

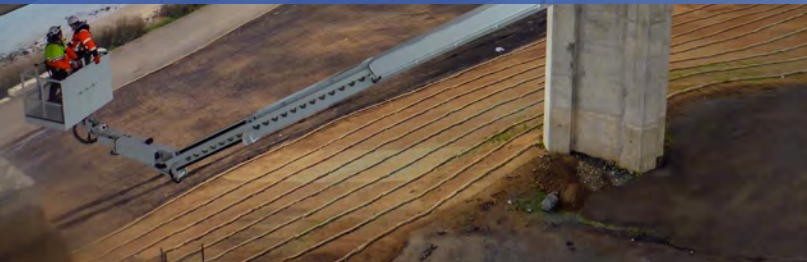


# PLAN BAY AREA 2050 AND SEA LEVEL RISE ADAPTATION:

HOW IS MTC/ABAG INTEGRATING  
THIS CRITICAL ISSUE INTO THE NEXT-  
GENERATION REGIONAL PLAN?

**SEPTEMBER 2020**

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PLAN BAY AREA 2050



# PLAN BAY AREA 2050 AND SEA LEVEL RISE ADAPTATION: HOW IS MTC/ABAG INTEGRATING THIS CRITICAL ISSUE INTO THE NEXT-GENERATION REGIONAL PLAN?

## CONTEXT

Plan Bay Area is a long range plan for the nine-county Bay Area, outlining a vision for growth and infrastructure in the decades ahead. The Plan is updated every four years, with the latest version – a major update known as Plan Bay Area 2050 – slated for adoption by the Metropolitan Transportation Commission and the Association of Bay Area Governments (MTC/ABAG) in 2021. As defined by the Final Blueprint approved in fall 2020, Plan Bay Area 2050 will include a set of strategies that advance a regional vision to make the Bay Area more affordable, connected, diverse, healthy, and vibrant for all. Each strategy is a public policy or set of capital investments that can be implemented on the local, regional, and/or state levels over the next 30 years.

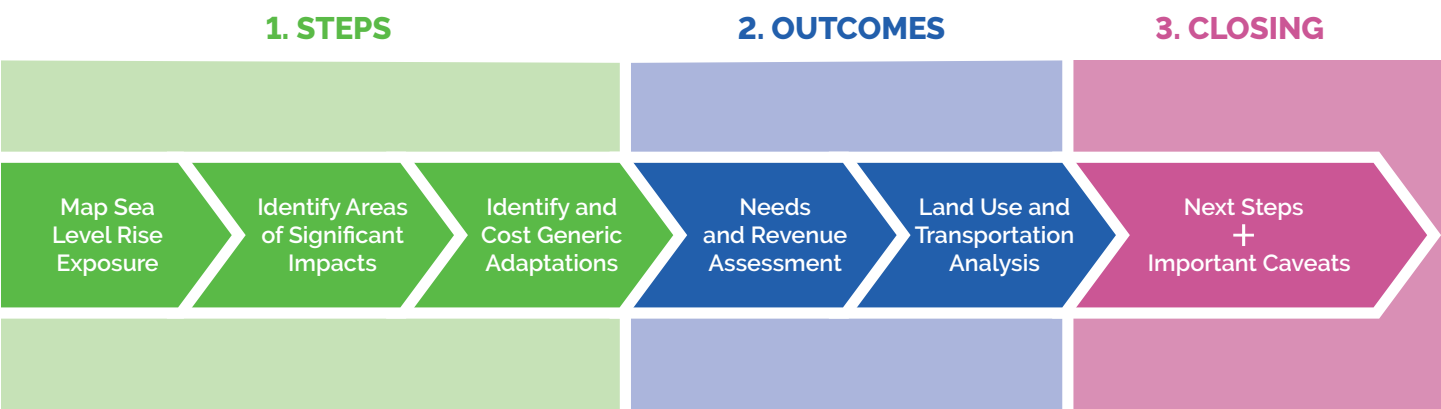
The Environment Element of the Plan focuses on three specific issue areas - climate & hazard resilience, climate mitigation, and conservation. This brief focuses on one of the key environmental strategies, Adapt to Sea Level Rise, which has been integrated to ensure that the region recognizes and addresses future shoreline flooding challenges.

