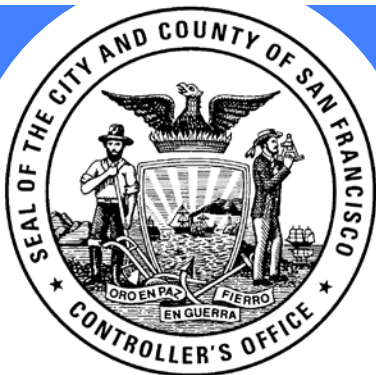


# Seawall General Obligation Bond:

## Economic Impact Report



**CITY & COUNTY OF SAN FRANCISCO**

Office of the Controller

Office of Economic Analysis

Item #180454

06.06.2018

- The proposed legislation concerns a proposed \$425 million General Obligation bond for repair and reconstruction of the Embarcadero seawall along San Francisco's northeastern waterfront.
- If approved, the measure would be placed on the November, 2018 ballot. Local General Obligation bonds in California require voter approval, with a two-thirds majority.
- The seawall, which protects downtown San Francisco from the Bay, is vulnerable to an earthquake, and also to increased flooding risk due to sea-level rise.
- The bond would require a property tax increase of approximately \$13.23 per \$100,000 of assessed value, per year, for 24 years.
- The Office of Economic Analysis (OEA) has prepared this report after determining that the proposed infrastructure spending and tax increase might have a material impact on the City's economy.

# The JV Economic Impact Study

- In 2016, the Port of San Francisco released a study on the seismic vulnerability of the seawall, by a joint venture of two engineering firms (“the JV study”). It included an economic estimate of the impacts of large earthquakes on the Port and the city’s waterfront.
- The study estimated the economic activity in Port property adjacent to the seawall from AT&T Park to Aquatic Park, to be \$2 billion in annual spending.
- The study further estimated the economic loss associated with a two potential earthquakes. Total economic loss on Port properties from the former earthquake was estimated at \$1.2 billion, and \$3.2 billion from the latter; both assumed a 12-month loss of business operations.
- The report did not consider damage associated with other potential earthquakes, or present an annualized benefit from the proposed mitigation. However, the economic impact was used, along with other considerations, to rank priority areas of the seawall.

# The Economic Value-At-Risk Study

- After the JV study, in 2017 the Port released a report by BAE Urban Economics (the “Value-at-Risk study”) that estimated the property value and economic activity that would be at risk from one earthquake scenario, and two scenarios combining sea-level rise with severe floods.
- The report found that the earthquake scenario risked damage to \$17.4 billion in property, \$6.3 billion (annually) in business interruption losses, and \$902 million in taxes. The report found \$9.8 in value-at-risk relative to the full cost of seawall replacement, with higher ratios for the sea-level rise/flood scenarios.
- Two reasons for the difference in damage impacts between the two studies is that the Value-at-Risk study considered both Port-owned and privately-owned property, and reported only the value of the property and potential business loss, not an estimate of losses during an actual event.

- The Office of Economic Analysis is required to estimate the economic impact of any new legislation that would have a significant impact on the city's economy. In this case, this involves determining if the economic benefits of the project exceed the cost of the property tax required to pay for it, viewed from the perspective of the city's economy as a whole.
- Thus, while this report draws on material from the JV report and the Value-at-Risk study, it attempts to answer a different question.
- Of course, the Port's reports make clear that there are additional benefits from seawall remediation that cannot be quantified in the context of this report, including protecting critical utility and transportation infrastructure, historic resources, and emergency access.
- Additionally, even the narrow question of economic impact is unusually challenging to estimate because the details of the expenditure plan are not yet known, so certain simplifying assumptions will be made for this analysis.

- Overall, disaster remediation is economically beneficial to the extent that it prevents emergency costs and a large rebuilding commitment in the future, by making a smaller investment in the near term. The net economic benefit grows with the likelihood of a disaster, its potential damage to the economy, and the cost-effectiveness of the mitigation.
- The proposed legislation involves both positive and negative effects on the San Francisco economy. The positive economic effects of the seawall that are considered in this report include:
  - Prevention of future property damage, business interruption, and reconstruction costs.
  - Immediate benefits of spending on rehabilitation of the seawall.
- The primary negative economic effect is the property tax increase to fund the rehabilitation and debt service, along with the cost of disruption to businesses during construction.

