

## CHAPTER 13

# A CHANGING SHORELINE

## Planned public and private development at San Francisco's edge

San Francisco's shoreline is a dynamic place. New mixed-use neighborhoods are being built in formerly industrial areas, the City is creating significant new open spaces for all to use, and new transportation and other infrastructure is being built to serve new residents, workers, and visitors. These uses co-exist with ongoing Port, maritime, and industrial operations that continue to serve a vital function on the waterfront.

The rest of the Sea Level Rise Vulnerability and Consequences Assessment studies San Francisco's current land use and infrastructure. This chapter focuses on future proposed changes to San Francisco's waterfront that will be impacted by rising sea levels, and the steps that proposed infrastructure and development projects are taking to address SLR impacts (see Figure 13.1).

Figure 13.1 Planning Efforts Underway



- ① Ocean Beach Adaptation Projects
- ② Port of San Francisco Embarcadero Seawall Program and Flood Study
- ③ Treasure Island/Yerba Buena Island
- ④ Central SOMA
- ⑤ Mission Rock
- ⑥ Mission Bay
- ⑦ Pier 70
- ⑧ Potrero Power Station
- ⑨ India Basin Mixed-Use Project and India Basin Shoreline Park
- ⑩ Hunters Point Shipyard and Candlestick Point



Inundation at 108" Sea Level Rise

## Ocean Beach Adaptation Projects <sup>1</sup>



Ocean Beach, a 3.5-mile stretch of sand along San Francisco's rugged Pacific coast, draws a diverse population of more than 300,000 visitors each year and is an important piece of the Golden Gate National Recreation Area. Ocean Beach is also home to major elements of San Francisco's wastewater and stormwater infrastructure.

At Ocean Beach, storm-driven waves contribute to erosion of coastal bluffs. As climate change causes sea levels to rise, erosion is expected to worsen, threatening coastal infrastructure including roads and sewers and causing the beach to narrow.

Along the southern reaches of Ocean Beach, shoreline erosion is threatening the most seaward component of the combined sewer/stormwater system, the Lake Merced Tunnel, a 14-foot-diameter pipe under the Great Highway. Other components of the sewer system are located just behind the tunnel. To address erosion and SLR threats to this critical infrastructure, SFPUC participated along with other agencies and the public, in the development of the Ocean Beach Master Plan. SFPUC subsequently published a Coastal Protection Measures & Management Strategy Report.<sup>2</sup>

<sup>1</sup> San Francisco Planning. 2019. Ocean Beach Adaptation Efforts. <https://sfplanning.org/ocean-beach-adaptation-efforts>.

<sup>2</sup> San Francisco Public Utilities Commission (SFPUC). 2015. Coastal Protection Measures and Management Strategy for South Ocean Beach. Available at [https://www.spur.org/sites/default/files/wysiwyg/OB\\_Coastal\\_Protection\\_Mgmt\\_Final\\_20150424.pdf](https://www.spur.org/sites/default/files/wysiwyg/OB_Coastal_Protection_Mgmt_Final_20150424.pdf).

City and federal agencies are working together to implement short- and long-term adaptation measures at South Ocean Beach, following the recommendations of the Ocean Beach Master Plan<sup>3</sup>. Current implementation efforts include annual sand replenishment, roadway narrowing, and wastewater pump station improvements. Long-term improvements include road narrowing and realignment, an improved recreation trail, and the Ocean Beach Long-Term Improvements Project.

The Long-Term Improvement Project includes managed retreat (i.e., recontouring the bluffs and removing the Great Highway between Sloat Boulevard and California State Route 35), removal of rubble and rock from the beach and bluffs, continued beach nourishment, and installation of a low-profile wall to protect the Lake Merced Tunnel.

This project will protect vital public wastewater infrastructure and improve access, recreation, and habitat at South Ocean Beach. The Ocean Beach Long-Term Improvements Project, being implemented by SFPUC, is expected to begin construction in 2022.

