

M. BIOLOGICAL RESOURCES

Section 4.M, Biological Resources, begins with a description of the existing conditions for terrestrial and marine biological resources that occur or have the potential to occur on the project site or in the immediate vicinity. Regulations and guidelines relevant to biological resources are discussed next, followed by an impacts analysis that evaluates the potential effects on biological resources that would result from implementation of the Proposed Project. Mitigation measures that would avoid or reduce impacts to less-than-significant levels are identified. Cumulative effects of the Proposed Project in combination with past, present, and reasonably foreseeable future projects are discussed.

This section identifies project study areas for both terrestrial and marine biological resources, and assesses the potential impacts on these resources that would result from construction and operation of the Proposed Project. Aside from database searches, a fixed buffer area is not defined for the study areas; however, the Proposed Project's potential area of influence relevant to each biological resource was considered. Information on natural communities, plant and animal species, and sensitive biological resources was obtained from regional databases, plans, and reports relevant to the Proposed Project, including the California Natural Diversity Database (CNDDDB),¹ the California Native Plant Society (CNPS) Electronic Inventory,² California Department of Fish and Wildlife (CDFW),^{3,4} the U.S. Fish and Wildlife Service (USFWS),⁵ the National Oceanic and Administration (NOAA) Report on the Subtidal Habitats and Associated Biological Taxa in San Francisco Bay,⁶ long-term regional studies such as the Regional Monitoring Program for Water Quality in San Francisco Bay,⁷ the Interagency Ecological

¹ California Natural Diversity Database (CNDDDB), Rarefind version 5 query of the San Francisco North and San Francisco South USGS 7.5-minute topographic quadrangles, Commercial Version, 2015. Accessed August 21, 2015.

² California Native Plant Society (CNPS), Inventory of Rare and Endangered Plants for San Francisco North and San Francisco South USGS 7.5-minute topographic quadrangles, 2015. Available online at <http://www.rareplants.cnps.org/>. Accessed August 21, 2015.

³ California Department of Fish and Wildlife (CDFW), 2015, Natural Diversity Database. October 2015. Special Animals List. Periodic publication.

⁴ CDFW, 2015, Natural Diversity Database. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication, October 2015.

⁵ U.S. Fish and Wildlife Service (USFWS), My Project, IPaC Trust Resource Report of Federally Endangered and Threatened Species in the San Francisco North and San Francisco South USGS 7.5-minute topographic quadrangles, August 20, 2015.

⁶ National Oceanic and Atmospheric Administration (NOAA), Report on the Subtidal Habitats and Associated Biological Taxa in San Francisco Bay (hereinafter referred to as Report on the Subtidal Habitats). June 2007.

⁷ San Francisco Estuary Institute and the Aquatic Science Center, 2015, Clean Water Program. Available online at <http://www.sfei.org/programs/cleanwater>. Accessed August 17, 2015.

Program (IEP) for San Francisco Bay,⁸ standard biological literature, eBird.org,⁹ biological reports and studies from other waterfront locations in the project vicinity,^{10,11,12,13} and focused and reconnaissance-level surveys of the project site. A reconnaissance-level botanical and terrestrial wildlife survey of the project site was conducted on August 20, 2015, to characterize existing conditions, assess habitat quality, and assess the potential presence of special-status species and sensitive natural communities. Rare plant surveys of the Irish Hill portion of the project site were conducted on March 30 and May 3, 2016.¹⁴ A survey of marine habitat and wildlife was performed by an independent consultant on April 20, 2015.¹⁵

ENVIRONMENTAL SETTING

For the purposes of this California Environmental Quality Act (CEQA) assessment, the project study area for terrestrial biological resources includes the project site and landside areas adjacent to it with similar habitat composition that includes developed or paved areas with long-standing industrial uses from Mission Creek to the north, Islais Creek to the south, and the I-280 Freeway corridor to the west. The baseline development projects listed in Section 4.A, Introduction to Chapter 4, pp. 4.A.5-4.A.12, are considered the baseline conditions for this analysis. The marine/aquatic biological resources study area includes San Francisco Bay shoreline along the project site and San Francisco Bay Central Bay basin waters immediately adjacent to the project site, though marine resources documented in all waters of the Central Bay basin from the north side of Treasure Island to the San Bruno Shoals, which demark the southern border of Central San Francisco Bay, were considered in this analysis. The shoreline and adjacent San Francisco

⁸ Interagency Ecological Program, Cooperative Ecological Investigations in the San Francisco Estuary since 1970. Available online at <http://www.water.ca.gov/iep/>. Accessed August 18, 2015.

⁹ eBird, An online database of bird distribution and abundance [web application]. Agua Vista Park Hotspot. eBird, Ithica, New York. Available online at <http://www.ebird.org>. Accessed September 28, 2015.

¹⁰ Weeden, N., and M. Lynes, Summary Report of Avian Surveys Conducted in 2008 at Dilapidated Piers and Other Structures along the Port of San Francisco's Southern Waterfront Properties, 2009 (hereinafter referred to as Summary Report of Avian Surveys Conducted in 2008). Unpublished report (GGA-2009-01). Golden Gate Audubon Society, Berkeley, California.

¹¹ The Port of San Francisco, *Pier 94 Wetland Enhancement Monitoring Report*. San Francisco, California. June 1, 2010.

¹² Bartley, E., N. Weeden, A. Opkins, M. Ziatunich, and M. Chambers, *A Field Guide to 100 Birds of Heron's Head, Islais Creek to Candlestick Point*, 2010. San Francisco, California.

¹³ Coastal Conservancy, *Clapper Rail Surveys for the San Francisco Estuary Invasive Spartina Project*, 2013. Prepared by Jen McBroom, Olofson Environmental, Inc., November 2013.

¹⁴ Environmental Science Associates (ESA), Pier 70 Mixed-Use Development Project: Results of the March 30, 2016 and May 3, 2016, Irish Hill rare plant surveys, May 25, 2016.

¹⁵ Applied Marine Sciences, Inc. (AMS), Intertidal Habitat and Biological Community Survey Along the Pier 70 Redevelopment Site (hereinafter referred to as Intertidal Habitat and Biological Community Survey). Report prepared for Turnstone Consulting / SWCA, San Francisco, California, April 20, 2015.

Bay waters comprising the marine resources study area have been extensively modified from their prior natural condition; however, they remain ecologically productive habitats. Figure 4.M.1: Terrestrial Biological Resources Study Area, and Figure 4.M.2: Marine Biological Resources Study Area, p. 4.M.4 and p. 4.M.5, depict, respectively, the generalized study areas for the terrestrial and marine biological resources considered in this analysis.

REGIONAL SETTING

The project site is located in the San Francisco Bay Area-Delta region, which hosts a diverse variety of natural communities ranging from the open waters of San Francisco Bay and the Delta to salt and brackish marshes to chaparral and oak woodlands. The climate is Mediterranean in nature, with relatively mild, wet winters and warm, dry summers. The high diversity of vegetation and wildlife found in the region is a result of soils, topography, and microclimate diversity that promotes relatively high levels of endemism.¹⁶

San Francisco Bay is the second largest estuary in the United States and supports numerous marine habitats and biological communities. It encompasses 479 square miles, including shallow mudflats. San Francisco Bay is divided into four main basins: San Pablo or North Bay, Suisun Bay, Central Bay, and South Bay.¹⁷ This assessment focuses on the southernmost portion of the Central Bay basin. Depending on the use, the Central Bay basin of San Francisco Bay has different geographic boundaries. For the purposes of this CEQA analysis, the geographic boundaries for the Central Bay basin are between the Richmond-San Rafael Bridge and the San Bruno Shoal, located 11.5 miles south of the San Francisco-Oakland Bay Bridge, and connect to the Pacific Ocean through the Golden Gate. The regional setting for purposes of evaluating marine biological resources includes both the shoreline intertidal habitats and the shallow water habitats – the “baylands”¹⁸ and the deeper waters of San Francisco Bay itself that are located in the southernmost area of the Central Bay basin. The marine biological biota found in the Central Bay basin includes invertebrate infauna¹⁹ and mobile epifauna²⁰ that inhabit San Francisco Bay sediments; sessile²¹ and encrusting invertebrates and marine vegetation on natural and human-

¹⁶ Endemism refers to the degree to which organisms or taxa are restricted to a geographical region or locality and are thus individually characterized as endemic to that area.

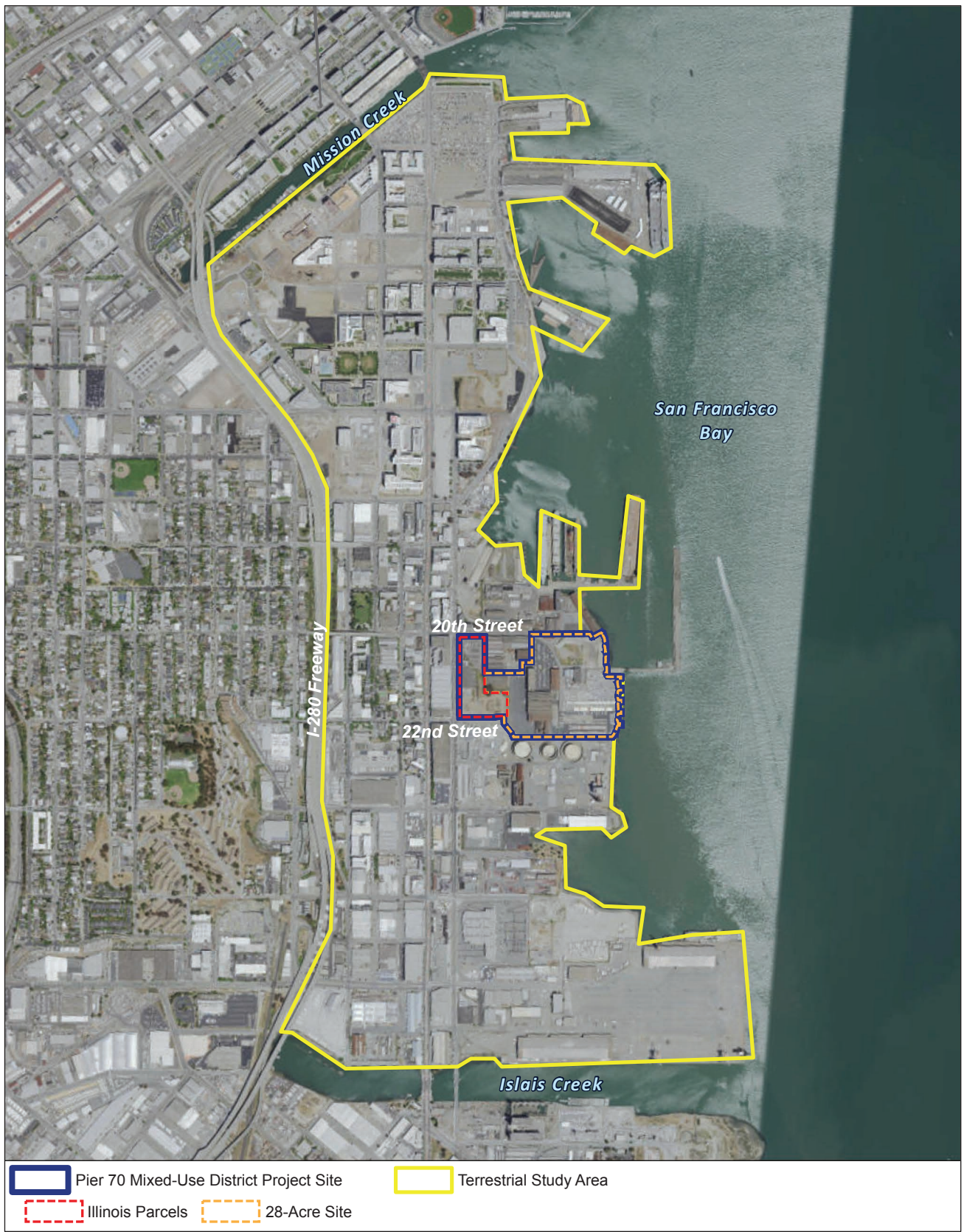
¹⁷ NOAA, Report on the Subtidal Habitats.

¹⁸ Goals Project, 1999, *Baylands Ecosystem Habitat Goals*. A report of habitat recommendations prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. U.S. Environmental Protection Agency, San Francisco, Calif./S.F. Bay Regional Water Quality Control Board, Oakland, California.

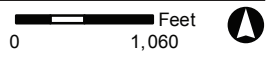
¹⁹ Organisms living in the sediments of the San Francisco Bay floor.

²⁰ Organisms living on the surface of the San Francisco Bay floor, or attached to submerged objects or aquatic animals or plants.

²¹ Permanently attached or established; not free to move about.



Source: ESA (2016), AMS (2016)

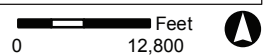


PIER 70 MIXED-USE DISTRICT PROJECT

FIGURE 4.M.1: TERRESTRIAL BIOLOGICAL RESOURCES STUDY AREA



Source: ESA (2016), AMS (2016)



PIER 70 MIXED-USE DISTRICT PROJECT

FIGURE 4.M.2: MARINE BIOLOGICAL RESOURCES STUDY AREA

made hard substrates; and planktonic organisms, fish, marine mammals, and marine birds that inhabit or use the open waters of San Francisco Bay. These habitats and their associated biological communities are described below in more detail.