# Estimating Potential Earthquake Damage

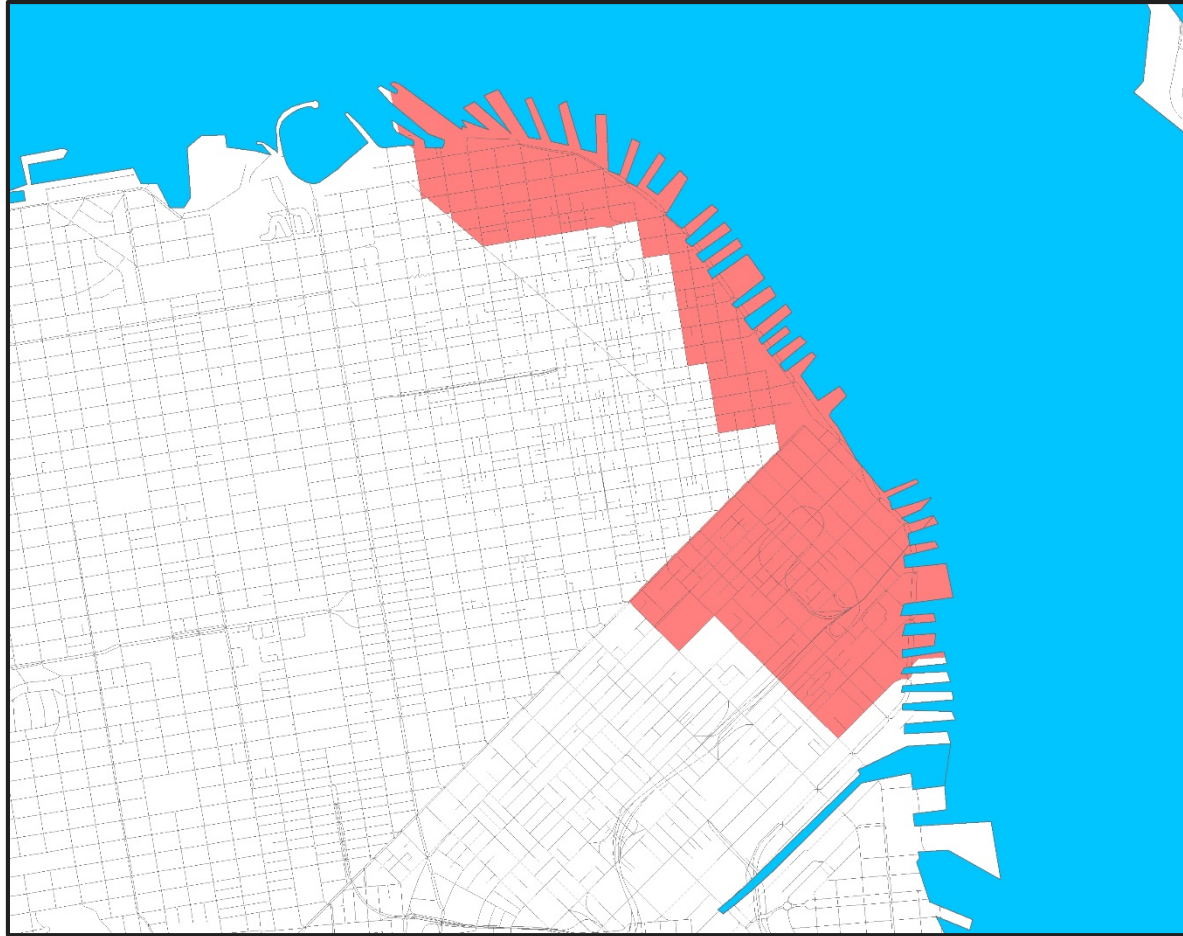
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- As discussed earlier, the JV study included an assessment of the potential damage to Port properties associated with two potential earthquakes: one likely to occur every 275 years, and one likely to occur every 975 years.
- To get an estimate of the likely damage associated with *all* potential earthquakes, weighted by their likelihood of happening, the OEA used the HAZUS hazard modelling tool, developed by the Federal Emergency Management Agency (FEMA).
- HAZUS combines economic and seismic data for an area, to allow users to simulate the economic, social, and physical losses associated with an earthquake having a specific probability.
- By simulating different earthquakes, and weighting their damage by their likelihood of occurring in any given year, it is possible to create an overall annualized estimate of earthquake damage and economic losses\*.