<sup>3</sup> [https://www.spur.org/featured-project/ocean-beach-master-plan?utm\\_medium=redirect&utm\\_source=oceanbeach](https://www.spur.org/featured-project/ocean-beach-master-plan?utm_medium=redirect&utm_source=oceanbeach)

## Port of San Francisco Embarcadero Seawall Program <sup>4</sup> and Flood Study <sup>5</sup>



The Embarcadero Seawall is over 100 years old and was designed and constructed before engineers understood how to build infrastructure to survive earthquakes. Most of the seawall is built over “young bay mud,” a weak, saturated, and highly compressible marine clay that tends to amplify earthquake shaking. The seawall has aged and settled, and no longer offers sufficient flood protection.

The Port of San Francisco is leading the Embarcadero Seawall Program, a Citywide effort to create a more sustainable and resilient waterfront. The Program is dedicated to robust community and stakeholder engagement, along with fiscal responsibility, accountability, and transparency. Part of the Port’s Waterfront Resilience Program, the Seawall Program will provide the tools to address current and future risks over time. There are three elements to the Program—Strengthen, Adapt and Envision—which allow the Port to respond to risks and conditions. Planning for all three elements is occurring now, implementation for each element will depend upon findings, public input, regulatory input, cost/benefit analysis, and availability of funding and financing.

<sup>4</sup> <https://www.sfportresilience.com/seawall-program>.

<sup>5</sup> <https://www.sfportresilience.com/-/flood-study><https://sfport.com/sites/default/files/Commission/Documents/Item%2013A%20USACE%20Feasibility%20Cost%20Sharing%20Agreement.pdf>.

San Francisco voters passed a \$425 million General Obligation Bond for the Program in November 2018. The Port is currently pursuing local, state, federal, and private funding sources to fully fund infrastructure improvements anticipated to cost up to \$5 billion. Immediate seismic and flood protection upgrades are targeted for completion by 2026. The Program is currently in the early stages of planning, following an extensive Vulnerability Study. Chapter 4, Supporting Assessments includes further discussion of the Embarcadero Seawall Program.

In addition to the Embarcadero Seawall Program, USACE and the Port are partnering to study flood risk along San Francisco’s bayside shoreline. The approximately three- to five-year Flood Study will identify vulnerabilities and recommend strategies to reduce current and future flood risks for consideration by the Assistant Secretary of the Army and the U.S. Congress for federal investment and implementation.

The goals of the Flood Study are to better understand current and future flood risk along San Francisco’s bayside shoreline, identify alternatives to reduce flood risk, engage the public and other stakeholders to identify priorities for the Flood Study, and create opportunities for funding for flood risk reduction projects.

The study area includes the Port’s entire shoreline ownership from Aquatic Park to Heron’s Head Park. The study will result in potential flood risk mitigation projects to protect against flooding through 2080 and consideration of flood risks through 2130.

## Treasure Island/Yerba Buena Island <sup>6</sup>



<sup>6</sup> City and County of San Francisco. Treasure Island Development Authority. Available at <https://sftreasureisland.org/>.

The redevelopment of Treasure Island and Yerba Buena Island will produce a new district of up to 8,000 homes, 25 percent of which will be offered at below-market rates, extensive open spaces, three hotels, restaurants, retail, and entertainment venues within San Francisco. Project construction will use grading and shoreline protection features to adapt to estimated 2050 SLR impacts and identifies triggers for future adaptation planning. The development also includes tax increment financing to fund future shoreline adaptation strategies.

## Central SOMA <sup>7</sup>



<sup>7</sup> San Francisco Planning. Central SOMA Plan. Available at <https://sfplanning.org/project/central-soma-plan>.

The Central SOMA Plan Area, located within the South of Market Area neighborhood, is bounded by Market Street, Townsend Street, 2nd Street, and 6th Street, and enables the development of up to 32,500 jobs and 8,800 housing units in a complete neighborhood. The new development would result in more than \$2 billion in public benefits to serve the neighborhood. The Plan Area is largely within the SLR exposure zone. To that end, the plan incorporates policies to protect individual buildings and the neighborhood from flooding. These policies call for the development of a comprehensive SLR and flood management strategy for Central SOMA, the implementation of building and subdivision requirements to reduce flood risk, and the installation of green infrastructure to reduce flood risk. The Central SoMa Plan also includes funding through a Community Facilities (Mello-Roos) District to address long-term SLR.