## INTEGRATING SEA LEVEL RISE INTO THE PLAN BAY AREA 2050

While previous iterations of Plan Bay Area acknowledged the risks associated with sea level rise, Plan Bay Area 2050 has integrated this issue area directly into the Plan itself with a built-in strategy to protect communities and infrastructure from rising tides.

To do so, staff identified areas with near-term sea level rise exposure, identified and estimated costs for generic adaptation options where permanent inundation occurred, and used the elements of the analysis to inform the land use and transportation analysis as well as the Needs and Revenue Assessment. Figure 1 provides a high level outline of the different steps used to integrate sea level rise into the Plan – the figure also acts as a guide to this document structure.

Figure 1. Steps and Outcomes to Integrate Sea Level Rise into Plan Bay Area 2050



## MAP SEA LEVEL RISE EXPOSURE

Two different water levels informed elements of the sea level rise methodology, 2 feet and 3 feet. For planning purposes, two feet of permanent inundation was assumed by year 2050<sup>1</sup> and was used to model the effects of sea level rise on land use and transportation. However, annual storm and king tide events may add an additional foot of temporary inundation, for up to 3 feet of inundation risk. Staff assumed 3 feet of inundation to determine where proactive adaptation actions were needed most to inform the financial need for future adaptation. Sea Level Rise exposure was assessed using BCD's Adapting to Rising Tides Bay Shoreline Flood Explorer, and NOAA's Coastal Flood Exposure Mapper for coastal impacts.

## IDENTIFY AREAS OF SIGNIFICANT INUNDATION

Staff used a range of regional data sets as well as parcel level data to determine the magnitude of impacts across the region. The following data was used to identify areas of regional significance:

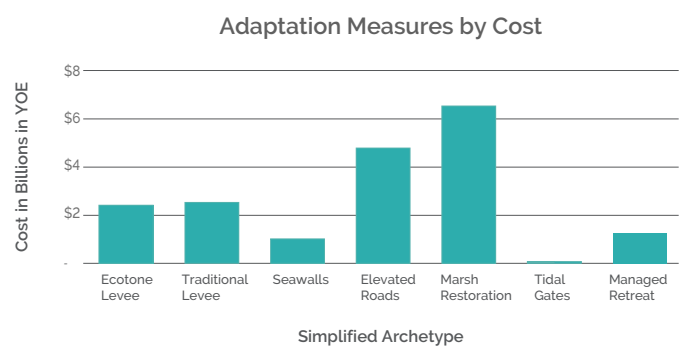
- Priority Development Areas
- Transit Rich Areas and High Resource Areas (areas eligible for future PDA nominations)
- Socially vulnerable communities (census tracts with high percentages of residents who are less able to prepare for, respond to, and recover from a flood event)
- Transportation corridors with significant volumes
- High population areas
- High employment areas

Wherever flooding met minimum thresholds, the affected area was flagged, marking where shoreline overtopping caused inundation (for marshes, polygons were drawn around flooded areas). Additional areas with known planning efforts were flagged individually. The goal was not to try to address all inundation areas, but rather identify areas with high levels of regional vulnerability. Some areas with inundation were left unaddressed to account for alternative scenarios, including areas that may adapt on a longer timeline, or communities that may pursue managed retreat.