PROJECT SITE SETTING

Terrestrial Vegetation Communities and Wildlife Habitats

Natural communities are assemblages of plant and wildlife species that occur together in the same area, which are defined by species composition and relative abundance. The terrestrial biological resources study area contains developed/landscaped/ruderal (weedy) and eucalyptus grove plant communities, which were identified during the terrestrial resources reconnaissance survey on August 20, 2015.

Developed/Landscaped/Ruderal

The majority of the project site (i.e., most areas within the 28-Acre Site and the Illinois Parcels) is paved and currently developed with buildings, mainly warehouses, associated with the previous use of the site. The terrestrial resources study area surrounding and including the project site is also mostly developed, in keeping with the conditions and previous uses of the project site.

Some long-abandoned landscaping occurs among the existing buildings and parking lots. This includes various yucca (*Yucca* spp.) plants, garden geranium (*Pelargonium* spp.), and a few common fig (*Ficus carica*), loquat (*Eriobotrya japonica*), and conifer trees. Areas dominated by often temporary assemblages of opportunistic non-native plants that thrive in disturbed areas were characterized as ruderal habitat. Within the project site, this vegetation type occurs in pavement cracks, along edges of buildings or parking lots, and in the few undeveloped portions of the site such as the radio tower location on the northeast portion of the site and on the northern and eastern slopes of the remnant of Irish Hill. Non-native plant species typical of ruderal vegetation in the terrestrial study area or observed during the reconnaissance survey of the project site include ripgut brome (*Bromus diandrus*), slender wild oat (*Avena barbata*), soft chess (*Bromus hordeaceus*), Italian ryegrass (*Festuca perennis*), English plantain (*Plantago lanceolata*), sheep sorrel (*Rumex acetosella*), cheeseweed mallow (*Malva parviflora*), stinkwort (*Dittrichia graveolens*), prickly sow thistle (*Sonchus asper* ssp. *asper*), sweet clover (*Melilotus* spp.), alfalfa (*Medicago sativa*), red valerian (*Centranthus ruber*), pampas grass (*Cortaderia selloana*), and sweet fennel (*Foeniculum vulgare*), which is the dominant species on site. Native herb associates include telegraph weed (*Heterotheca grandiflora*) and Canadian horseweed (*Erigeron canadensis*).

Landscaped and ruderal areas can provide cover, foraging, and nesting habitat for a variety of bird species as well as reptiles and small mammals, especially those that are tolerant of

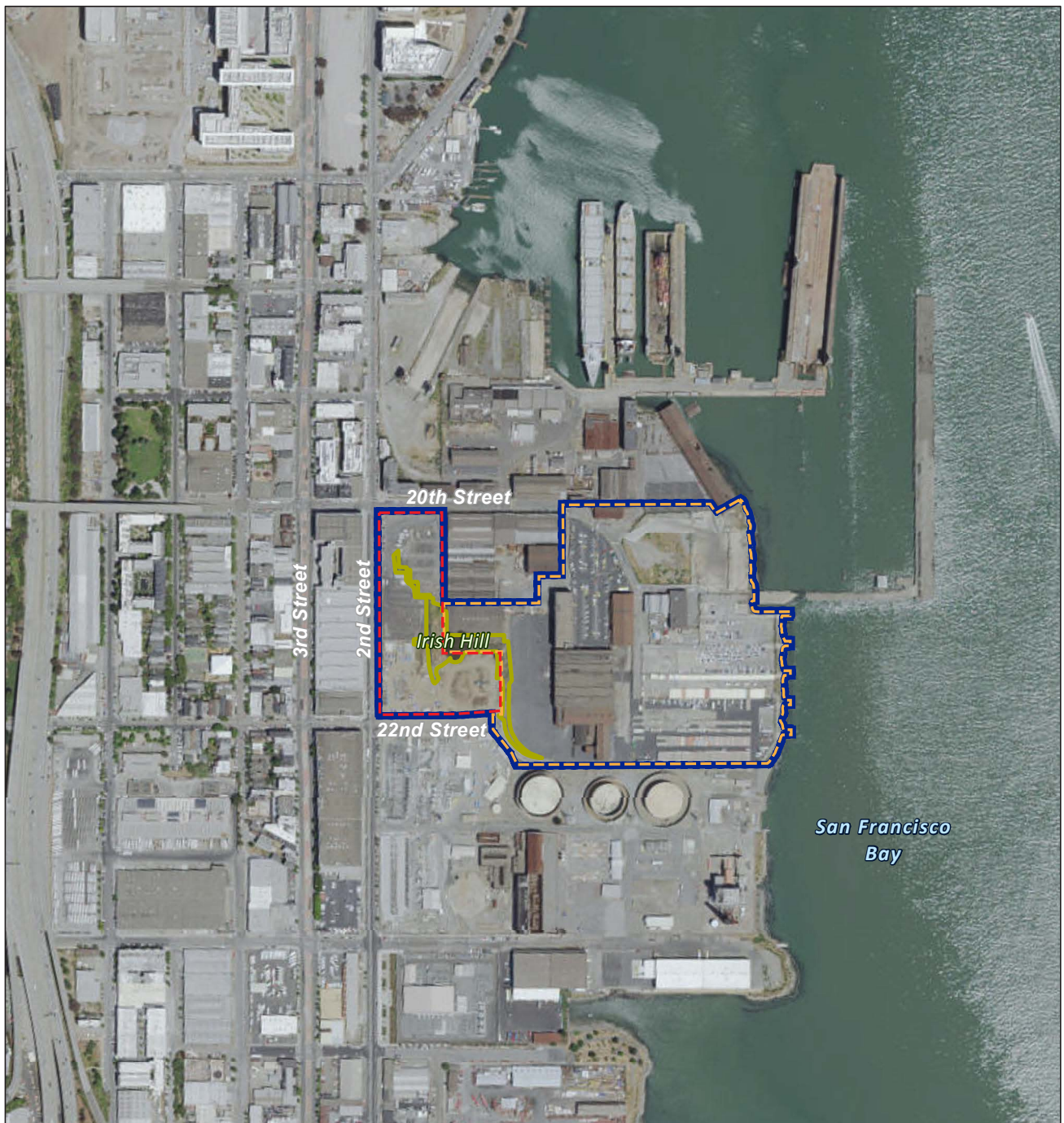
disturbance and human presence. Birds commonly found in such areas are typically seed-eating or accustomed to scavenging human litter. In the terrestrial study area these include non-native species, such as house sparrow (observed feeding on poison hemlock [*Conium maculatum*] seeds during the reconnaissance survey), rock pigeon, and European starling (*Sturnus vulgaris*). Native bird species found in such an environment include house finch (*Haemorhous mexicanus*), American goldfinch (*Spinus tristis*), lesser goldfinch (*Spinus psaltria*), Brewer's blackbird (*Euphagus cyanocephalus*), and mourning dove (*Zenaida macroura*). These species are common to highly developed urbanized areas. Other wildlife common to such an urban area includes striped skunk (*Mephitis mephitis*) and raccoon (*Procyon lotor*), and non-natives such as Virginia opossum (*Didelphis virginiana*), Norway rat (*Rattus norvegicus*), black rat (*Rattus rattus*), and feral cat. Vacant buildings can serve as roosting sites for local bats or as nesting sites for common urbanized birds such as barn owl (*Tyto alba*), cliff swallow (*Petrochelidon pyrrhonota*), rock pigeon, and house sparrow. Common bats, such as Mexican free-tailed bat (*Tadarida brasiliensis*), can also adapt to living in urban areas near water and roost in structures that provide adequate thermal regulation.

IRISH HILL SERPENTINE ROCK AND SOILS

The 1.4-acre remnant of Irish Hill located in the eastern portion of the project site is a serpentine rock outcrop with loose soil and ruderal vegetation covering its northern and eastern sides. Irish Hill is largely located on the Hoedown Yard portion of the Illinois Parcels and partially on the 20th/Illinois Parcel and the 28-Acre Site. The northern spur of Irish Hill snakes, from north to south, through paved portions of the 20th/Illinois Parcel built up to the remaining bluff adjacent to the 28-Acre Site. Figure 4.M.3: Serpentine Rock and Soils on the Project Site, depicts the extent of serpentine rock and soils associated with Irish Hill.

Although serpentine soils of the San Francisco peninsula have been documented to host a specialized group of rare and sensitive plants, historical disturbance of Irish Hill due to its location within the former industrial area has resulted in a dominance of non-native and invasive vegetative cover consistent with other ruderal vegetation of the project site, described above. Invasive sweet fennel thrives in disturbed areas and covers a majority of Irish Hill, and persistent human presence was evident. Trails or paths have been created up the hill slope, and discarded trash was visible. Special-status plants with an affinity for serpentine soils may have once occupied Irish Hill; however, rare plant surveys of this feature conducted in 2016 were negative and no special-status plant populations occur within the project site.²²

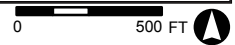
²² ESA, Pier 70 Mixed-Use Development Project: Results of the March 30, 2016 and May 3, 2016, Irish Hill Rare Plant Surveys, May 25, 2016.



LEGEND

- Pier 70 Mixed-Use District Project Site
- Illinois Parcels
- 28-Acre Site
- Irish Hill Serpentine Rock Outcrop

Source: ESA (2015)



PIER 70 MIXED-USE DISTRICT PROJECT

FIGURE 4.M.3: SERPENTINE ROCK AND SOILS ON PROJECT SITE

Eucalyptus Grove

The grove of trees within the terrestrial resources study area primarily consists of a small stand of non-native blue gum eucalyptus (*Eucalyptus globulus*) located at the east-facing slope of Irish Hill. Trees in this stand occur in both the Hoedown Yard portion of the Illinois Parcels and the 28-Acre Site. Ground cover within this stand is exclusively leaf litter with no understory plant species. Given that the trees inhabit only 0.2 acre and are exposed on a hill, they do not provide habitat functions that are normally found in forest ecosystems that support a diverse array of native species. Native species such as red-tailed and red-shouldered hawks (*Buteo jamaicensis*; *B. lineatus*), American robin (*Turdus migratorius*), chestnut-backed chickadee (*Poecile rufescens*), pygmy nuthatch (*Sitta pygmaea*), Anna's hummingbird (*Calypte anna*), California towhee (*Melospiza crissalis*), western grey squirrel (*Sciurus griseus*), and the non-native eastern fox squirrel (*Sciurus niger*) may occur in non-native forest communities; however, common terrestrial mammals discussed above in "Developed/Landscaped/Ruderal," pp. 4.M.6-4.M.7, would be more common to such an isolated site.

Marine Communities

Intertidal habitat, subtidal habitat, and open water habitat comprise the marine communities within the marine study area identified during the marine resources reconnaissance survey on April 20, 2015.

Intertidal Habitat

San Francisco Bay waterfront areas of the project site can be divided into three distinctly different segments. The first area coincides with Reaches I and II²³ (see Figure 2.25: Shoreline Improvements Map, in Chapter 2, Project Description, pp. 2.72) and has a gentle slope transiting from a short bluff at the edge of a concrete slab down to the water's edge with distinct low, middle, and high intertidal zones containing natural (quarry rock) and artificial (concrete-riprap, debris, and abandoned creosote wharf pilings) materials. Reach II is a concrete breakwall that is perpendicular to the edge of the water. The second area coincides with Reach III and consists of a short section in each of the four former slipways and the concrete sides of the slipways. This area contains natural and artificial riprap (quarry rock, concrete, and brick debris) similar to Reach I in the high and middle intertidal zones. Exposed concrete slab floor and bulkheads (sides of the former slipways) characterize the habitat in the lower intertidal zone. The third area coincides with Reach IV and is very similar to the first area (Reach I) in that it contains natural

²³ Moffatt & Nichol, Pier 70 Development Preliminary Shoreline Improvements Report, San Francisco, CA (hereinafter referred to as Preliminary Shoreline Improvements Report). Prepared for Forest City. August 2015. 107 pp.

and artificial riprap with a gentle slope to the edge of the water. It differs from Reach I, however, in that it curves inland to match up with the adjacent property, covers a shorter span from high to low intertidal zones, contains no creosote wharf pilings, and, because of its natural slope, has a distinct upper intertidal zone but a mixed or combined middle and lower intertidal zone.²⁴

The invertebrate and algae species observed inhabiting the three intertidal zones (low, middle, and high) are typical for the Central Bay basin. The dominant algae species include sea lettuce (*Ulva* spp.), rockweed (*Fucus gardeneri*), the red algae species (*Polyneura Latisima*) and *Gigartina* spp.), and the non-native brown algae species (*Sargossum muticum*). Sea lettuce dominated the high intertidal zone; sea lettuce, rockweed, and red algae dominated the middle intertidal zone; and brown algae dominated the low intertidal zone.²⁵

Invertebrate taxa inhabiting the Proposed Project shoreline include balanoid barnacles (Balanidae) in the high and middle intertidal zones; limpets, both species of *Mytilus* mussels, and shore crabs in the middle and low intertidal zones; and the native oyster (*Ostrea luidia*) in the lower middle and low intertidal zones. Both live and long-dead oysters (bottom shell present) were observed, with only a few live oysters observed compared to the number of dead oysters, suggesting high predation. Although there was minimal evidence of high siltation at the site, the invertebrate community observed was relatively limited compared to intertidal communities observed at Treasure and Yerba Buena islands, 3.3 miles north of Pier 70.²⁶ Additionally, no evidence of other invasive algae species was observed, such as sushi kelp (*Undaria pinnatifida*), which has taken a foothold at South Beach marina, adjacent to AT&T Park and just north and east of the marine study area.