## Mission Rock <sup>8</sup>



8 <https://sfport.com/missionrock>

Mission Rock, a partnership between the Port and the San Francisco Giants, will convert a 28-acre site consisting primarily of a surface parking lot homes, offices, and open space. The project includes:

- 1,500 rental homes with 40 percent affordable
- 8 acres of parks and open space
- SLR and sustainability strategies
- 1 million to 1.4 million square feet of office space
- Water access

The proposed development will adapt to SLR by grading, elevating its waterfront riprap and seawall, and designing floodable shoreline open space.

## Mission Bay <sup>9</sup>



9 <https://sfocii.org/mission-bay>

San Francisco's Mission Bay North and South Redevelopment Project Areas cover 303 acres of land between the San Francisco Bay and I-280, bounded by portions of Townsend Street to the north and Mariposa Street to the south. The Board of Supervisors adopted the Mission Bay North and South Redevelopment Plans and related controlling documents in November 1998.

As of March 2019, 5,789 housing units (including 1,191 affordable units) of the planned 6,514 units have been constructed in Mission Bay. More than 3.5 million square feet of commercial, office, clinical, and biotechnology laboratory space has been built out of the planned 4.4 million square feet. About 75 percent of the University of California, San Francisco (UCSF) campus will be developed by 2020 when several buildings currently under construction are completed. The campus will include nine research buildings, a campus community center, three parking structures, a university housing development, a childcare center, and the UCSF Health medical center. More than 19 acres of new non-UCSF parks and open space out of the planned 41 acres have also been completed, including a children's park.

## Pier 70 <sup>10</sup>



Pier 70 is a Port of San Francisco site that is approximately 69-acres located in the City's Central Waterfront, generally between Mariposa and 22nd Street, east of Illinois Street. This site has been identified as a future National Historic District due to its over 150 years of continuous operations in Ship Building and Repair, the role it has played in the industrialization of the Western United States, the war efforts and architectural and engineering feats.

The Port of San Francisco working with its regulatory partners and through an extensive community planning process recently completed a Pier 70 Preferred Master Plan. The Preferred Master Plan outlines an

approach to rehabilitate historic resources, provide new shoreline open space, allow for new infill development, continue the historic ship repair operations and conduct environmental remediation and infrastructure improvements where required.

Pier 70 includes a 25-acre waterfront site that will house new mixed-use development. Following a competitive development solicitation process, in July 2011, the Port entered into an Exclusive Negotiation Agreement (ENA) with Forest City Development.

The Forest City project includes new market-rate and affordable residential uses, commercial use, retail-arts-light industrial uses, parking, shoreline improvements, infrastructure development and street improvements, and public open space. Depending on the uses proposed, the Project would include between 1,645 to 3,025 residential units, 1,102,250 to 2,262,350 gross square feet (gsf) of commercial-office use, and 494,100 to 518,700 gsf of retail-light industrial-arts use.

The proposed development will adapt to SLR through grade changes, floodable open space along the shoreline, and building elevation as necessary. The project will also contribute to a Port-wide resilience fund.

<sup>10</sup> <https://sfport.com/pier-70-area>

## Potrero Power Station <sup>11</sup>



The Potrero Power Station is a 28-acre site located in the Central Waterfront District east of the Dogpatch neighborhood and American Industrial Center and directly fronting San Francisco Bay. For over 150 years before being decommissioned as a power plant in 2011 by then-owner Mirant Potrero LLC, the site was host to a range of industrial uses from barrel-making and sugar refining to power generation. While industrial uses will continue to be an

<sup>11</sup> San Francisco Planning. Potrero Power Station. Available at <https://sfplanning.org/project/potrero-power-station>.

important element of the urban fabric in the Central Waterfront, including on this site, the City's Central Waterfront Area Plan identifies the site as a location for additional growth and a wider range of land uses, including residential, commercial, and parks.