## IDENTIFY AND COST GENERIC ADAPTATIONS

To develop the cost assumption for the Needs and Revenue Assessment, generic archetype adaptations were assumed for different segments of impacted shoreline. Archetypes spanned both green and grey strategies, including a variety of levee types, seawalls, elevated roadways, marsh restoration, and tidal gates. When choosing an archetype adaptation for a segment of impacted shoreline staff used various methods. If staff was aware of a current, well-defined strategy, then it was associated with that archetype category – for example, the SFO airport seawall is represented as a type of seawall. Where no current strategy existed, staff consulted a series of resources, including the Adaptation Atlas, EcoAtlas, the CHARG Sea Level Rise Resiliency Map, and subject matter expert guidance. In some cases, high level regional assumptions were made, particularly when the suggestion did not fit an archetype, or if there was no suggestion from consulted resources. In the case where there was no suggestion, natural solutions, such as marsh restoration and ecotone levees, were assumed wherever possible. Some communities that did not meet specific thresholds were assumed to be good candidates for a managed retreat program, which may offer a subsidy to those in at-risk housing. Ultimately, the archetypes were used to develop a high level cost estimate for near-term sea level rise adaptation within the region.

Figure 2. Adaptation Measure Costs by Archetype



1. The State of California Sea-Level Rise Guidance 2018 Update projects a 1-in-200 chance of exceeding 1.9' by the year 2050, characterizing this projection as a medium-high risk adverse choice. [http://www.opc.ca.gov/webmaster/ftp/pdf/agenda\\_items/20180314/Item3\\_Exhibit-A\\_OPC\\_SLR\\_Guidance-rd3.pdf](http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf)