Western sandpiper (*Calidris mauri*), least sandpiper (*C. minutilla*), sanderling (*C. alba*), and spotted sandpiper (*Actitis macularius*) may forage among the riprap and few sandy areas exposed during low tide within the intertidal zone of the marine study area.

Subtidal Habitat

The near-shore subtidal area immediately adjacent to the project site can be characterized as a predominantly soft substrate habitat comprised of soft mud (silt and clay) and sand with occasional quarry rock, concrete, and brick debris that has become dislodged from the armored

²⁴ AMS, Intertidal Habitat and Biological Community Survey.

²⁵ AMS, Intertidal Habitat and Biological Community Survey.

²⁶ AMS, Survey of Intertidal Habitat and Marine Biota at Treasure Island and Along the Western Shoreline of Yerba Buena Island (hereinafter referred to as Survey of Treasure Island Intertidal Habitats). Report prepared for the Treasure Island Redevelopment Project, San Francisco, California, April 2009.

shoreline or historically dumped when the facility was an active shipyard.²⁷ Additionally, the area contains numerous artificial hard substrates in the form of the aforementioned quarry rock, concrete, and brick debris as well as abandoned and decaying creosote wood pilings from former docks and wharfs.²⁸ Water depths range from shallow subtidal areas (less than 3.3 feet in depth) to maintained navigation channels (around 39 feet in depth).

The waters of San Francisco Bay adjacent to the project site are part of the Central Bay basin, which is typically characterized as either a polyhaline²⁹ or euhaline³⁰ salinity environment. The marine infaunal community (organisms that live within or near the surface of seafloor sediments) consists of amphipod and decapod crustaceans, bivalves, polychaete and oligochaete worms, bryozoans, gastropod snails, ascidians, octocorals, phoronids, tanaids, and cumaceans. NOAA identified 45 taxa inhabiting shallow subtidal, slough channel, and main channel polyhaline habitats and 57 taxa inhabiting three similar euhaline seafloor habitats within San Francisco Bay.³¹

The most common large mobile invertebrate organisms in the Central Bay basin include blackspotted shrimp (*Crangon nigromaculata*), California bay shrimp (*C. franciscorum*), Dungeness crab (*Cancer Magister*), and the slender rock crab (*C. gracilis*). Although other species of shrimp are present (*C. nigricauda*, *C. munitella*, *Palaemon macrodactylus*, and *Exopalaemon carinicauda*), their overall presence in the Central Bay basin is significantly reduced when compared to the number of blackspotted and California bayshrimps present.³² All of these mobile invertebrates are present throughout the Central Bay basin and provide an important food source for carnivorous fishes, marine mammals, and birds in San Francisco's food web. Dungeness crabs use most of San Francisco Bay as an area for juvenile growth and development prior to returning to the ocean as sexually mature adults.³³

The Central Bay basin has the largest accumulation of hard substrate in San Francisco Bay. The hard substrate benthos in San Francisco Bay consists of both natural and artificial surfaces. Natural substrates include boulders, rock face outcrops, and low-relief rock. Artificial hard substrate includes submerged concrete breakwalls, bulkheads, vessel structures, pilings, riprap,

²⁷ NOAA, Report on the Subtidal Habitats.

²⁸ AMS, Intertidal Habitat and Biological Community Survey.

²⁹ Polyhaline refers to a body of water with salinity concentrations ranging between 18.0 and 30.0 parts per thousand (ppt).

³⁰ Euhaline refers to a body of water with salinity concentrations ranging between 30.0 and 35.0 ppt.

³¹ NOAA, Report on the Subtidal Habitats.

³² NOAA, Report on the Subtidal Habitats.

³³ Tasto, R.N., "San Francisco Bay: Critical to the Dungeness Crab?" In: T.J. Conomos, editor, *San Francisco Bay: The Urbanized Estuary*, 1979. Pacific Division of the American Association for the Advancement of Science, San Francisco, California: 479–490.

and pipelines. Pilings, riprap, and pipelines can be found in every San Francisco Bay region and are a dominant feature along the Port's waterfront, including the project site.

Subtidal hard substrate areas provide habitat for an assemblage of marine algae, invertebrates, and fishes, similar to the hard substrate in the intertidal zone of the Central Bay basin. Submerged hard bottom substrate is typically covered with a mixture of turf organisms that is dominated by hydroids, bryozoans, tunicates, encrusting sponges, encrusting diatoms, and anemones. Pacific rock crab (*Cancer antennarius*) and the red rock crab (*C. productus*) inhabit rocky, intertidal, and subtidal areas in the Pacific Ocean, and likely use San Francisco Bay as an extension of their coastal habitats.³⁴ The Pacific and red rock crabs are frequent targets of sport anglers from piers and jetties.

Subtidal plants and submerged aquatic vegetation occur throughout the Central Bay basin on both soft and hard substrate. On the shallow unconsolidated subtidal habitat within the Central Bay basin, such as the intertidal mudflats in Richardson Bay, the green algae—*Ulva/Enteromorpha*, *Gracillaria verrucosa* (formerly *pacifica*), *Ruppia maritime*, *Potamogeton pectinatus*, and eelgrass (*Zostera marina*)—frequently occur.³⁵ Eelgrass is a shallow subtidal as well as intertidal flowering plant found inhabiting bays, estuaries, and the leeward side of islands. There are no known submerged aquatic vegetation beds in San Francisco Bay waters adjacent to or near the project site.

The bottom, or demersal, fish community reported to inhabit the area surrounding Pier 70 is composed of 49 species, dominated by speckled sanddab (*Citharichthys stigmaeus*), comprising 31.3 percent of the total fish abundance, and the Bay goby (*Lepidogobius lepidus*), accounting for 27.7 percent, based on fish census data collected between 2009 and 2013.³⁶ Eight additional species of fish have been commonly observed in association with the seafloor or inhabit the waters immediately above the seafloor in and around the project area: plainfin midshipmen (*Porichthys notatus*), English sole (*Parophrys vetulus*), brown rockfish (*Sebastes auriculatus*), shiner perch (*Cymatogaster aggregata*), white croaker (*Genyonemus lineatus*), Pacific staghorn sculpin (*Leptocottus armatus*), longfin smelt (*Spirinchus thaleichthys*), and California tonguefish

³⁴ Hieb, K., *Cancer Crabs*. In: James J. Orsi, *Report on the 1980-1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California*, 1999. Available online at http://www.estuaryarchive.org/archive/orsi_1999, 1999.

³⁵ NOAA, *Report on the Subtidal Habitats*.

³⁶ AMS, *Fish Species Inhabiting the Central San Francisco Bay Region Near the Port of San Francisco* (hereinafter referred to as *Fish Species Inhabiting the Central San Francisco Bay Region*). Report prepared for Turnstone Consulting-SCWA, San Francisco, California, August 2015.

(*Symphurus atricaudus*).³⁷ These eight taxa accounted for an additional 35.8 percent of the community during the period from 2009 to 2013.

Non-Native Marine Species

One of the greatest threats to San Francisco Bay marine subtidal and intertidal habitats is from the introduction of non-native species. The introduction of non-native species into the San Francisco Bay ecosystems can result in large-scale changes to the marine communities. It is estimated that a new species is introduced into San Francisco Bay every 14 weeks based on the number of known introduced species into San Francisco Bay since tracking began in 1960.³⁸ Most fail to survive their introduction into San Francisco Bay waters, but some that have survived have produced major ecological changes in resident biological communities. This has been the case with the introduction of the Asian clams (*Potamocorbula amurensis* and *Corbicula fluminea*), which resulted in significant changes in native benthic infaunal communities in the western Delta and Sacramento and San Joaquin rivers. Historically, the principal mechanism of introduction into San Francisco Bay has been fouling, boring, and release of ballast-dwelling organisms. Introduced species include snails, shrimp, plankton, crabs, and algae.

Introduced species now dominate all benthic communities within San Francisco Bay and make up more than 95 percent of the biomass and total abundance of organisms.³⁹ Estuaries and sheltered coastal areas appear to be among the most invaded habitats as a result of being naturally disturbed, low-diversity systems with historic centers of anthropogenic (human-made or -caused) disturbance from shipping, industrial development, and urbanization.⁴⁰ Another concern regarding invasive marine organisms is their potential to spread throughout San Francisco Bay waters once they are introduced to the region or the acceleration of their spreading throughout San Francisco Bay, as has occurred with the algae *Undaria*, for example.

Open Water Habitat

Because of its close proximity to the Pacific Ocean through the Golden Gate, the open water environment of the Central Bay basin in and around the project site is most like and strongly influenced by the open water coastal environment. Because of its lack of significant freshwater inflow, the phytoplankton and zooplankton communities are almost entirely marine in composition and seasonality. The copepods (*Acartia clausi*, *A. californiensis*, and *Oithona*

³⁷ AMS, Fish Species Inhabiting the Central San Francisco Bay Region.

³⁸ Roman, J., Aquatic Invasive Species, 2010 (hereinafter referred to as Aquatic Invasive Species). Available online through the Encyclopedia of Earth, <http://www.eoearth.org/view/article/51cbecf37896bb431f68eaf4/>. Accessed August 28, 2015.

³⁹ Roman, J., Aquatic Invasive Species.

⁴⁰ Ray, G., Invasive Marine and Estuarine Animals of California, ERDC/TC ANSRP-05-2, August 2005.

davisae), harpacticoid copepods, tintinnids, and the larvae of gastropods, bivalves, barnacles, and polychaetes dominate the community structure.⁴¹ Mean zooplankton biomass, or the total number of zooplanktonic organisms occurring in the water column, has ranged from 10 to 50 milligrams per cubic centimeter for San Francisco Bay with the Central Bay basin averaging approximately 30 milligrams per cubic meter.⁴² Unlike the North and South Bay basins, the Central Bay basin is the least affected by introduced exotic species.⁴³

Central Bay basin meroplankton, including macrozooplankton and micronekton, is dominated by the ctenophore (*Pleruobranchia bachei*), the isopod (*Syndotea laticauda*), the shrimps (*Palaemon macrodactylus*, *Crangon franciscorum*, and *C. Nigricauda*), the mysid (*Neomysis kadiakensis*), and the medusa (*Polyorchis* spp.).⁴⁴ Those meroplankton taxa that are found year-round throughout the Central Bay basin include two of the shrimp species (*Crangon franciscorum* and *C. nigricauda*) and northern anchovy (*Engraulis mordax*).⁴⁵

Thirty-five species of pelagic⁴⁶ fish (living in open water) have been documented inhabiting the deep and shallow water areas of Central Bay basin near Pier 70 between 2009 and 2013. Three of these species account for over 98.0 percent of the total abundance of fish present, with the dominant species, northern anchovy, comprising 88.3 percent of the fish inhabiting the pelagic community. Pacific herring (*Clupea pallasii*), the second most common fish species, accounted for 8.3 percent of the total abundance, and jacksmelt (*Atherinopsis californiensis*) accounted for 2.2 percent of the total abundance inhabiting the water column.⁴⁷

Marine Birds

Typical marine birds regularly inhabiting or using the open waters of the study area include double-crested and Brandt's cormorants (*Phalacrocorax auritus* and *P. penicillatus*), pigeon guillemot (*Cephus columba*), herring gull (*Larus argentatus*), mew gull (*L. canus*), Western gull (*L. occidentalis*), California gull (*L. californicus*), ring-billed gull (*L. delawarensis*), eared grebe (*Podiceps nigricollis*), western and Clark's grebe (*Aechmophorus occidentalis* and *A. clarkii*),

⁴¹ Ambler, J.W., J.E. Cloern, and A. Hutchinson. 1985. *Seasonal Cycles of Zooplankton from San Francisco Bay* (hereinafter referred to as *Seasonal Cycles of Zooplankton*). *Hydrobiologia* 129:177–197.

⁴² Ambler, et al., *Seasonal Cycles of Zooplankton*.

⁴³ Ambler, et al., *Seasonal Cycles of Zooplankton*.

⁴⁴ Gewant, D.S. and S. M. Bollens. 2005. Macrozooplankton and Micronekton of the Lower San Francisco Estuary: Seasonal, Interannual, and Regional Variation in Relation to Environmental Conditions *Bay* (hereinafter referred to as *Macrozooplankton and Micronekton in San Francisco Estuary*). *Estuaries* 28:3 p 473-485.

⁴⁵ Gewant and Bollens, *Macrozooplankton and Micronekton in San Francisco Estuary*

⁴⁶ Residing within the open water column.

⁴⁷ AMS, *Fish Species Inhabiting the Central San Francisco Bay Region*.

common loon (*Gavia immer*), Caspian tern (*Hydroprogne caspia*), least tern (*Sternula antillarum*), and California brown pelican (*Pelecanus occidentalis californicus*). Among the diving benthivores guild, canvasback (*Aythya valisineria*), greater scaup (*A. marila*), lesser scaup (*A. affinis*), and surf scoter (*Melanitta perspicillata*) are common.

