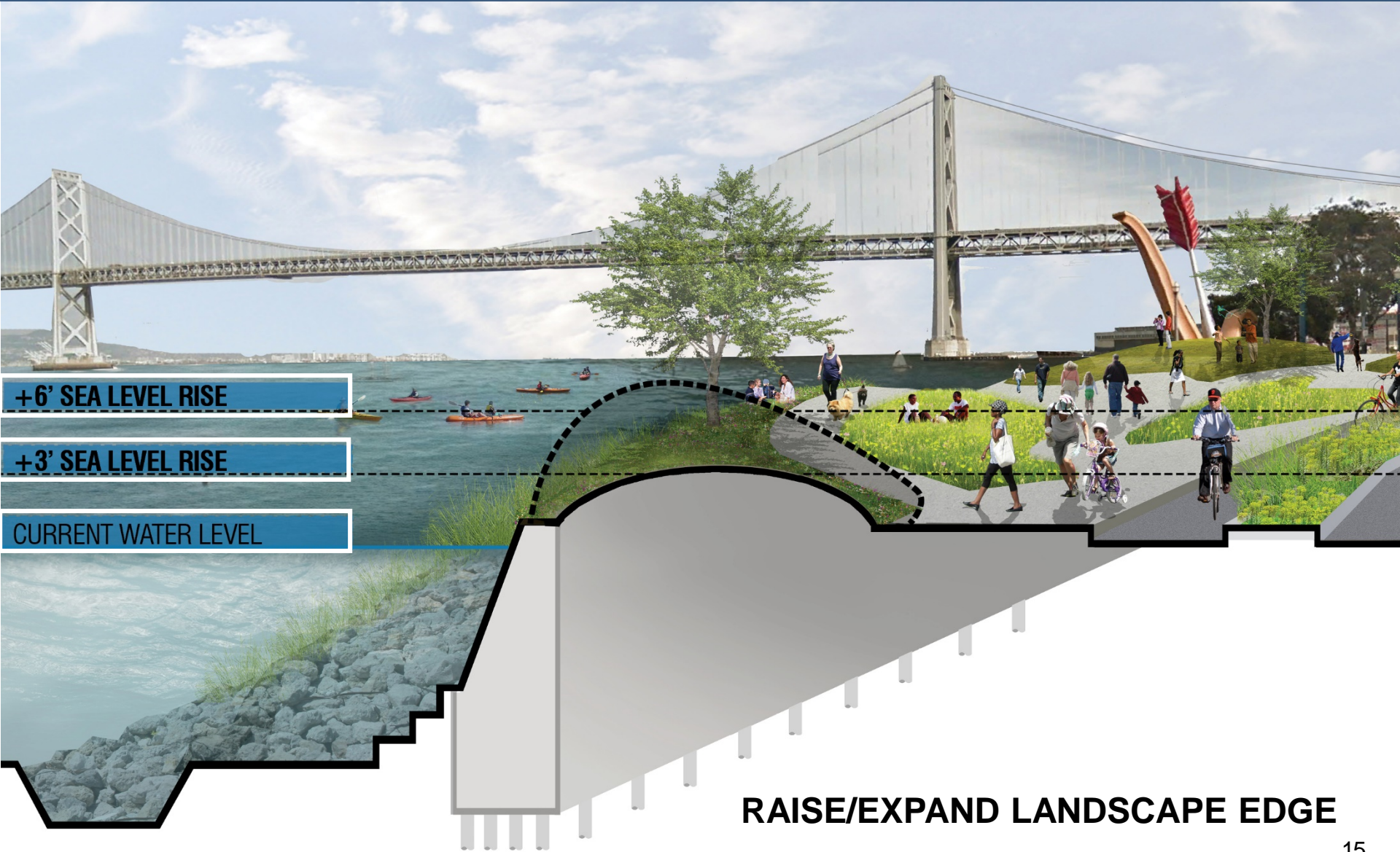
OPTION 3 BULKHEAD REPLACEMENT



OPTION 4 NEW BAYWARD SEAWALL

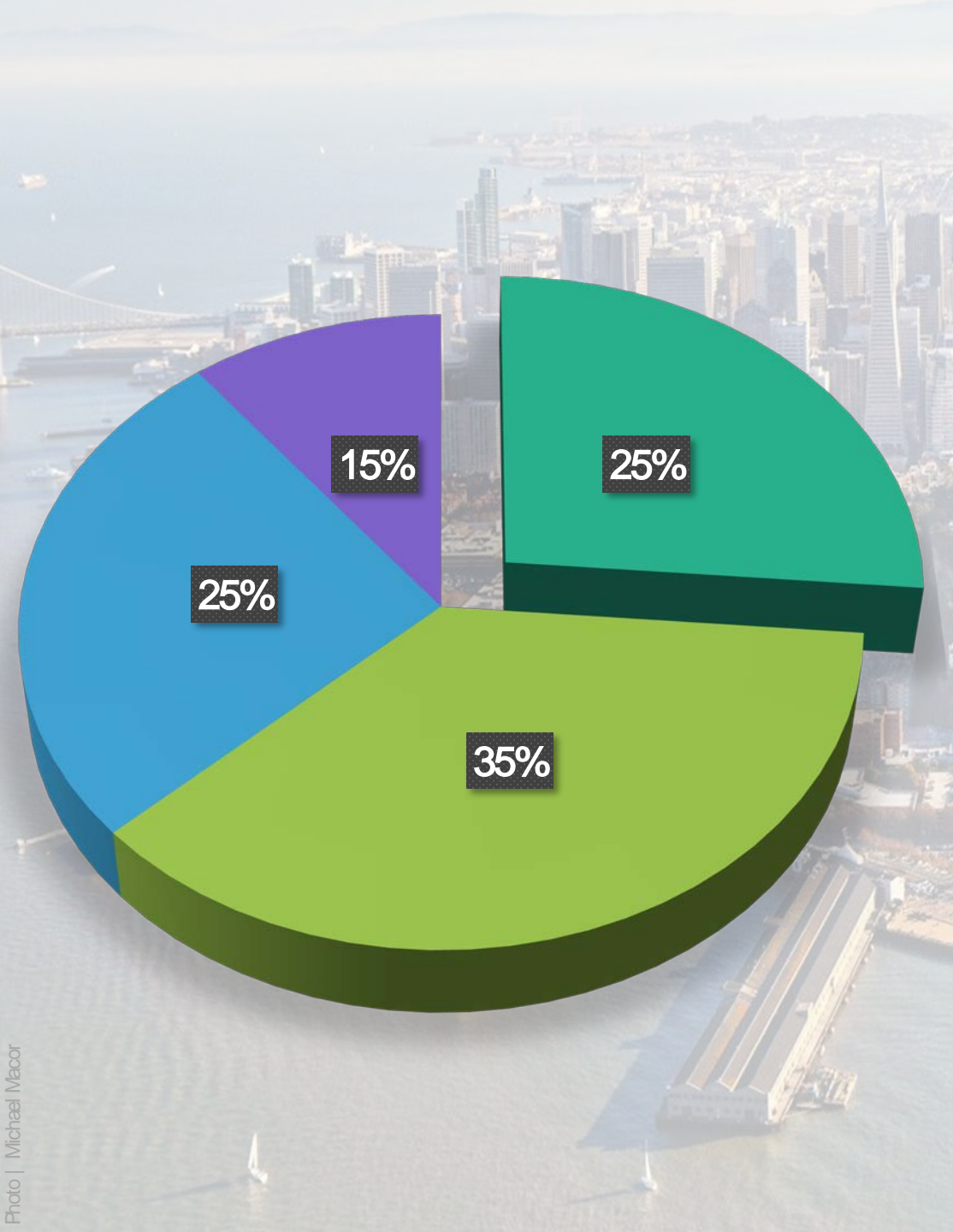


POTENTIAL SEA LEVEL RISE SOLUTIONS



Desired Program Funding by Source

- City GO Bond Program (residential and commercial taxpayers)
- Federal (Water Resources, Transportation)
- State (Cap and Trade, State Share of Tax Increment)
- Private (waterfront development projects and businesses)



GENERAL TIMELINE

Capital Planning Committee (informational) – March 5, 2018

Port Commission – April 10, 2018

Capital Planning Committee (approval) – April 16, 2018

Board of Supervisors – May 2018

CCSF General Election – November 6, 2018

QUESTIONS?

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