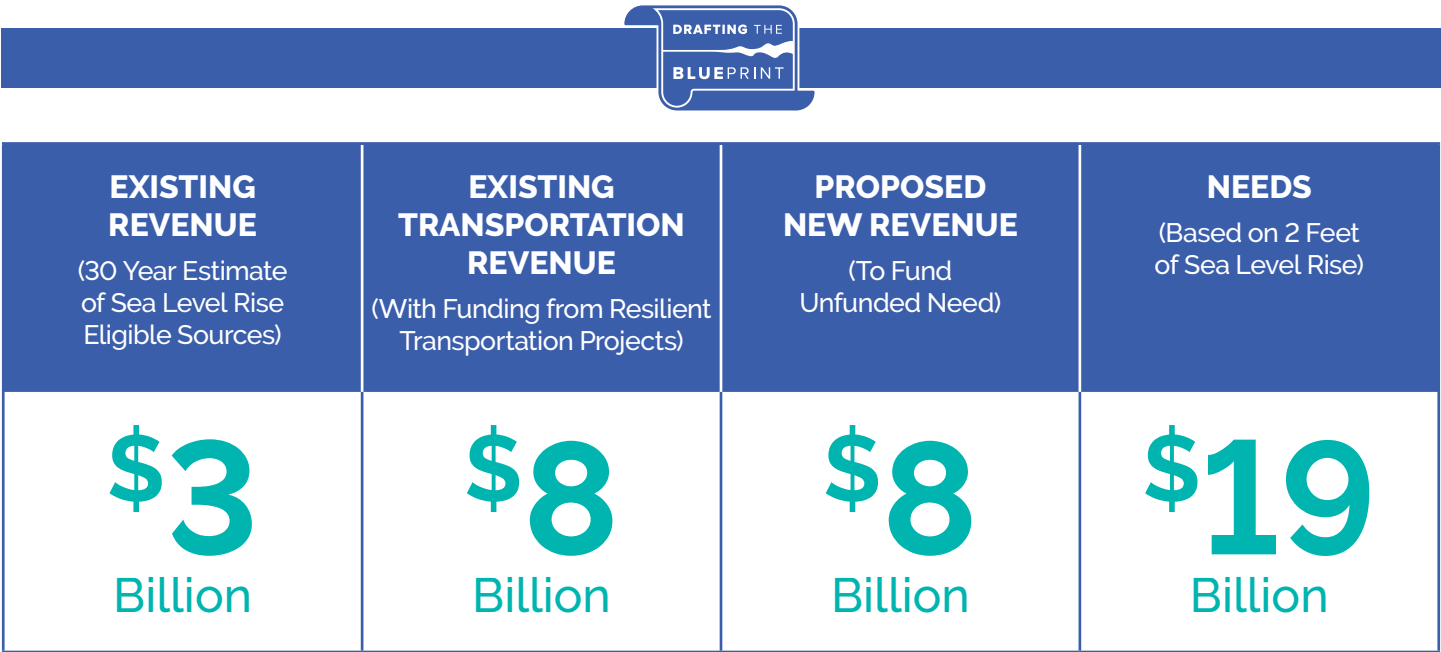
LAND USE AND TRANSPORTATION ANALYSIS

By including sea level rise in the Plan, the inundation and associated adaptation strategy are able to align with land use planning and transportation investment decisions. Plan strategies are studied using analytical land use and transportation tools. To study the Adapt to Sea Level Rise strategy, staff analyzed the effects of inundation on land use and transportation, mapping how displacement would place greater development pressures elsewhere in the region, and how the inundation of transportation corridors would increase travel times and strain other transportation routes. Including this analysis inside Plan Bay Area 2050 has highlighted the significant benefits of sea level rise adaptation and has raised the importance of advancing adaptation planning in the region, particularly in vulnerable communities and areas slated for future growth. In past analysis staff found that this strategy as currently designed could prevent up to 98 percent of the region's 2050 housing from inundation, protecting up to 200,000 homes.<sup>2</sup>

NEEDS AND REVENUE ASSESSMENT

The Needs and Revenue Assessment compares the anticipated forecasted fiscal need over a future period against the available forecasted revenue. For decades, MTC has developed a Transportation Needs and Revenue Assessment to highlight funding gaps and helped strategically prioritize future investments. As part of Plan Bay Area 2050, a similar albeit simpler assessment has been developed for resilience and affordable housing. Using the adaptation costs developed earlier in the methodology, as seen in Figure 2, staff aggregated regional financial needs to adapt the region's shoreline in the Plan. The revenue estimate was developed by collecting past election data and known large state and federal funding sources to project out likely sea level rise revenue sources over the next 30 years. Existing revenue includes roughly \$3 billion from sources that protect against shoreline flooding, and \$8 billion from transportation sources. Potential new revenues could include adding to the regional parcel tax, expanding assessment districts to more at-risk areas in the region, establishing new business taxes, or advocating for more state and federal funding. Figure 3 summarizes the Needs and Revenue estimates for the adapt to sea level rise strategy.

Figure 3. Plan Bay Area 2050 Sea Level Rise Needs and Revenue



2. This result was based on scenarios analyzed in the Horizon initiative, which used different adaptation measures, and housing information that has since been updated. The number of homes protected accounted for existing and future (2020-2050) housing. For more information on this analysis, please refer to the [Horizon: Futures Final Report](#).

## NEXT STEPS

### PLAN BAY AREA 2050

The Final Blueprint strategies were recently adopted by the ABAG Executive Board and MTC Commission in fall 2020. Having integrated revisions from both the public and partners earlier in the year, the strategies are being analyzed as a package to understand how effective the strategies are in advancing the Plan's vision. By the end of 2020, the Final Blueprint will be considered to serve as the Preferred Alternative for the Plan Bay Area 2050 Environmental Impact Report (EIR).

Following the completion of the Blueprint phase this fall, staff will pivot to the near-term Implementation Plan phase, working with partners to outline how these 30-year strategies can be advanced over the next four years. The Implementation Plan is also an opportunity to further align the Plan with regional actions on sea level rise adaptation. Following the completion of the EIR and Implementation Plan, Plan Bay Area 2050 will be considered by the ABAG and MTC governing boards for adoption in late summer 2021.