Marine Mammals

Multiple species of marine mammals are known to occur within San Francisco Bay. The most common, predominant, and likely to be present in waters adjacent the project site include the harbor seal (*Phoca vitulina*) and the California sea lion (*Zalophus californianus*). Other species of marine mammals that are known to occur in San Francisco Bay are less likely to be present in waters adjacent to the project site. The harbor porpoise (*Phocoena phocoena*), although regularly observed inhabiting the waters of the western portion of the Central Bay basin (in and around the Golden Gate and Angel Island), have been observed in recent years as far north as San Pablo and Suisun bays and Yerba Buena Island and the San Francisco-Oakland Bay Bridge to the south.^{48,49} Similarly, the northern elephant seal (*Mirounga angustirostris*) has become a regular visitor to the western Central Bay basin, with annual occurrences of individuals being present within San Francisco Bay. In recent years, young elephant seals have been observed at Crissy Field in San Francisco Bay, where they have been recovered by the Marine Mammal Center, and recently a pregnant female was recovered from north San Pablo Bay and relocated to Point Reyes.⁵⁰ Although elephant seals are observed within San Francisco Bay more frequently than in past decades, there is no indication that they have taken up residency or are foraging for food within San Francisco Bay waters. The humpback whale (*Megaptera novaengliae*), the California gray whale (*Eschrichtius robustus*), the bottlenose dolphin (*Tursiops truncatus*), and the California sea otter (*Enhydra lutra*) are occasionally observed in San Francisco Bay but are at present relatively rare occurrences.

In general, the presence of marine mammals in San Francisco Bay is related to distribution and presence of prey species and foraging habitat. Additionally, harbor seals and sea lions use

⁴⁸ National Marine Fisheries Service (NMFS), *Harbor Porpoise (Phocoena phocoena): San Francisco-Russian River Stock*, 2009. Available online at http://www.nmfs.noaa.gov/pr/sars/2013/po2013_harborporpoise-sfrussianriver.pdf. Accessed October 24, 2014.

⁴⁹ NOAA, Taking of Marine Mammals Incidental to Specified Activities; San Francisco – Oakland Bay Bridge Pier E-3 Demolition via Controlled Implosion. 80 FR 44060–44076, July 24, 2015. Available online at <https://federalregister.gov/a/2015-18178>.

⁵⁰ Press Democrat, “Elephant seal at highway 37 near San Pablo Bay, captured for relocation.” December 29, 2015. Available online at <http://www.pressdemocrat.com/news/4991440-181/elephant-seal-at-highway-37?artslide=0>. Accessed April 18, 2016.

various intertidal substrates that are exposed at low to medium tide levels for resting and breeding.⁵¹

Harbor seals and harbor porpoises are the only year-round residents of San Francisco Bay, although sea lions can be observed most of the year. Harbor seals have permanent colonies at Castro Rocks in San Pablo Bay, Yerba Buena Island in the Central Bay basin, and Mowry Slough in the South Bay basin.⁵² The current San Francisco Bay harbor seal population is estimated to be between 500 and 700 individuals.⁵³ Harbor seals forage throughout San Francisco Bay, feeding on schooling fish such as smelt, anchovies, herring, rockfish, sculpin, perch, and midshipmen, along with squid and mysid shrimp, most of which are present in the waters adjacent to the Proposed Project.

Harbor porpoises can be observed in San Francisco Bay at any time of the year, but use both the waters of San Francisco Bay and near-shore coastal waters of Central and Northern California. The harbor porpoise is most commonly observed near the Golden Gate Bridge and open water areas of the western Central Bay basin, although sightings in other areas of San Francisco Bay do occur.^{54,55} The San Francisco Bay-Russian River stock of harbor porpoises, identified as a unique genetic group, ranges from Point Arena to Monterey Bay. At present, no accurate estimates of the size of the San Francisco Bay-Russian River population exist.⁵⁶ Unlike some of their cousins, harbor porpoises typically avoid boats and humans. Harbor porpoise eat mostly small schooling fish and invertebrates and, along with seals and sea lions, will feed on herring and anchovies.

California sea lions use San Francisco Bay for refuge and foraging but do not breed or pup within the Bay. California sea lions occur within San Francisco Bay in their highest numbers while migrating to and from their primary breeding areas on the Farallon and California Channel islands, and when Pacific herring and salmon inhabit San Francisco Bay waters to spawn or migrate to upriver spawning areas, typically November to March for herring and November to May for salmon. Sea lions are known to swim up into the Delta along with migrating salmon, but most concentrate feeding in the Central Bay basin and where herring spawn. Similar to harbor seals, sea lions haul out onshore, often using structures such as boat docks and navigational buoys, although

⁵¹ NOAA, Report on the Subtidal Habitats.

⁵² NOAA, Report on the Subtidal Habitats.

⁵³ NOAA, *Report on the Subtidal Habitats*, citing Grigg, E.K., S.G. Allen, D.E. Green, and H. Markowitz, *Harbor Seal, Phoca vitulina richardii, Population Trends in the San Francisco Bay Estuary, 1970-2002*, California Fish and Game 90(2):51-70, 2004.

⁵⁴ Todorov, K., Porpoises playing in Napa River. *Napa Valley Register*, August 3, 2007. Available online at http://napavalleyregister.com/news/local/porpoises-playing-in-napa-river/article_9e95d523-26bf-5a37-9d33-182fb5e97d93.html. Accessed April 19, 2016.

⁵⁵ Keener W. 2016. Personal communication.

⁵⁶ NOAA, Report on the Subtidal Habitats.

individuals may also haul out on islands in San Francisco Bay, such as Alcatraz and Angel Island. The largest California sea lion haul-out in San Francisco Bay has been at the Port of San Francisco's Pier 39, where up to 800 sea lions have been counted in the past. Sea lions often float on the surface in large groups of 10 to 20 after feeding.

The California gray whale migrates between its mating/calving grounds in Baja, Mexico, to its primary feeding grounds in Alaska and Canada on an annual basis. Gray whales are commonly sighted offshore of San Francisco Bay during peak migration periods in spring (northward) and winter (southward). North Pacific coastal waters also contain at least three separate populations of humpback whales, of which one inhabits the waters of California, Oregon, and Washington. This population winters in coastal Central America and Mexico and migrates to areas ranging from California to southern British Columbia in summer and fall. When migrating, both humpbacks and California gray whales stay near the surface of the ocean.

California gray whales and humpback whales are infrequent transients into San Francisco Bay, with gray whales potentially present December through April, and humpback whales potentially present April through December. Humpback and California gray whales are both occasional visitors to the San Francisco Bay,⁵⁷ with sightings as recent as 2007 for humpbacks when a pair swam up the Sacramento River as far as Sacramento before returning south to San Francisco Bay and the Pacific Ocean.⁵⁸

SENSITIVE NATURAL COMMUNITIES

A sensitive natural community is a biological community that is regionally rare, provides important habitat opportunities for wildlife, is structurally complex, or is in other ways of special concern to local, State, or Federal agencies. Most sensitive natural communities are given special consideration because they perform important ecological functions, such as maintaining water quality and providing essential habitat for plants and wildlife. Some plant communities support a unique or diverse assemblage of plant species and therefore are considered sensitive from a botanical standpoint. The most current version of the CDFW's List of Vegetation Alliances and Associations⁵⁹ indicates which natural communities are of special status given the current State of

⁵⁷ Green, D.E., E. Grigg, S. Allen, and H. Markowitz, 2006. Monitoring the Potential Impact of the Seismic Retrofit Construction Activities at the Richmond-San Rafael Bridge on Harbor Seals (*Phoca vitulariarichardsi*) May 1, 1998–September 15, 2005.

⁵⁸ Associated Press International (API), "Two Humpback Whales Head Up California River," *Associated Press*, May 17, 2007. Available online at <http://www.foxnews.com/story/0,2933,272692,00.html>. Accessed March 18, 2011.

⁵⁹ California Department of Fish and Game, *List of Vegetation Alliances and Associations*, 2010. Vegetation Classification and Mapping Program, California Department of Fish and Game. Sacramento, California. September 2010.

the California classification. The CDFW formerly tracked sensitive natural communities in the CNDDDB. Due to funding cuts, CDFW staff have not added any new occurrences of sensitive natural communities to the CNDDDB since the mid-1990s, although the database continues to include those occurrences recorded prior to the program being defunded. The CNDDDB reports no sensitive natural community occurrences within the San Francisco North and South U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles containing and surrounding the terrestrial study area.⁶⁰ Serpentine soils in California often support unique native flora, of which many species are endemic⁶¹ to this substrate, and therefore are rare or have special status throughout the State. The serpentine rock outcrop of Irish Hill has been heavily disturbed throughout the history of development within the project site, and as a result does not contain the species assemblage that qualifies other serpentine areas as sensitive natural communities.

WETLANDS AND OTHER JURISDICTIONAL WATERS

No wetlands occur in either the marine or terrestrial project study areas; however, the project site is adjacent to San Francisco Bay, which the U.S. Army Corps of Engineers (Corps) classifies as navigable “waters of the U.S.” Navigable waters of the U.S. refer to non-wetland aquatic features (other waters) which are regulated by the Federal Clean Water Act (CWA) and are defined under the CWA at Title 33 Code of Federal Regulations (CFR) Part 328.4. To be considered Federally jurisdictional, these features generally must exhibit a defined bed and bank and an ordinary high water mark (OHWM), or be subject to the ebb and flow of the tides. Examples of other waters of the U.S. include rivers, creeks, intermittent and ephemeral⁶² channels, ponds, lakes, and the ocean. Waters of the State of California are defined as “any surface water or groundwater, including saline waters, within the boundaries of the State” (California Water Code Section 13050[e]) and include all Federally jurisdictional waters. Waters of the State are broadly construed to include both public and private waters in natural and artificial channels.

As navigable waters of the U.S., San Francisco Bay is regulated by the Corps under Section 10 of the Rivers and Harbors Act up to mean high water mark, and under Section 404 of the CWA up to the high tide line. These waters are also regulated by the Regional Water Quality Control Board (RWQCB) as Waters of the State. In addition, the San Francisco Bay Conservation and Development Commission (BCDC) regulates the fill, extraction of materials, and substantial changes in use of land, water, and structures within the bay and within 100 feet of the bay shoreline, which includes terrestrial or landside portions of the project site. See Regulatory

⁶⁰ California Natural Diversity Database (CNDDDB), 2015 Rarefind version 5 query of the San Francisco North and San Francisco South USGS 7.5-minute topographic quadrangles, Commercial Version. Accessed August 21, 2015.

⁶¹ Native or restricted to a certain area.

⁶² A channel that is dry most of the time but flows briefly following rainfall.

Framework on pp. 4.M.33-4.M.45 for more information on Federal and State waters, and BCDC jurisdiction over San Francisco Bay and near-shore areas.

WILDLIFE MOVEMENT CORRIDORS

Wildlife movement corridors are considered an important ecological resource by the CDFW and USFWS, and under CEQA. Movement corridors may provide favorable locations for wildlife to travel between larger areas of open space referred to as core habitat areas that support foraging, breeding, shelter, and preferred summer and winter range locations. Movement corridors may also function as dispersal corridors that allow animals to move between various locations within their range. Topography and other natural factors, in combination with urbanization, can fragment or separate large open-space areas. Areas of human disturbance or urban development can fragment wildlife habitats and impede wildlife movement between areas of suitable habitat. This fragmentation can create isolated “islands” of vegetation that may not provide sufficient area to accommodate sustainable populations, and can adversely affect genetic and species diversity. Movement corridors mitigate the effects of this fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished and promotes genetic exchange between separate populations. The project site is not considered to be part of an established wildlife movement corridor because it does not provide a connection between two larger core habitat areas.

Although the project site is not within a terrestrial wildlife movement corridor, the San Francisco Peninsula is an important migratory stopover for birds along the Pacific Flyway, one of the four major migratory routes in North America. During fall and spring migrations raptors, songbirds, shorebirds, and waterbirds stop to forage and rest in suitable habitat along this route such as Golden Gate Park, the Presidio, Mount Sutro, Lake Merced, and coastal or bayside beaches. Although the San Francisco Peninsula’s location on the Pacific Flyway allows open spaces to host transient individuals, it does not constitute a wildlife movement corridor as these areas are isolated within an otherwise densely developed urban environment. Migrating birds that can forage in intertidal and marine environments may use San Francisco Bay during migration; however, because the terrestrial study area and shoreline are developed/highly disturbed, they do not offer high-quality habitat for migrating birds.

SPECIAL-STATUS AND OTHERWISE PROTECTED SPECIES

A number of species known to occur in either the marine or terrestrial study areas are protected pursuant to Federal and/or State endangered species laws, have been designated species of special concern by the CDFW or NOAA-National Marine Fisheries Service (NMFS), or are afforded certain protection through regulatory means such as the California Department of Fish and Game Code. In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare,

endangered, or threatened species that are not currently included in an agency listing, but whose “survival and reproduction in the wild are in immediate jeopardy” (endangered) or which are “in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens” or “is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered ‘threatened’ as that term is used in the Federal Endangered Species Act.”⁶³ Species recognized under these terms are collectively referred to as “special-status species.” For the purpose of this Environmental Impact Report (EIR), special-status species include the following:

1. Species listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (50 CFR 17.12 [listed plants], 17.11 [listed animals], and various notices in the Federal Register [FR] [proposed species]).
2. Species that are candidates for possible future listing as threatened or endangered under the Federal Endangered Species Act (61 FR 40, February 28, 1996).
3. Species of “special concern,” as designated by USFWS or NOAA-NMFS.
4. Species listed or proposed for listing by the State as threatened or endangered under the California Endangered Species Act (14 Cal. Code Regs. 670.5).
5. Species described by the CDFW as species of special concern.⁶⁴
6. Species designated as “special animals” by the State.⁶⁵
7. Species designated as “fully protected” by the State (there are about 35, most of which are also listed as either endangered or threatened).

