

City of Emeryville – AB 691 Sea-Level Rise Assessment on State Grant Lands

A. AB691 and Summary of Emeryville’s Response

AB 691 requires local trustees of legislatively granted public trust lands whose annual revenue averages over \$250,000 to assess how to address sea-level rise. Emeryville’s public trust grant is located between Emeryville Marina and Emery Cove Yacht Harbor, as shown in Figure 1. Annual rents for the marina and restaurant in the granted lands averaged \$567,088 per year for 2014-2018, as shown in Table 1.

Table 1. City of Emeryville – Rental Income –
Emeryville Marina and Hong Kong East Ocean Restaurant

	2014	2015	2016	2017	2018
Marina	301,878	316,639	340,862	350,816	338,202
Restaurant	208,325	231,299	256,761	242,901	247,757
Total	510,203	547,938	597,623	593,717	585,959

This report aims to address the four AB 691 assessment criteria:

1. Assessment of impacts of sea-level rise
2. Maps of 2050 and 2100 impacts (2030 impacts are not mapped)
3. Estimate of financial costs of sea-level rise
4. Description of how trustee proposes to protect and preserve resources and structures

1. Assessment of impacts of sea-level rise

a. Vulnerable natural and built “manmade” resources and facilities.

The natural resources are the Marina portion of the Emeryville peninsula and the Bay lands within the grant. The City does not expect significant effects on natural systems in the Bay in the granted lands.

b. Impacts and recommendations in Ocean Protection Council’s Sea-Level Rise Guidance.

The 2018 Guidance document recommends using the 50% probability projected sea-level rise for all assets except for long-term critical regional assets. In this report, the City has used 50% probability projection. For San Francisco Bay, this is 12 inches by 2050 and 24 inches by 2100.

c. Impacts of storms and extreme events.

In this report, the City assessed the impacts of 2050 and 2100 sea-level rise with a 100-year storm. For 2050, this is 52 inches. For 2100 it is 66 inches.

d. Changing shorelines.

In this report, the City used the San Francisco Bay Conservation and Development Commission's Adapting to Rising Tides maps, which consider changing shorelines. There are no cliffs or beaches in the City's grant lands; therefore, the shoreline is not expected to change much, other than sea-level rise.

e. Trends in relative local sea level.

We do not expect noticeable changes in relative local sea level. Noticeable changes in land elevation are not expected here.

f. Impacts to public trust resources and values, including public access, commerce, recreation, coastal habitats, and navigability.

We assessed impacts on roads, paths, and docks (access) a restaurant (commerce), and a park (recreation). We do not expect significant impacts to coastal habitats or navigability during this century in the grant lands.

g. Prioritize vulnerabilities to be addressed.

In Table 2 on page 6, the City prioritizes vulnerabilities to be addressed by when and how often they are expected to occur.

2. Maps of 2040 and 2100 impacts

a. FEMA flood hazard maps

We did not choose this option.

b. Online mapping tool resources.

In this report, the City used the San Francisco Bay Conservation and Development Commission's Adapting to Rising Tides maps of sea-level rise alone and with 100-year storm for 2050 and 2100. Please see Figures 2-5 on pages 8-11.

3. Estimate of financial costs of sea-level rise

a. Replacement or repair costs of resources and facilities that could be impacted

Replacement or repair costs of facilities would be the same as the cost of adaptation measures, because both involve relocation or waterproofing. These costs are shown in Table 2.

b. Non-market values of public trust resources that could be impacted

Recreational value of Marina Park is described in Section B.4 on page 6 regarding Year 2100 sea-level rise with 100-year storm.

c. Costs of 2050 and 2100 sea-level rise projection with a 100-year storm

Costs of preparing for or responding to sea-level rise with a 100-year storm are shown in Table 2.

d. Anticipated costs of adaptation measures and benefits of such strategies and structures

The cost of preparing for sea-level rise and 100-year storms is shown in Table 2.

4. How trustee proposes to protect and preserve resources and structures

a. Proposed mitigation/adaptation measures, and how vulnerabilities will be addressed

Proposed mitigation and adaptation measures are described in Section B, starting on page 4.

b. Timeframe of implementation of such measures

Timeframes for implementation of adaptation measures are shown in Table 2 on page 5.