### IMPORTANT CAVEATS

Given that this is the first time sea level rise has been deeply integrated into Plan Bay Area, there are many key caveats to be addressed in future planning cycles:

- The specifics of adaptation measures are strictly intended to be model and estimated financial inputs for the regional plan, and are not suggestions for local planning in either their specific location nor depiction. These potential adaptation measures are not placed on a list for funding.
- Plan Bay Area 2050 only explored adaptation action in areas with impacts at three feet of total water level. Our assessment provides a near-term fiscal need to adapt the most susceptible portions of shoreline. Advanced local planning should consider higher water levels and longer term considerations beyond 2050, as per guidance from OPC released in Spring 2020.<sup>3</sup>
- Due to the manner in which the placeholders were developed, estimated costing for the placeholders remains very high level. Many of the placeholders in the assessment are not planned strategies,

and as such, they were costed based on regional assumptions. Adaptation archetypes that did not have reliable costing information were not included in this assessment. Future updates of the Needs and Revenue Assessment may be able to expand studied archetypes.

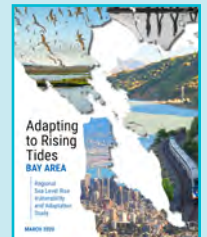
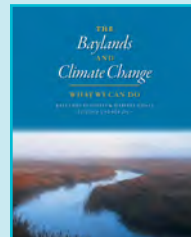
- The narrow set of adaptations used for the Plan Bay Area 2050 analysis are not intended to represent the full universe of adaptation solutions. Advanced local planning should consider other solutions, including nature-based strategies.
- Plan Bay Area is updated every four years. Future cycles will incorporate the best available local information and climate science for Bay Area sea level rise adaptation, which will continue to evolve in the years ahead.

## ONGOING ADAPTATION WORK IN THE REGION

Plan Bay Area 2050 is just one of the many important efforts to explore sea level rise in the region, building upon the work of others to better understand this challenge. The images below highlight primary resources used to incorporate sea level rise adaptation into Plan Bay Area 2050. In addition to these existing resources, many of the Bay Area partners listed below have ongoing efforts, and the implementation of Prop 68 and Measure AA continue to fund projects around the Bay.