⁶³ For example, the CDFW interprets Ranks 1A, 1B, 2A, and 2B of the California Native Plant Society’s *Inventory of Rare and Endangered Vascular Plants of California* to consist of plants that, in a majority of cases, would qualify for listing as rare, threatened, or endangered. However, the determination as to whether an impact is significant is made by the lead agency, absent the protection of other laws.

⁶⁴ A California species of special concern is one that has been extirpated from the State; meets the State definition of threatened or endangered but has not been formally listed; is undergoing or has experienced serious population declines or range restrictions that put it at risk of becoming threatened or endangered; and/or has naturally small populations susceptible to high risk from any factor that could lead to declines that would qualify it for threatened or endangered status.

⁶⁵ Species listed on the current CDFW “special animals” list (October 2015), which includes 905 species. This list includes species that CDFW considers “those of greatest conservation need” (CDFW, *Special Animals List*).

8. Raptors (birds of prey), which are specifically protected by California Fish and Game Code Section 3503.5, thus prohibiting the take, possession, or killing of raptors and owls, their nests, and their eggs.⁶⁶
9. Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.).
10. Species that meet the definitions of rare and endangered under CEQA. CEQA Section 15380 provides that a plant or animal species may be treated as “rare or endangered” even if not on one of the official lists (CEQA Guidelines, Section 15380).
11. Plants considered by the CNPS to be “rare, threatened or endangered in California” under the California Rare Plant Ranking system, which includes Rank 1A, 1B, 2A, and 2B, as well as Rank 3 and 4,⁶⁷ plant species.⁶⁸

Lists of special-status plant and animal species that have the potential to occur within the study area for terrestrial biological resources were compiled based on data contained in the CNDDDB,⁶⁹ the USFWS CalIPaC Trust Report,⁷⁰ and the CNPS Inventory of Rare and Endangered Plants⁷¹ for the San Francisco North and South USGS 7.5-minute topographical quadrangles. Marine special-status species were compiled from USFWS, NOAA, and CDFW listings, FR notifications, and assorted published and non-published literature relevant to the marine study area of the Central Bay basin. Several additional species were identified based on the findings of

⁶⁶ The inclusion of birds protected by Fish and Game Code Section 3503.5 is in recognition of the fact that these birds are substantially less common in California than most other birds, having lost much of their habitat to development, and that the populations of these species are therefore substantially more vulnerable to further loss of habitat and to interference with nesting and breeding than most other birds. It is noted that a number of raptors and owls are already specifically listed as threatened or endangered by State and Federal wildlife authorities.

⁶⁷ Rank 3 plants may be analyzed under CEQA Guidelines Section 15380 if sufficient information is available to assess potential impacts to such plants. Factors such as regional rarity vs. Statewide rarity should be considered in determining whether cumulative impacts to a Rank 4 plant are significant even if individual project impacts are not. California Rare Plant Ranking system (CRPR) Ranks 3 and 4 may be considered regionally significant if, for example, the potentially impacted occurrence is located at the periphery of the species’ range, or exhibits unusual morphology, or occurs in an unusual habitat/substrate. For these reasons, CRPR Ranks 3 and 4 plants should be included in the special-status or otherwise protected species analysis. Ranks 3 and 4 plants are also included in the CNDDDB Special Vascular Plants, Bryophytes, and Lichens List. The current online published list is available at: <http://www.dfg.ca.gov/biogeodata>. (CDFW, Natural Diversity Database. July 2015. Special Vascular Plants, Bryophytes, and Lichens List. Quarterly publication. 125 pp.)

⁶⁸ CRPR rankings are defined in detail in Regulatory Framework on p. 4.M.40.

⁶⁹ CNDDDB, 2015 Rarefind version 5 query of the San Francisco North and San Francisco South USGS 7.5-minute topographic quadrangles, Commercial Version. Accessed August 21, 2015.

⁷⁰ USFWS, 2015 My Project, IPaC Trust Resource Report of Federally Endangered and Threatened Species in the San Francisco North and San Francisco South USGS 7.5-minute topographic quadrangles, August 20, 2015.

⁷¹ California Native Plant Society (CNPS), 2015, Inventory of Rare and Endangered Plants for San Francisco North and San Francisco South USGS 7.5-minute topographic quadrangles. Available online at <http://www.rareplants.cnps.org/>. Accessed August 21, 2015.

technical reports and environmental literature. Locally significant plants are incorporated herein based on a list produced by the Yerba Buena Chapter of CNPS that identifies locally rare plants with extant populations identified in the project vicinity.⁷² Lists for terrestrial and marine species that may occur in the project study areas are addressed separately. Three tables in Appendix E (Table E-1: Special-Status or Otherwise Protected Plant Species that May Occur in the Study Area, Table E-2: Special-Status or Otherwise Protected Terrestrial Animal Species that May Occur in the Study Area, and Table E-3: Special-Status Fish and Marine Mammals that May Occur within the Bay Waters of the Project Area) present the special-status species considered in the analysis, including each species' legal or protective status, habitat requirements, and blooming period (for plants), and the potential for occurrence within either the terrestrial or marine project study areas. Figure M.1 in Appendix E identifies the locations of regional special-status species occurrences as reported in the CNDDDB within 5 miles of the project site.

Species designations regarding the likelihood of occurrence were assigned based on a review of the biological literature of the region, information presented in previous environmental documentation, and an evaluation of the habitat conditions of the study area. A species was designated to have “no potential” to occur if (1) its specific habitat requirements (e.g., serpentine grasslands, as opposed to grasslands occurring on other soils) are not present; or (2) it is presumed to be extirpated from the project area or region based on the best scientific information available. A species was designated as having a “low” potential for occurrence if (1) its known current distribution or range is outside of the study area; or (2) only limited or marginally suitable habitat is present within the study area. A species was designated as having a “moderate” potential for occurrence if (1) there is low to moderate quality habitat present within the study area or immediately adjacent areas; or (2) the study area is within the known range of the species, even though the species was not observed during biological surveys. A species was designated as having a “high” potential for occurrence if (1) moderate to high quality habitat is present within the study area; and (2) the study area is within the known range of the species. A species was designated as “present” if it was observed within the project site during reconnaissance or focused surveys.

Special-Status Plants

The special-status or otherwise protected plant species identified in Appendix E, Table E-1 are considered to have either no potential to occur in the terrestrial study area or a low potential to occur in the terrestrial study area due to the heavily disturbed nature of the project site and corresponding absence of suitable habitat. No special-status plant species were observed during

⁷² CNPS, Yerba Buena Chapter, 2015, List of Locally Significant Plants for San Francisco County. Available online at http://www.cnps-yerbabuena.org/experience/plant_guides.html?jumpToGuide=0 Information. Accessed August 21, 2015.

the August 20, 2015, terrestrial biological resources reconnaissance survey of the project site. Several special-status plant species with affinity to serpentine soils that have some known occurrences in disturbed, rocky, weedy habitats were considered to have potential to occur on Irish Hill due to the serpentine geology of the feature and historical presence of such species in the region. Potential habitat for rare plants does not occur within the terrestrial study area outside of the Irish Hill remnant of the project site. CDFW protocol-level⁷³ rare plant surveys of Irish Hill were conducted in the spring of 2016 during blooming periods of suspected species to determine if any special-status plants occupied Irish Hill. No special-status plant species were observed during the rare plant surveys of Irish Hill on March 30 and May 3, 2016,⁷⁴ and the surveying botanist concluded that the historical disturbance to Irish Hill and resulting composition of non-native or invasive species displaced any remaining suitable serpentine habitat for rare plants. No special-status plants are considered to have even a moderate potential to occur within the terrestrial study area and are not considered further in this analysis.

Special-Status Terrestrial Animals

Many of the special-status terrestrial animals identified in Appendix E, Table E-2 have no potential to occur in the terrestrial study area or a low potential to occur in the terrestrial study area due to the absence of suitable habitat preferred by the species or necessary for their survival. Double-crested cormorant, a California species of special concern, was observed in San Francisco Bay during the biological resources reconnaissance survey conducted August 20, 2015, and other special-status bird and bat species have the potential to occur in the terrestrial study area. Only those special-status species known to occur within the study area or considered to have at least a moderate potential to occur in the study area were considered in the impact analysis; these species are described below.

The following groups of terrestrial special-status animals have at least a moderate potential to occur in the terrestrial study area:

- Special-Status Birds
- Other Resident and Migratory Birds
- Special-Status Bats

⁷³ CDFG, Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities, California Natural Resources Agency, November 24, 2009.

⁷⁴ ESA, Pier 70 Mixed-Use Development Project: Results of the March 30, 2016 and May 3, 2016, Irish Hill Rare Plant Surveys, May 2016.

Special-Status Birds

The following birds are State or Federal listed as endangered or threatened, fully protected, recently delisted, or on a watch list. Species considered Birds of Conservation Concern by the USFWS, Species of Special Concern by CDFW, or species that occur on the CDFW Special Animals List are also discussed.

AMERICAN PEREGRINE FALCON

The American peregrine falcon (*Falco peregrines anatum*) is a California fully protected species that is regularly observed in the study area.⁷⁵ The American peregrine falcon nests on cliff ledges in natural environments, but it has adapted to nesting on shelves of tall buildings or structures in urban environments.⁷⁶ The Santa Cruz Predatory Research Group has been closely following a successful breeding pair of peregrines who nested on a ledge of the 33rd floor of the Pacific Gas & Electric building on Beale Street in San Francisco from 2005 to 2014. This raptor commonly hunts other birds in flight from perches or from high in the air. Although peregrines typically prefer to nest in taller buildings, it is possible that they could nest in one of the multi-story buildings on the site. American peregrine falcon nesting has not been documented or observed on site, though they may forage in the study area.

CALIFORNIA GULL

The California gull, formerly a State Species of Special Concern due to declining numbers in their historical breeding population at Mono Lake, is on the CDFW Watch List. Nesting colonies in California are still considered to be of conservation concern by CDFW, even though the species has established large breeding colonies in the San Francisco Bay Area.⁷⁷ The California gull is a medium-sized gull with a yellow bill with a black ring, and yellow legs. The species breeds primarily at lakes and marshes in interior western North America from Canada south to eastern California and Colorado.⁷⁸ Birds that breed inland are migratory, most moving to the Pacific coast in winter. More recently, the species has been breeding in large numbers at the salt

⁷⁵ eBird, An online database of bird distribution and abundance [web application]. Agua Vista Park Hotspot. eBird, Ithica, New York. Available online at <http://www.ebird.org>. Accessed September 28, 2015.

⁷⁶ Sibley, David A., 2003, *The Sibley Guide to Birds*. National Audubon Society. Alfred A. Knopf, New York.

⁷⁷ Ackerman, J.T., J.Y. Takekawa, C. Strong, N. Athearn, and A. Rex, *California Gull Distribution, Abundance, and Predation on Waterbird Eggs and Chicks in South San Francisco Bay, Final Report* (hereinafter referred to as *California Gull Report*), U.S. Geological Survey, Western Ecological Research Center, Davis and Vallejo, California, 61 pp.

⁷⁸ Sibley, David A., 2003, *The Sibley Guide to Birds*. National Audubon Society. Alfred A. Knopf, New York, 215 pp.

ponds of south San Francisco Bay. They nest in colonies, sometimes with other bird species. The nest is a shallow depression on the ground lined with vegetation and feathers. The female usually lays two or three eggs, and both parents feed the young birds. California gulls forage in flight or pick up objects while swimming, walking, or wading and primarily eat insects, fish, and eggs. They also scavenge at garbage dumps or docks. California gulls may have negative effects on other ground-nesting birds and are significant predators on American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), and western snowy plover (*Charadrius nivosus* ssp. *nivosus*) eggs and chicks.⁷⁹ California gull forage in San Francisco Bay but are not expected to nest on the project site due to the lack of historic nesting at the site, the absence of suitable nesting habitat, and the constant presence of people in the parking lots and buildings adjacent to the shoreline.

OSPREY

The osprey (*Pandion haliaetus*) is a former California Species of Special Concern, and nesting osprey are on the CDFW Watch List. Osprey are also protected under Section 3503.5 of the California Fish and Game Code. These large fish-eating raptors can be found around nearly any water body, including salt marshes, rivers, ponds, reservoirs, estuaries, and oceans. Historically, ospreys nested throughout much of California, but by the 1960s much of the osprey population declined in the central and southern California areas. This decline was attributed to human persecution, habitat alteration, and DDT use. The osprey prefers to nest within sight of permanent water and readily builds its nest on human-made structures, such as telephone poles, channel markers, duck blinds, and nest platforms designed especially for it. A nesting pair bred successfully on top of a crane located at Pier 80 in 2012, south of the project site.⁸⁰ Marginal nesting structures for osprey occur within the project site, and foraging habitat is present within San Francisco Bay.