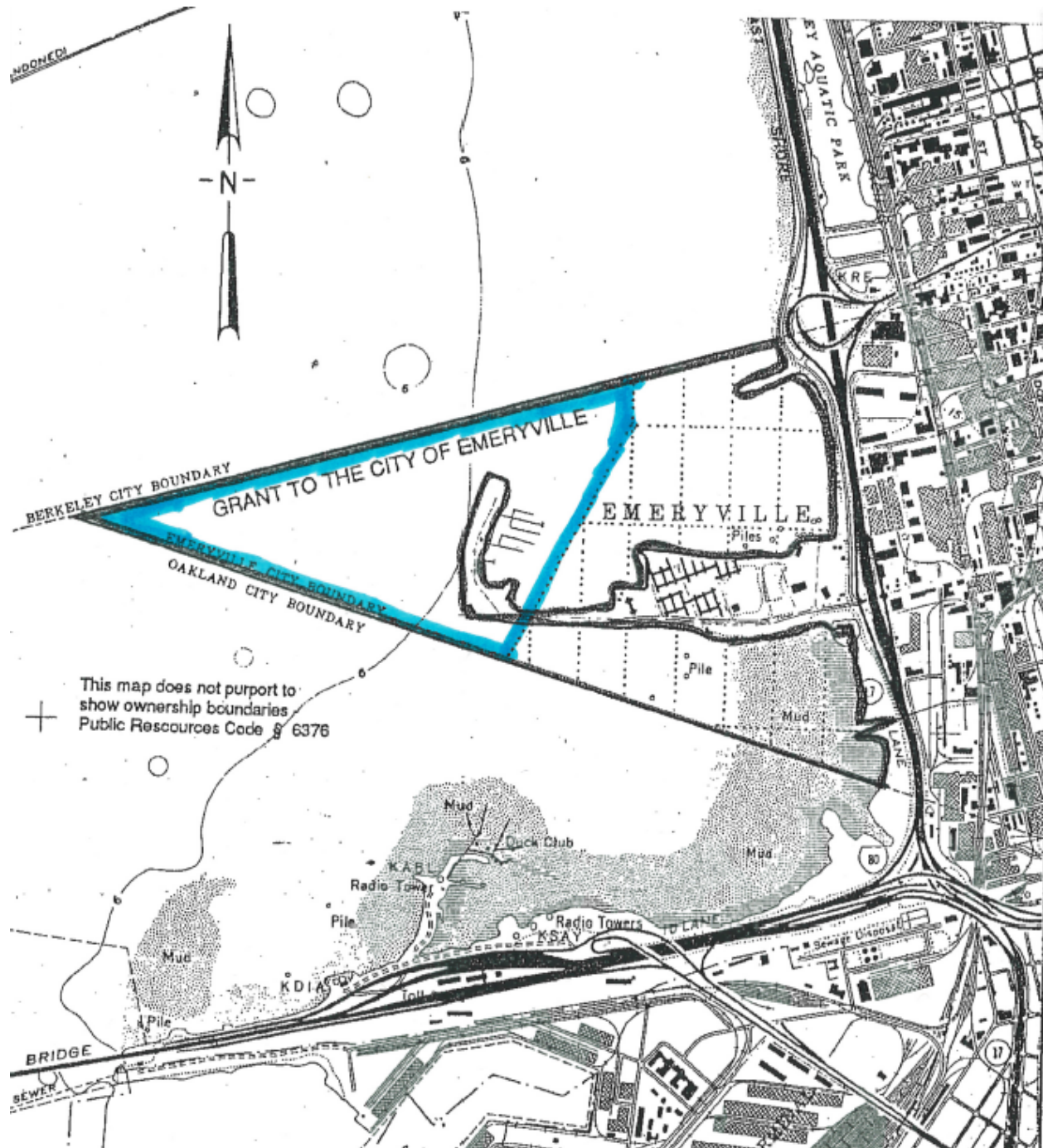
c. Plans to monitor impacts of sea-level rise and climate change and effectiveness of measures

Sea-level rise is addressed in Emeryville's Local Hazard Mitigation Plan (2017). The LHMP includes a section on plan review, evaluation and implementation. The LHMP will be monitored, evaluated, and updated every 5 years. The next General Plan (circa 2030-2050) is also anticipated to address sea-level rise in more detail than the current General Plan. General Plan implementation is monitored each year when the General Plan Annual Progress Report is prepared.

d. Regional partnerships the trustee is party to or intending to form

The City works with the San Francisco Bay Conservation and Development Commission's Adapting to Rising Tides program.

Figure 1. Map of Public Trust Grant to the City of Emeryville



Source: State Lands Commission, 2019

B. Potential Impacts, Adaptation Strategies, and Cost of Strategies

Figures 2-5 at the end of this section depict 50% probability projections of sea-level rise and flooding from a 100-year storm. The yellow line means no overtopping, the red line means 0-1-foot overtopping, and the light blue means 0-2-foot flooding.

1. 2050 Sea-level rise, 50% probability - 12 inches

We see slight overtopping on the east shore between the Marina rest room and the Marina office. However, there is no light blue flooding inland of the land, so the impact on lawns and trees would be negligible from sea-level rise alone in the first half of the century. Sea-level rise will bring the docks closer to land elevation, reducing the angle of the ramps to the slips.

About 200 feet of the trail could be flooded just south of the park restroom. It could be relocated a few feet up for about \$100,000.

2. 2100 Sea-level rise, 50% probability - 24 inches

By end of century, with sea-level rise alone, the Marina office could be inundated. It will likely need to be rebuilt by then anyway, and the City can rebuild it closer to Powell Street – there would be no additional cost due to sea-level rise. Water covering some of the parking would not be a problem, because a restaurant and an office building were approved on the parking and not built. One tree could be inundated near the Marina restroom; it would need to be removed. Sea-level rise will bring the docks up to land elevation making the ramps to the slips approximately level.