\* FEMA has used this approach in its publication, *Hazus Estimated Annualized Earthquake Losses for the United States*, April 2017.  
<https://www.fema.gov/media-library/assets/documents/132305>

# Area Analyzed in the HAZUS Damage Estimate

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We performed the analysis at the smallest scale that HAZUS allows – 3 Census tracts adjacent to the Seawall in downtown San Francisco.

The area is somewhat larger than the area considered in the JV study, and also excludes a small area of the southern seawall.

Additionally, the base version of HAZUS provided by FEMA would not include detailed information about the seawall's condition, and may underestimate damage in the area as a result.



# Results of the HAZUS Analysis

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Earthquake Return Period	Chance of Occurring Each Year	Loss to Residential Structures (\$M)	Loss to Non-Residential Structures (\$M)	Loss to Business Sales and Wages (\$M)
100 year	1%	\$95.4	\$394.7	\$118.8
250 year	0.4%	\$197.5	\$919.6	\$280.6
500 year	0.2%	\$286.1	\$1,435.7	\$417.7
750 year	0.13%	\$345.6	\$1,797.8	\$510.2
1,000 year	0.1%	\$392.8	\$2,076.4	\$572.7
1,500 year	0.07%	\$460.6	\$2,480.9	\$659.1
2,000 year	0.05%	\$522.0	\$2,851.5	\$738.8
2,500 year	0.04%	\$580.6	\$3,213.5	\$815.7

The estimated losses above only refer to the area in red in the map on the previous page; losses in other parts of the city are not included, because they were assumed to be unaffected by the seawall project. Full details on the methodology to calculate the annualized damage can be found in the FEMA study cited on page 7.

- The HAZUS simulations result in a probability-weighted estimate of earthquake damage in those areas of downtown San Francisco that are adjacent to the seawall.
- For the purposes of this report, we assume that this damage would be fully mitigated by a complete seawall replacement, which is estimated to cost \$2.5 billion. The proposed \$425 million bond measure represents 17% of this total cost, and we assume that 17% of the total damage would be reduced by the proposed measure.
- The quantifiable damage reduction includes reduced repair costs for structures, and reduced losses in business activity. The present value of these savings, discounted at a 3% discount rate, were added to the REMI simulation of the economic impact of the tax and spending, as described on the next page.
- Other short-term disaster costs which would likely be reduced by the project, including casualties and emergency response costs, debris removal, and any loss of essential facilities, are not accounted for.

- The present value of the savings in capital and business costs from the seawall was modelled in the REMI model, along with the costs of the property tax to residents and property owners, and the benefits of construction-related spending, which are detailed below.
- According to the Office of Public Finance, the \$425 million bond will require \$730.4 million in debt service payments over a 24-year borrowing period, under conservative assumptions about interest rate risk. Based on current assessments, annual property taxes payments would rise by approximately \$13.23 per \$100,000 of assessed value. Under the City's Rent Ordinance, owners of rent-controlled apartments may pass-through 50% of any property tax increase to tenants.
- The specific projects funded by the bond will not be known until CEQA analysis is completed. For the purposes of this report, based on analysis by the Budget and Legislative Analyst, we estimate 80% of the proceeds will be spent on construction, 18% on professional services, and 3% on Port staff costs.

- The HAZUS and REMI simulations suggest the proposed project will have a moderately positive economic impact, creating 145 jobs and raising city GDP by \$19 million, on average over the 24-year financing plan.
- This estimate does not include the benefits of any long-term reduction in damage from sea-level rise, which cannot be estimated in HAZUS. It should therefore be considered as a conservative estimate.
- Additionally, several aspects of the project cannot be known at this time. This estimate is sensitive to three assumptions in particular:
  - the extent to which HAZUS damage estimates reflect the current structural condition of the seawall.
  - the extent to which the proposed project will prevent earthquake damage in downtown areas adjacent to the seawall.
  - the bond interest rate, which would determine how much of the property tax payment would be re-circulated in the local economy as construction spending.

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