CALIFORNIA BROWN PELICAN

A State Fully Protected Species, brown pelicans occur in estuarine, marine subtidal, and marine pelagic waters throughout coastal California.⁸¹ Important habitat for pelicans during the nonbreeding season includes roosting and resting areas, such as offshore rocks, islands, sandbars, breakwaters, and pilings. Suitable areas need to be free of disturbance. This species rests temporarily on the water or isolated rocks, but roosting requires a dry location near food and a buffer from predators and humans. The California brown pelican is a common post-breeding

⁷⁹ Ackerman et al., *California Gull Report*.

⁸⁰ Golden Gate Audubon Society, Osprey Chick Hatches on Top of Maritime Crane in San Francisco's First Documented Osprey Birth. Press release, July 1, 2012.

⁸¹ Zeiner D.C., W.F. Laudenslayer, Jr., K.E. Mayer, M. White, 1990, *California's Wildlife Volume II, Birds*, California Department of Fish and Game, California brown pelican.

resident (May through November) of the open waters of central San Francisco Bay. Nesting habitat does not occur on the project site; San Francisco Bay is located outside of the species' breeding range, which is limited to the Channel Islands south to central Mexico. Brown pelican presence within or near the project site would be limited to loafing on decapitated piers or bulkheads and foraging in the Bay and adjacent environs.

DOUBLE-CRESTED CORMORANT

The double-crested cormorant is a Species of Special Concern in California. A year-round resident along the entire coast of California, the species is common along the coast and in estuaries and salt ponds. They forage mainly on fish, crustaceans, and amphibians. These birds sometimes feed cooperatively in flocks of up to 600, often with pelicans, and nest in colonies of a few to hundreds of pairs.⁸² There are breeding colonies on Alcatraz, Yerba Buena Island, and the old eastern span of the Bay Bridge. The species forages in San Francisco Bay. Although unlikely, the species has the potential to nest on the dilapidated piers northeast of the project site.

CASPIAN TERN

Caspian terns are considered a Bird of Conservation Concern by USFWS, and their nesting areas are protected. This species is common along the California coast and at scattered locations inland. They nest in colonies from April through early August on sandy estuarine shores, on levees in salt ponds, and on islands in alkali and freshwater lakes. Breeding adults often fly substantial distances to forage in lacustrine,⁸³ riverine, and fresh and saline emergent wetland habitats. They have successfully nested at Piers 60 and 64, north of the project site.⁸⁴

Other Resident and Migratory Birds

Although many native birds are not considered to be special-status species, their nests are protected by the Migratory Bird Treaty Act (MBTA) and the California Fish and Game Code. Many resident and migratory birds could nest in ruderal vegetation, eucalyptus trees, on or in buildings within the study area, as well as on the dilapidated piers off shore of the project site. Western gulls have been documented nesting at Piers 60 and 64,⁸⁵ north of the project site, and could nest on dilapidated piers northeast of the project site. Raptor species, such as great horned owl (*Bubo virginianus*), red-tailed hawk, and red-shouldered hawk, could build a nest in the stand

⁸² Zeiner et al., 1990, *California's Wildlife Volume II, Birds*, California Department of Fish and Game, Double-crested cormorant.

⁸³ Habitat surrounding inland depressions or dammed riverine channels containing standing water (i.e. a lake).

⁸⁴ Weeden, N., and M. Lynes, Summary Report of Avian Surveys Conducted in 2008

⁸⁵ Weeden, N., and M. Lynes, Summary Report of Avian Surveys Conducted in 2008.

of mature eucalyptus adjacent to Irish Hill. Cliff swallow, barn swallow (*Hirundo rustica*), and black phoebe (*Sayornis nigricans*) could build mud nests on the outside of existing buildings and barn owls may nest inside of existing buildings at the project site. Other passerine species, such as house finch and Anna's hummingbird, could build nests in shrubs or trees in the study area, while killdeer (*Charadrius vociferous*) and mourning dove build nests on the ground. Great blue heron (*Ardea Herodias*) and shorebirds such as sanderling, western sandpiper, and spotted sandpiper could also frequent the exposed shoreline along the northeastern boundary of the site to forage while migrating or overwintering in the Bay Area.

Special-Status Bats

Two special-status bat species have at least a moderate potential to roost within the project study area: Pallid bat (*Antrozous pallidus*), considered a California Species of Special Concern by CDFW, and Yuma myotis (*Myotis yumanensis*), considered a California special animal by CDFW. Suitable roosting habitat for these bats is open spaces, cracks, and crevices; within buildings; in tree foliage; underneath the exfoliating bark of trees; and in tree cavities, all of which occur within the project site. Bat surveys conducted in 2009 of San Francisco's parks and natural areas found that the three most commonly encountered species in the area are Mexican free-tailed bat (*Tadarida brasiliensis*), Yuma myotis, and western red bat (*Lasiurus blossevillii*).⁸⁶ Mexican free-tailed bats, which have no special status, were widespread and abundant throughout the sampled natural areas and the only species documented in the Krauel study sample sites closest to the project site including Buena Vista Park (approximately 2 miles southwest) and Bayview Park (approximately 3 miles south).⁸⁷ Yuma myotis and western red bat were much less abundant and generally were restricted to parks with lakes. Suitable roosting habitat for Pallid bat, Yuma myotis, and common bat species is present in the project area.

Special-Status Fish and Marine Mammals

Specific individual species in the following groups of marine special-status animals have at least a moderate potential to occur in the marine study area:

- Special-Status Fish Species
- Special-Status Marine Mammals
- Managed U.S. Fisheries Species
- Other Special-Status Marine Species

⁸⁶ Krauel, J.K., *Foraging Ecology of Bats in San Francisco*. M.S. Thesis, San Francisco State University. San Francisco, California. August 2009.

⁸⁷ Krauel, J.K., *Foraging Ecology of Bats in San Francisco*.

The special-status marine species list presented in Appendix E, Table E-3 includes those taxa for which potential habitat (i.e., general habitat types for breeding or foraging) has been observed to occur within the general vicinity of the project site and can be reasonably expected to be affected by project activities. Species for which generally suitable habitat occurs but that were nonetheless determined to have low potential to occur in the project area are also listed in Appendix E, Table E-3. This table provides the rationale for each potential-to-occur determination. Species observed or with a moderate to high potential to occur in the marine project study area (i.e., the San Francisco Bay Waters of the Project Area) are discussed in further detail below.

Special-Status Fish

GREEN STURGEON

Green sturgeon, an anadromous⁸⁸ fish, is the most widely distributed member of the sturgeon family and the most marine-oriented of the sturgeon species. It is listed as a Federal threatened species and as a State species of special concern. Green sturgeons (*Acipenser medirostris*) range in near-shore coastal waters from Mexico to the Bering Sea, and are common occupants of bays and estuaries along the western coast of the United States.⁸⁹ Adults in the San Joaquin Delta are reported to feed on benthic invertebrates including shrimp, amphipods, and occasionally small fish,⁹⁰ while juveniles have been reported to feed on opossum shrimp and amphipods. Adult green sturgeons migrate into fresh water beginning in late February, with spawning occurring in March through July and peak activity in April and June. After spawning, juveniles remain in fresh and estuarine waters for one to four years and then begin to migrate out to the sea.⁹¹ The upper Sacramento River has been identified as the only known spawning habitat for green sturgeon in the southern distinct population segment. Critical habitat for the green sturgeon includes the Sacramento River, the Sacramento-San Joaquin Delta, and Suisun, San Pablo and San Francisco bays.⁹² This includes the waters adjacent to Pier 70.

⁸⁸ Anadromous fish are those migrating from the sea to fresh water to spawn.

⁸⁹ Moyle, P.B., R.M. Yoshiyama, J.E. Williams, and E.D. Wikramanayake, *Fish Species of Special Concern of California, Second Edition* (hereinafter referred to as *Fish Species of Special Concern*), University of California, Davis, Department of Wildlife and Fisheries Biology, prepared for the California Department of Fish and Game, Rancho Cordova, CA, June 1995.

⁹⁰ Moyle, et al., *Fish Species of Special Concern*.

⁹¹ Moyle, et al., *Fish Species of Special Concern*.

⁹² NOAA, "Endangered and Threatened Wildlife and Plants: Final Rulemaking to Designate Critical Habitat for the Threatened Southern District Population Segment of North American Green Sturgeon," *Federal Register* 74(195):52300–52351, October 9, 2009.

LONGFIN SMELT

Longfin smelt is a State-listed endangered species and is currently under reconsideration as a special-status species by the USFWS.⁹³ The longfin smelt is a pelagic schooling fish known to inhabit the San Francisco Bay, including all of the waters of the Central Bay basin including the waters in and adjacent to Pier 70, along the west shoreline of Treasure Island, and in the Central Bay basin.^{94, 95} Although observed in Central Bay basin waters throughout the year, longfin smelt migrate to the fresher water of the Delta to spawn in the winter, returning to San Francisco Bay waters in late spring. No critical habitat has been designated for this species.

PACIFIC HERRING

Pacific herring is neither a protected species under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA), nor a managed fish species under the Fishery Conservation and Management Act (Magnuson-Stevens Act). Pacific herring does, however, represent a species of special concern for San Francisco Bay since it is an important member of the San Francisco Bay marine ecosystem; provides an important food source for marine mammals, sea birds, and fish; and constitutes a State fishery that is entirely conducted within an urban estuary, making it particularly susceptible to human-caused impacts. As a State fishery it is regulated under Sections 8550 through 8559 of the California Fish and Game Code.

Pacific herring are found throughout the coastal zone from northern Baja California northward around the rim of the North Pacific Basin to Korea. In California, herring forage offshore during spring and summer and then migrate inshore to bays and estuaries to spawn October through April. Known spawning areas in California include San Diego Bay, San Luis River, Morro Bay, Elkhorn Slough, San Francisco Bay, Tomales Bay, Bodega Bay, Russian River, Noyo River, Shelter Cove, Humboldt Bay, and Crescent City Harbor.⁹⁶ The largest spawning aggregations in California occur in San Francisco and Tomales bays. Most spawning areas are characterized as having reduced salinity with calm and protected waters. Spawning substrate such as submerged aquatic vegetation beds, especially eelgrass beds, or rocky intertidal areas are preferred, but human-made structures such as pier pilings and riprap are also frequently used spawning

⁹³ USFWS, “Endangered and Threatened Wildlife and Plants; Initiation of Status Review for Longfin Smelt,” *Federal Register* 76(47), March 10, 2011.

⁹⁴ Interagency Ecological Program for the San Francisco Bay Estuary (IEP), *San Francisco Bay Study, 2009-2013*, unpublished raw midwater trawl data, 2009-2013.

⁹⁵ IEP, *San Francisco Bay Study, 2009-2013*, unpublished raw bottom trawl data, 2009-2013.

⁹⁶ Bartling, R., *Pacific Herring – Status of the Fisheries Report*, prepared for the California Department of Fish and Game, 2006 (hereinafter referred to as *Pacific Herring Report*). Available online at <http://www.dfg.ca.gov/marine/status/report2006/herring.pdf>. Accessed March 22, 2011.

substrates in San Francisco Bay.⁹⁷ Key spawning areas within San Francisco Bay include the eelgrass beds in Richardson Bay and along Point Pinole, and the artificial infrastructure of the Port of San Francisco. The waterfront area of the project site has been identified as a herring spawning location.⁹⁸ CDFW reported herring spawning occurring along the waterfront of the project site during the 2012-2013 and 2014-2015 spawning seasons.^{99,100} No reported spawning occurred during the 2013-2014 spawning season at the project site.¹⁰¹ After hatching, herring fry and juveniles use nearby protected inshore waters for rearing habitat.¹⁰²

Special-Status Marine Mammals

HARBOR SEAL

The harbor seal is a permanent resident in San Francisco Bay and is routinely seen in waters near the project site. Harbor seals are protected under the Marine Mammal Protection Act (MMPA). They have been observed as far upstream in the Delta and Sacramento River as the City of Sacramento, though their use of the habitat north of Suisun Bay is irregular.¹⁰³

The closest location to the project site where harbor seals are known to haul out year-round is on the southeastern side of Yerba Buena Island, on U.S. Coast Guard (USCG) property. Individual seals may occasionally haul out farther to the west and southwest of the main haul-out site, depending on space availability and conditions at the main haul-out area. Harbor seals feed in the deepest waters of San Francisco Bay, with the region from the Golden Gate Bridge east to Treasure Island and south to the San Mateo Bridge being the principal feeding sites.¹⁰⁴ Harbor seals feed on a variety of fish, such as perch, gobies, herring, and sculpin.

⁹⁷ Bartling, Pacific Herring Report.

⁹⁸ CDFW Herring Data as Reported by WRA, Inc. Available online at <https://gis.wra-ca.com/herring/>.

⁹⁹ CDFW 2013. Summary of the 2012-2013 Pacific Herring Spawning Population and Commercial Fisheries in San Francisco Bay. November 2013.

¹⁰⁰ CDFW 2015. Summary of the 2014-2015 Pacific Herring Spawning Population and Commercial Fisheries in San Francisco Bay. September 2015.

¹⁰¹ CDFW 2014. Summary of the 2013-2014 Pacific Herring Spawning Population and Commercial Fisheries in San Francisco Bay. July 2014.