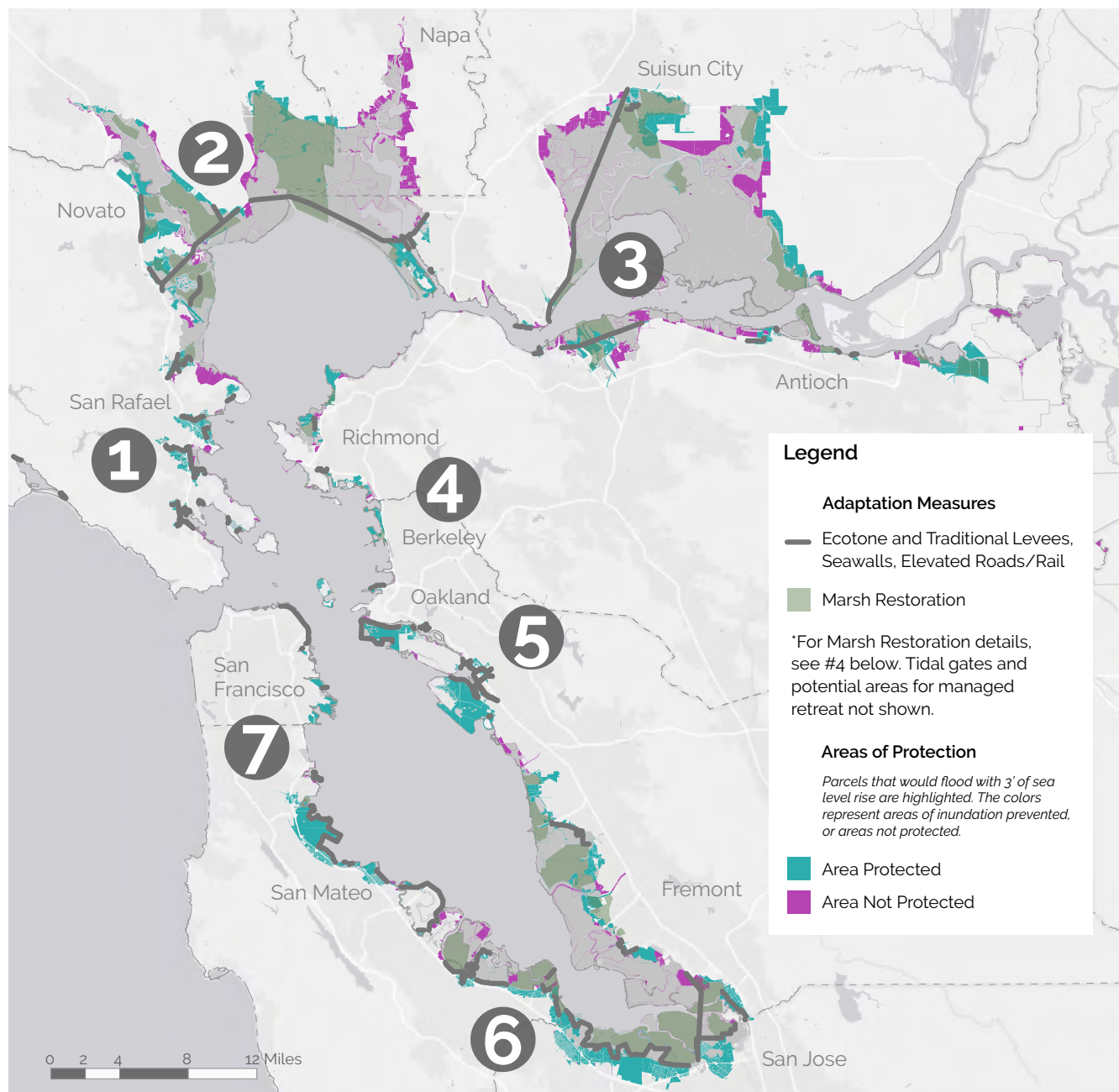
There also continue to be discussions at the state level related to adaptation and resilience as critical statewide issues, including the potential to raise new revenues for action in the coming years.

### RESOURCES AND TOOLS



3. <https://www.opc.ca.gov/webmaster/ftp/pdf/2020-2025-strategic-plan/OPC-2020-2025-Strategic-Plan-FINAL-20200228.pdf>

Figure 4. Plan Bay Area 2050 Draft Blueprint Adaptation Actions



## Key Adaptation Areas

- 1 In Marin County, existing communities and priority development areas in San Rafael are protected. Low sections of Highway 10 could be partially elevated to maintain connectivity.
- 2 The SR-37 corridor includes segments of elevated highway, marsh restoration, and smaller projects to protect existing communities.
- 3 Interregional rail systems are included in the strategy in order to maintain critical passenger and commodity connections. Rail corridors protected in this assessment were based on assumptions, as active adaptation plans are not yet finalized.
- 4 Vulnerable segments of the Berkeley and Albany shoreline are assumed to be partially protected by marsh and subtidal restoration, not shown on the map. The region has a goal to restore 100,000 acres of marsh. Since much of the restoration is not yet sited, not all marsh restoration is currently shown on this map. The region is expected to double the amount of marsh restoration currently mapped.
- 5 The greater Coliseum Priority Development Area in Oakland is known to be vulnerable. While there is not currently a well-defined adaptation plan, a generic protective strategy is assumed to account for the investment need until a local plan is developed.
- 6 South Bay communities and businesses are anticipated to be protected by the SAFER Bay Project, enhanced by plans for marsh restoration throughout the area.
- 7 Large planned developments at Hunter's Point and Treasure Island integrate 3' of sea level rise adaptation into the overall construction. No protective measure is illustrated on the map, but the areas are assumed protected.





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