In 2016, Associate Capital (Project Sponsor) purchased the Potrero Power Station from then-owner NRG Energy. In 2017, it began an extensive planning process with City agencies and the community to develop a master plan for the site. The proposed project would include approximately 2,400 dwelling units, 1.2-to 1.9 million gsf of commercial uses, and six acres of open space. The proposed development would adapt to SLR by grading, elevating its waterfront riprap and seawall, and designing floodable shoreline open space.

The Potrero Power Station Design for Development Public Review Draft, Draft Infrastructure Plan, and Draft Environmental Impact Report were published on October 3, 2018. These documents remain under review by City agencies and additional opportunities for community input will occur throughout 2019.

## India Basin Mixed-Use Project and India Basin Shoreline Park <sup>12</sup>



India Basin is located along the San Francisco Bay generally between the PG&E Power Plant site and Hunters Point Shipyard. The proposed India Basin Mixed-use Project consists of two main components,

the 700 Innes Avenue Development Project and the India Basin Waterfront Parks and Trails Project. The 700 Innes Avenue Development Project currently consists of 17.2 acres of mostly Bay-fill vacant land. The project envisions the creation of a mixed-use village with retail shops, apartments, and townhomes intricately linked to a 6-acre park along the shoreline. At completion, 700 Innes will include approximately 1,250 dwelling units, an allowance of up to 270,000 square feet of retail, and 1,800 parking spaces, and public open space.

The India Basin Waterfront Parks and Trails Project would create a new 1.8-acre public park at 900 Innes and rehabilitate two existing open spaces, India Basin Shoreline Park (5.6 acres) and India Basin Open Space. The proposed development will adapt to SLR by grading, elevating its waterfront rip rap and seawall, and designing floodable shoreline open space.

<sup>12</sup> India Basin San Francisco. Reimagining Urbanism. Available at <http://india-basinsf.com/>. San Francisco Recreation and Park. India Basin Shoreline Park. Available at <https://sfrecpark.org/destination/india-basin-shoreline-park/>.

## Hunters Point Shipyard and Candlestick Point<sup>13</sup>



The Hunters Point Shipyard, a former naval base, is a master-planned community located along the southeastern waterfront of San Francisco. The Board of Supervisors originally adopted the Redevelopment Plan in 1997 and amended it in 2010 to provide for the integrated planning and development of the Shipyard and the Candlestick Point portion of the Bayview Hunters Point Redevelopment Project Area.

Phase I of the Shipyard Project, which includes the Hillside and Hilltop areas, is completing the infrastructure and will ultimately include up to 1,428 homes and 20,000 square feet of commercial space.

Hunters Point Shipyard and Candlestick Point Phase II covers approximately 702 acres in San Francisco's Bayview Hunters Point and Hunters Point Shipyard neighborhoods. The amended plan for the area calls for mixed-use development consisting of up to 10,672

residential units that includes a mix of affordable and market rate units, 1,146,000 square feet of neighborhood and regional retail, 4.4 million square feet of research and development/office, and 328 acres of open space.

The SLR strategy at Candlestick Point is addressed in Volume 1 of OCII's Infrastructure Plan and the Shipyard is addressed in Volume 2. The design criteria of this strategy include: a) raising grades such that finished floor elevations are a minimum of 5.5 feet above the base flood elevation; b) raising the shoreline open space areas around the development perimeter 24 inches above wave-influenced water surfaces, and; c) a new storm drain system designed to operate under gravity at a height 24 inches above water levels, and other design criteria based on the amount of actual SLR.

The Hunters Point Shipyard Project will establish a special assessment district to develop an Adaptive Management Plan, as referenced in the Project's Mitigation Measures. As sea level rises, adaptive management strategies will include storm drain pump stations and shoreline berms to protect the Hunters Point Shipyard-Candlestick Point Project roads, infrastructure, and buildings. The addition of a new pump station at each storm drain outfall will increase the storm drain system capacity. The strategy also calls for identifying a stream of funding to construct future improvements.

<sup>13</sup> Office of Community Investment and Infrastructure (OCII). Hunters Point Shipyard and Candlestick Point. Available at <https://sfocii.org/hunters-point-shipyard-and-candlestick-point>.



Photo by Sergio Ruiz