¹⁰² Lassuy, D.R., Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Northwest)--Pacific herring, USFWS Biol. Rep. 82(11.126), U.S. Army Corps of Engineers, TR-EL-82-4.18 pp., 1989.

¹⁰³ Goals Project, 2000, Baylands Ecosystem Species and Community Profiles, Life Histories and Environmental Requirements of Key Plants, Fish and Wildlife. Prepared by the San Francisco Bay Area Wetlands Ecosystem Goals Project. P.R. Olofson, ed. San Francisco Bay Regional Water Quality Control Board, Oakland, California.

¹⁰⁴ Kopec, D., and J. Harvey, 1995, Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay, 1989-91: A Final Report. Technical publication. Moss Landing, California: Moss Landing Marine Labs.

CALIFORNIA SEA LION

Like the harbor seal, the California sea lion is a permanent resident in San Francisco Bay and protected by the MMPA. A common, abundant marine mammal, they are found throughout the West Coast, generally within 10 miles of shore. They breed in southern California and the Channel Islands, and then migrate up the Pacific coast to the Bay. They haul out on offshore rocks, sandy beaches, and onto floating docks, wharfs, vessels, and other human-made structures in the Bay and coastal waters. California sea lions feed on a wide variety of seafood, mainly squid and fish and sometimes even clams. Commonly eaten fish and squid species include salmon, hake, Pacific whiting, anchovies, herring, schooling fish, rockfish, lamprey, dog fish, and market squid.¹⁰⁵ California sea lions may forage in the waters of and adjacent to the project site.

Managed U.S. Fisheries Species

Under the Magnuson-Stevens Act (see Regulatory Framework, pp. 4.M.36–4.M.37, for a description), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), NMFS, Fishery Management Councils, and Federal agencies are required to cooperatively protect essential fish habitat for commercially important fish species such as Pacific coast groundfish, three species of salmon, and five species of coastal pelagic fish and squid. As defined by Congress, essential fish habitat includes “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Those fish species present in the Central Bay basin included in Fishery Management Plans prepared by regional Fishery Management Councils under the Magnuson-Stevens Act are listed in Appendix E, Table E-4.

Other Special-Status Marine Species

NATIVE OLYMPIA OYSTERS

The Olympia oyster (*Ostrea lurida*), also known as the “native oyster,” is native to most of western North America, and it was a key component of the San Francisco Bay marine ecosystem prior to overharvesting and increased siltation from hydraulic mining in the mid-nineteenth century.¹⁰⁶ Thought to have gone extinct in San Francisco Bay, Olympia oysters have been observed slowly reestablishing their presence in San Francisco Bay since 2000. Because of its special importance as a keystone species in the Bay, the restoration and reestablishment of

¹⁰⁵ Southwest Fisheries Science Center, “[Sea Lion Diet.](http://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=148&id=1252)” 2011. Available online at: <http://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=148&id=1252>. Accessed March 18.

¹⁰⁶ NOAA, Habitat Connections, Restoring the Olympia Oyster (*Ostrea conchaphila* = *lurida*), Volume 6, Number 2, 2008 (hereinafter referred to as Habitat Connections). Available online at <http://www.oyster-restoration.org/wp-content/uploads/2012/06/OlympiaOysterHabitatConnections.pdf>, 2008. Accessed August 26, 2015.

Olympia oysters in San Francisco Bay has become an important component of the overall resource management and restoration of San Francisco Bay by NOAA-NMFS and CDFW.¹⁰⁷

Olympia oysters inhabit brackish water conditions but prefer salinities above 22 parts per thousand. In their natural state, Olympia oysters form sparse to dense beds in coastal bays and estuaries and in drought conditions will move up into channels and sloughs, dying off when wetter conditions return. Olympia oysters are not reef builders like their East and Gulf Coast cousin, *Crassostrea virginica*. Olympia oysters are known to provide high biodiversity habitat because they provide physical habitat structure sought by juvenile fish and crustaceans, worms, and foraging fish and birds.¹⁰⁸ They also stabilize sediment, reduce suspended sediment, and improve light penetrations, thereby improving the physical conditions that encourage the establishment of submerged aquatic vegetation, such as eelgrass beds. Additionally, a robust population of filter feeders can help modulate plankton blooms.¹⁰⁹

Naturally occurring populations of native oysters can be found throughout San Francisco Bay on natural and artificial hard substrate from Carquinez Strait to the South Bay. Intertidally they occur between Point Pinole to south of the Dumbarton Bridge, with the highest reported abundances of 80 per square meter in the Central Bay basin.¹¹⁰ Oysters have appeared to do well subtidally in many human-made habitats such as on marina floats and in tidally restricted ponds, lagoons, and saline lakes. Native oysters have been reported inhabiting the intertidal and subtidal rocks comprising the riprap shoreline of Treasure Island,¹¹¹ on wharf pilings of the Port of San Francisco,¹¹² and in the intertidal areas of the project site.¹¹³ Although thought to be extinct from San Francisco Bay since the mid-nineteenth century, native oysters have been observed in various locations in San Francisco Bay since 2000.¹¹⁴ Their presence in other rocky intertidal, rocky subtidal, and human-made habitats in Central Bay basin is expected.

Threats to Olympia oysters include predation from indigenous and non-native marine snails (*Acanthina spirata* and *Urosalpinx cinerea*, respectively), birds, bat rays, and crabs. Limited

¹⁰⁷ NOAA, Report on the Subtidal Habitats.

¹⁰⁸ NOAA, Habitat Connections.

¹⁰⁹ NOAA, Habitat Connections.

¹¹⁰ San Francisco Bay Subtidal Habitat Goals Report, Appendix 7-1: Shellfish Conservation and Restoration in San Francisco Bay: Opportunities and Constraints (hereinafter referred to as *Shellfish Conservation and Restoration*), September 17, 2010. Available online at <http://www.sfbaysubtidal.org/report.html>.

¹¹¹ AMS, Survey of Intertidal Habitat.

¹¹² AMS, Technical Memo: Reconnaissance Survey of the Intertidal Marine Community Inhabiting Pier Pilings at the Port of San Francisco, March 22, 2011. Prepared for ESA and the Port of San Francisco in support of the AC34 CEQA analysis.

¹¹³ AMS, Intertidal Habitat and Biological Community Survey

¹¹⁴ Shellfish Conservation and Restoration.

suitable hard substrate and physical water quality conditions are also important parameters.¹¹⁵ Olympia oysters do not appear to prosper in areas of high siltation.

CRITICAL HABITAT

The USFWS and NMFS designate critical habitat for species that they have listed as threatened or endangered. “Critical habitat” is defined in Section 3(5)(A) of the FESA as those lands (or waters) within a listed species’ current range that contain the physical or biological features that are considered essential to the species’ conservation, as well as areas outside the species’ current range that are determined to be essential to its conservation. Critical habitat may include an area that is not currently used by an endangered or threatened species but that will be needed for species recovery.

A review of GIS-based habitat data for *USFWS Critical Habitat for Threatened and Endangered Species* shows that the project site is not located within designated critical habitat for any listed species.¹¹⁶ Critical habitat for green sturgeon and Central California coast steelhead is designated in San Francisco Bay and includes the waters adjacent to the project site. Critical habitat for Franciscan manzanita (*Arctostaphylos franciscana*) occurs approximately 3 miles east of the project site.

REGULATORY FRAMEWORK

This section briefly describes Federal, State, and local regulations, permits, and policies pertaining to biological resources found on or in the vicinity of the Proposed Project.

FEDERAL REGULATIONS

Federal Endangered Species Act

The FESA (16 United States Code [USC] Section 1531 et seq.) designates threatened and endangered animal and plant species, and provides measures for their protection and recovery. The “take” of listed plant or wildlife species, defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct,” is prohibited without first obtaining a Federal permit. Harm includes any act that actually kills or injures fish or wildlife, including significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife. Activities that damage (i.e., harm) the habitat of listed wildlife species require approval from the USFWS or NMFS. The FESA also generally requires determination of critical habitat for listed species. If critical habitat has been designated,

¹¹⁵ Shellfish Conservation and Restoration.

¹¹⁶ USFWS Critical Habitat Portal available online at <http://ecos.fws.gov/crithab/>.

impacts to areas that contain the primary constituent elements identified for the species, whether or not it is currently present, are also prohibited. FESA Section 7 (for actions by Federal agencies) and Section 10 (for actions by non-Federal agencies) provide two pathways for obtaining authority to take listed species. Federal agency actions include activities on Federal land or that are conducted by, funded by, or authorized by a Federal agency (including issuance of Federal permits and licenses).

For projects that require a Federal permit (e.g., from the Corps for effects to jurisdictional other waters, as would be the case for the Proposed Project), the lead Federal agency is required by the FESA (under Section 7) to ensure that any action they authorize, implement, or fund will not jeopardize the continued existence of any Federally threatened or endangered species or destroy or adversely modify designated critical habitat. Under FESA Section 7 consultation, the lead Federal agency (e.g., the Corps) submits a biological assessment (BA) that analyzes whether the project is likely to adversely affect listed wildlife or plant species or their critical habitat, and proposes suitable avoidance, minimization, or compensatory mitigation measures. If the action would adversely affect the species, the USFWS then responds to the BA by issuing its biological opinion (BO) determining whether the project is likely to adversely affect the species to the extent that it would jeopardize the species or result in adverse modification of critical habitat.

If a “non-jeopardy” or “no adverse modification” opinion is provided by the USFWS, the Federal agency may proceed with the action as proposed. If a jeopardy or adverse modification opinion is provided, the USFWS may prepare a BO that specifies reasonable and prudent measures to minimize take and associated mandatory terms and conditions that describe the methods for accomplishing these prudent measures and/or also develop mandatory reasonable and prudent alternatives to the proposed action.

Migratory Bird Treaty Act

The Federal MBTA (16 USC, Section 703, Supp. I, 1989) prohibits pursuit, take or attempt to take, killing, possessing, selling, or trading in migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. This act applies to whole birds, parts of birds, and bird nests and eggs. For projects that would not result in the direct mortality of birds, the MBTA is generally also interpreted in CEQA analyses as protecting active nests of all species of birds that are on the List of Migratory Birds, published in the Federal Register in 1995. With respect to nesting birds, although the MBTA itself does not provide specific take avoidance measures, the USFWS and CDFW over time have developed a set of measures sufficient to demonstrate take avoidance. These requirements include avoiding vegetation removal or ground disturbance during nesting season (January 15 – August 15), conducting preconstruction nesting bird surveys of a project area during nesting season, and establishing appropriately-sized protective buffers from construction if active nests are found.

Marine Mammal Protection Act

The MMPA of 1972, and as amended in 1981, 1982, 1984, and 1995, establishes a Federal responsibility for the protection and conservation of marine mammal species by prohibiting the harassment, hunting, capture, or killing of any marine mammal. The primary authority for implementing the act belongs to the USFWS and NOAA Fisheries.

Federal Regulation of Wetlands and Other Waters

The Corps, acting under the U.S. Environmental Protection Agency (EPA), regulates the filling of wetlands and other “waters of the U.S.” The Corps has primary Federal responsibility for administering regulations that concern waters and wetlands in the project area under statutory authority of the Rivers and Harbors Act (Sections 9 and 10) and the CWA (Section 404).

Pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC 403), the Corps regulates the construction of structures in, over, or under, excavation of material from, or deposition of material into “navigable waters.” Navigable waters under the act are those “subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce” (33 CFR Section 3294). In tidal areas, the limit of navigable water under Section 10 is the elevation of mean high water mark; in nontidal waters it is the ordinary high water mark. Larger streams, rivers, lakes, bays, and oceans are examples of navigable waters regulated under Section 10 of the Rivers and Harbors Act. Typical activities requiring Section 10 permits are construction of piers, wharves, bulkheads, marinas, ramps, floats, intake structures, and cable or pipeline crossings; and dredging and excavation. Section 10 of the Federal Rivers and Harbors Appropriations Act (30 Stat. 1151, codified at 33 USC Sections 401, 403) also prohibits the unauthorized obstruction or alteration of any navigable water (33 USC Section 403).

Section 404 of the Federal CWA (33 USC 1251–1376) prohibits the discharge of dredged or fill material into waters of the U.S., including wetlands, without a permit from the Corps. The jurisdiction of the Corps in tidal waters under Section 404 extends to the high tide line or high tide mark, simply indicating a point on the shore where water reaches a peak height at some point each year. The CWA prohibits the discharge of any pollutant without a permit. Implicit in the CWA definition of “pollutant” is the inclusion of dredged or fill material regulated by Section 404 (22 USC 1362). The discharge of dredged or fill material typically means adding into waters of the U.S. materials such as concrete, dirt, rock, pilings, or side-cast material for the purpose of replacing an aquatic area with dry land or raising the elevation of an aquatic area. Activities typically regulated under Section 404 include the use of construction equipment such as bulldozers, and the leveling or grading of sites where jurisdictional waters occur.

National Invasive Species Act

Under the National Invasive Species Act of 1996, the USCG established national voluntary ballast water guidelines. The USCG published regulations on June 14, 2004, establishing a national ballast water management program with mandatory requirements for all vessels equipped with ballast water tanks that enter or operate in U.S. waters. The regulations carry mandatory reporting requirements to aid in the USCG's responsibility, under the National Invasive Species Act, to determine patterns of ballast water movement. The regulations also require ships to maintain and implement vessel-specific ballast water management plans.