The path south of the Marina rest room, where it runs near the shore, is likely to be covered and could be moved closer to Powell Street along with the Marina office. That segment minus the segment described under 2050 would be about 1,000 feet. That could cost up to \$500,000.

3. 2050 Sea-level rise with 100-year storm - 52 inches

By mid-century, a big storm could cause temporary flooding of the north end of the restaurant, parking for the restaurant and the Marina, the lawn north of the restaurant, about 300 feet of Powell Street, the boat ramp, the trail from the Marina restroom south, and some trees, picnic tables, benches, trash bins and lights. The docks could rise to about 2 feet higher than the adjacent shore. The ramp angle to the slips would then be about the same as it is now, going up from shore rather than down.

Water on Powell Street could be pumped toward the boat ramp parking lot to restore access to the Marina. Park users would not be able to use the lawn north of the restaurant, the two picnic tables just south of the Marina office, or the trail on the east side until flood waters recede; however, most of the park would be useable.

Sandbags could protect the restaurant. The lawn and pavement probably would not be damaged. When furnishings are replaced, they should be waterproof; that will add about \$25,000 to their cost. For streetlights, the City will need to stabilize the bases and waterproof the junction boxes, which will cost about \$100,000.

Trees could be flooded with saline water in the restaurant parking lot, in the meadow north of it, and along the east shore. Rinsing with fresh water after the flood could help them recover. As trees are replaced, species that can tolerate saline water should be planted.

4. 2100 Sea-level rise with 100-year storm- 66 inches

By end of century, a 100-year storm could cause temporary flooding of the entire restaurant, half of the part of Powell Street in the area and fields and parking next to it, the boat ramp parking and the lights there, the east shore from the windsurf ramp south, more lawns and furnishings, and the west shore from the park parking south. Additional trees would be flooded along Powell Street south of the park restroom and in the boat ramp parking lot. Again, rinsing them with fresh water could help them recover, and as trees are replaced, salt tolerant species should be used. The Marina docks would rise to about 3.5 feet higher than the land. The ramps can be made to adjust to this change.

Recreational value of Marina Park is estimated at \$770,000 per year, based on City observations of park use and values based on research by Economic and Planning Systems for East Bay Regional Parks District in 2017¹. Storm flooding of park access and half of the park, as would occur with 2100 sea-level rise and 100-year storm, would cause a loss of recreational value of about \$2,000 a day.

Flooding could affect the sanitary sewer pump station and manholes. The City will need to seal the manholes and upgrade the pump station to seal it from surface flows, building a berm around the pump station; that could cost about \$500,000 dollars.

The City could conduct a feasibility analysis of replacing the restaurant at a higher level with waterproof construction, compared to projected future revenue of the facility. The

¹ Economic & Planning Systems, Inc. for East Bay Regional Parks District, *Quantifying Our Quality of Life: An Economic Analysis of the East Bay's Unique Environment*, 2017, page 37.

current estimate to replace the 10,000-square-foot restaurant with a waterproof facility at a higher elevation is approximately \$4,000,000. A feasibility analysis would need to consider whether a new facility would continue to be threatened by sea-level rise and storms in the next century at its new level.

Alternatively, the City could create a beach made of gravel and mixed sand to protect the riprap, restaurant, parking, park fields, trees, lights, and benches from overtopping. A beach consisting of a sand beach face, sand berm, and gravel storm berm could dissipate wave energy, reduce erosion, and protect the riprap and the infrastructure it protects. This could cost about \$4,000,000. The Adaptation Atlas by San Francisco Estuary Institute and SPUR maps the west and south shorelines of the Emeryville Marina area as suitable for beach creation.²

5. Summary of Estimated Costs

Table 2 lists estimated costs of adaptation.

Table 2. Estimated Adaptation Costs

Trail relocation (200 feet) - by 2050 for sea-level rise	\$100,000
Trail relocation (1,000 feet) - by 2050 for storm, 2100 for sea-level rise	\$500,000
Streetlight stabilizing and waterproofing - by 2050 for storm	\$100,000
Waterproof furnishings - by 2050 for storm	\$25,000
Sanitary sewer sealing (manholes, pump station) - by 2100 for storm	\$500,000
Create beach OR Rebuild, raise and waterproof restaurant - by 2100 for storm	\$4,000,000
Total	\$5,225,000

² San Francisco Estuary Institute and SPUR, *San Francisco Bay Shoreline Adaptation Atlas: Working with Nature to Plan for Sea-Level Rise Using Operational Landscape Units*, April 2019, pages 74 and 150.

Figure 2. 2050 Sea-Level Rise, 50% Probability - 12 Inches



Source: San Francisco Bay Conservation and Development Commission – Adapting to Rising Tides

Figure 3. 2100 Sea-Level Rise, 50% Probability - 24 Inches



Source: San Francisco Bay Conservation and Development Commission – Adapting to Rising Tides

Figure 4. 2050 Sea-Level Rise with 100-Year Storm - 52 Inches



Source: San Francisco Bay Conservation and Development Commission – Adapting to Rising Tides

Figure 3. 2100 Sea-Level Rise with 100-Year Storm- 66 Inches



Source: San Francisco Bay Conservation and Development Commission – Adapting to Rising Tides