Estuary Protection Act (16 USC 1221–1226)

The Estuary Protection Act highlights the value of estuaries and the need to conserve their valuable natural resources. It authorizes the Secretary of the Interior, in cooperation with other Federal agencies and the states, to study and inventory estuaries of the United States and to determine whether any areas should be acquired by the Federal government for future protection.

Under this act, the Secretary of the Interior is required to review all project plans and reports for land and water resource development affecting estuaries and make an assessment of likely impacts and related recommendations for conservation, protection, and enhancement of estuaries.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Act (16 USC 1801–1884) of 1976, as amended in 1996 and reauthorized in 2007, applies to fisheries resources and fishing activities in Federal waters that extend to 200 miles offshore. Conservation and management of U.S. fisheries, development of domestic fisheries, and phasing out of foreign fishing activities are the main objectives of the legislation.

The Magnuson-Stevens Act defines “essential fish habitat” as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The act, as amended through 2007, sets forth a number of new mandates for NOAA Fisheries, regional Fishery Management Councils, and Federal action agencies to identify essential fish habitat and to protect important marine and anadromous fish habitat. The Magnuson-Stevens Act provided NOAA Fisheries with legislative authority to regulate fisheries in the United States in the area between 3 miles and 200 miles offshore and established eight regional Fishery Management Councils that manage the harvest of the fish and shellfish resources in these waters. The councils, with assistance from NOAA Fisheries, are required to develop and implement Fishery Management Plans (FMPs), which include the delineation of essential fish habitat for all managed species. An FMP is a plan to achieve specified management goals for a fishery and is comprised of data, analyses, and management measures. Essential fish habitat that is identified in an FMP applies to all fish species managed by that FMP, regardless of whether the species is a protected species or

not. Federal agency actions that fund, permit, or carry out activities that may adversely affect essential fish habitat are required under Section 305(b), in conjunction with required Section 7 consultation under FESA, to consult with NOAA Fisheries regarding potential adverse effects of their actions on essential fish habitat and to respond in writing to NOAA Fisheries' recommendations.

The waters of the Central Bay basin of San Francisco Bay are designated as essential fish habitat for fish managed under three FMPs. In total, 13 species of commercially important fish and sharks managed in the Pacific Coast Groundfish and Coastal Pelagic Species FMPs use this region of San Francisco Bay as either essential fish habitat or a habitat area of particular concern. In addition, the Pacific Coast Salmon FMP, which includes Chinook salmon, identifies all of the San Francisco Bay as essential fish habitat.¹¹⁷

STATE REGULATIONS

California Endangered Species Act

Under the CESA, the CDFW has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code Section 2070). The CDFW also maintains a list of candidate species, which are species formally under review for addition to either the list of endangered species or the list of threatened species.

The CESA prohibits the take of plant and animal species that the California Fish and Game Commission has designated as either threatened or endangered in California. "Take" in the context of the CESA means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill a listed species (California Fish and Game Code Section 86). The take prohibitions also apply to candidates for listing under the CESA. However, Section 2081 of the CESA allows the CDFW to issue permits for the minor and incidental "take" of species by an individual or permitted activity listed under the CESA.

In accordance with the requirements of the CESA, an agency reviewing a project within its jurisdiction must determine if any State-listed endangered or threatened species could be present in the project area. The agency also must determine if the project could have a potentially significant impact on such species. In addition, the CDFW encourages informal consultation on any project that could affect a candidate species. Project impacts on species on the CESA endangered list or threatened list would be considered significant in this EIR. Impacts on Species

¹¹⁷ U.S. Army Corps of Engineers (Corps), Programmatic Essential Fish Habitat (EFH) Assessment for the Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region. July 2009.

of Special Concern would be considered significant under certain circumstances, as discussed below.

California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (CNPPA) (California Fish and Game Code Sections 1900–1913), which directed the CDFW to carry out the legislature’s intent to “preserve, protect, and enhance endangered plants in this State.” The CNPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. The CESA expanded on the original CNPPA and enhanced legal protection for plants. The CESA established threatened and endangered species categories and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, three listing categories for plants are used in California: rare, threatened, and endangered.

Special-Status Natural Communities

The CDFW’s Natural Heritage Division identifies special-status natural communities, which are those that are naturally rare and those whose extent has been greatly diminished through changes in land use. The CNDDDB tracks 135 such natural communities in the same way that it tracks occurrences of special-status species: information is maintained on each site for the natural community’s location, extent, habitat quality, level of disturbance, and current protection measures. The CDFW is mandated to seek the long-term perpetuation of the areas in which these communities occur. Although there is no Statewide law that requires protection of all special-status natural communities, CEQA requires consideration of the potential impacts of a project on biological resources of Statewide or regional significance.

California Fish and Game Code

Fully Protected Species

Certain species are considered fully protected, meaning that the California Fish and Game Code explicitly prohibits all take of individuals of these species except for take permitted for scientific research. Fully protected amphibians and reptiles, fish, birds, and mammals are listed in Sections 5050, 5515, 3511, and 4700, respectively.

It is possible for a species to be protected under the California Fish and Game Code, but not be fully protected. For instance, mountain lion (*Puma concolor*) is protected under Section 4800 et seq., but is not a fully protected species.

Protection of Birds and Their Nests

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 of the code prohibits take, possession, or destruction of any birds in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Migratory non-game birds are protected under Section 3800, whereas other specified birds are protected under Section 3505. Any loss of fertile eggs or nesting raptors, or any activities resulting in nest abandonment, would constitute a significant impact. Project impacts on birds of prey would not be considered “significant” in this EIR unless the species are known to, or have a high potential to, nest on the site or rely on it for primary foraging.

Marine Life Management Act

Within California, most of the legislative authority over fisheries management is enacted within the Marine Life Management Act. This law directs CDFW and the Fish and Game Commission to issue sport and commercial harvesting licenses, as well as license aquaculture operations. CDFW, through the commission, is the State’s lead biological resource agency and is responsible for enforcement of the State endangered species regulations and the protection and management of all State biological resources.

Marine Invasive Species Act

All shipping operations that involve major marine vessels are subject to the Marine Invasive Species Act of 2003 (Public Resources Code Sections 71200–71271), which revised and expanded the California Ballast Water Management for Control of Non-indigenous Species Act of 1999 (Assembly Bill 703). This act is administered by the State Lands Commission. The act regulates the handling of ballast water from marine vessels arriving at California ports in order to prevent or minimize the introduction of invasive species from other regions.

State Regulation of Wetlands and Other Waters

The State’s authority in regulating activities in wetlands and waters in the project area resides primarily with the State Water Resources Control Board (SWRCB). The SWRCB, acting through the San Francisco RWQCB, must certify that a Corps permit action meets State water quality objectives (CWA Section 401). Any condition of water quality certification is then incorporated into the Corps Section 404 permit authorized for the project.

The SWRCB and RWQCB also have jurisdiction over Waters of the State under the Porter-Cologne Water Quality Control Act (Porter-Cologne). The SWRCB and RWQCB evaluate proposed actions for consistency with the RWQCB’s *Basin Plan*, and authorize impacts on

Waters of the State by issuing Waste Discharge Requirements (WDR) or, in some cases, a waiver of WDR.

The San Francisco BCDC has jurisdiction over coastal activities occurring within and around San Francisco Bay and Suisun Marsh. BCDC was created by the McAteer-Petris Act (California Government Code Sections 66600–66682). BCDC regulates fill, extraction of materials, and substantial change in use of land, water, and structures in San Francisco Bay and development within 100 feet of the Bay. BCDC has jurisdiction over all areas of San Francisco Bay that are subject to tidal action, including subtidal areas, intertidal areas, and tidal marsh areas that are between mean high tide and five feet above mean sea level. BCDC’s permit jurisdiction does not extend to Federally owned areas, such as Golden Gate National Recreation Area lands, because they are excluded from State coastal zones pursuant to the Coastal Zone Management Act of 1972 (CZMA). However, the CZMA requires that all applicants for Federal permits obtain certification from the State’s approved coastal program to ensure a proposed project is consistent with the State’s coastal program. In San Francisco Bay, BCDC is charged with making this consistency determination.

California Rare Plant Rankings

CDFW works in collaboration with the CNPS and botanical experts to maintain an Inventory of Rare and Endangered Plants, and the similar Special Vascular Plants, Bryophytes, and Lichens List. The plant species on these lists may meet the CEQA definition of rare or endangered. As the trustee agency for the plants and wildlife of California, ecological communities, and the habitat upon which they depend, CDFW advises public agencies during the CEQA process to help ensure that the actions they approve do not significantly impact such resources. CDFW often advises that plant species with an appropriate California Rare Plant Rank in the Inventory be properly analyzed by the lead agency during project review to ensure compliance with CEQA. The following definitions are used in the California Rare Plant Ranking system:

- Rank 1A: Plants presumed extirpated in California and either rare or extinct elsewhere.
- Rank 1B: Plants Rare, Threatened, or Endangered in California and elsewhere.
- Rank 2A: Plants presumed extirpated in California, but more common elsewhere.
- Rank 2B: Plants Rare, Threatened, or Endangered in California, but more common elsewhere.
- Rank 3: Plants about which more information is needed (A Review List).
- Rank 4: Plants of limited distribution (A Watch List).

LOCAL REGULATIONS AND PLANS

San Francisco General Plan

The Environmental Protection Element of the *San Francisco General Plan* contains the following objectives and policies related to biological resources protection that are relevant to the Proposed Project:

General

- Objective 1 Achieve a proper balance among the conservation, utilization, and development of San Francisco's natural resources.
 - Policy 1.1 Conserve and protect the natural resources of San Francisco.
 - Policy 1.2 Improve the quality of natural resources.
 - Policy 1.3 Restore and replenish the supply of natural resources.
 - Policy 1.4 Assure that all new development meets strict environmental quality standards and recognizes human needs.

Bay, Ocean, and Shorelines

- Objective 3 Maintain and improve the quality of the bay, ocean, and shoreline areas.
 - Policy 3.1 Cooperate with and otherwise support regulatory programs of existing regional, state, and federal agencies dealing with the Bay.
 - Policy 3.2 Promote the use and development of shoreline areas consistent with the General Plan and the best interest of San Francisco.

Land

- Objective 7 Assure that the land resources in San Francisco are used in ways that both respect and preserve the natural values of the land and serve the best interests of all the City's citizens.
 - Policy 7.3 Require that filling of land adheres to the highest standards of soils engineering consistent with the proposed use.

Flora and Fauna

- Objective 8 Ensure the protection of plant and animal life in the City.
 - Policy 8.1 Cooperate with and otherwise support the California Department of Fish and Game and its animal protection programs.
 - Policy 8.2 Protect the habitats of known plant and animal species that require a relatively natural environment.
 - Policy 8.3 Protect rare and endangered species.

San Francisco Public Works Code

The San Francisco's Urban Forestry Ordinance (Article 16 of the Public Works Code) protects street trees, significant trees, and landmark trees under San Francisco Public Works (SFPW) jurisdiction, regardless of species. The ordinance protects the following three categories of trees:

- A **street tree** is “any tree growing within the public right-of-way, including unimproved public streets and sidewalks, and any tree growing on land under the jurisdiction of the Department [of Public Works],” as defined in Section 802 of the ordinance. Section 806b requires entities (other than the SFPW) to obtain a permit from the department before removing any street trees.
- A **significant tree** is defined in Section 810A of the ordinance as any tree (1) located on property under the jurisdiction of the SFPW or on privately owned property with any portion of its trunk within 10 feet of the public right-of-way; and (2) any tree that satisfies at least one of the following criteria: a diameter at breast height in excess of 12 inches, a height in excess of 20 feet, or a canopy in excess of 15 feet. Any entity other than the SFPW must obtain a permit to remove significant trees according to the process described in Section 806b.
- A **landmark tree** is any tree that (1) has been nominated as such by a member of the public, a landowner, the San Francisco Planning Commission, the Board of Supervisors, or the Historic Preservation Commission; (2) the Urban Forestry Council (within the San Francisco Department of the Environment) has subsequently recommended as a landmark tree; and (3) is designated a landmark tree by ordinance approved by the Board of Supervisors. According to Section 810 of the ordinance, nominated trees undergoing review are protected according to the same standards as designated landmark trees until the review process is completed.

Permits are required for planting or removing street trees and significant trees, and protection measures are required for these trees if construction work would occur within the trees' drip lines.¹¹⁸ There are no significant or street trees that would meet these definitions and there are no landmark trees on or adjacent to the project site. No disturbance within the drip line of the eucalyptus trees on Irish Hill is planned under the Proposed Project, even though these trees are not protected under the City's urban forestry ordinance.

San Francisco Planning Code 139 (Standards for Bird-Safe Buildings)

The San Francisco Planning Department adopted *Standards for Bird-Safe Buildings* in 2011, adding Planning Code Section 139.¹¹⁹ These standards guide the use and types of glass and façade treatments, wind generators and grates, and lighting treatments. The standards impose requirements for bird-safe glazing and lighting in structures or at sites that represent a hazard to

¹¹⁸ The area defined by the outermost circumference of a tree canopy where water drips from and onto the ground.

¹¹⁹ San Francisco Planning Department, *Standards for Bird-Safe Buildings*, 2011.

birds and provide information on educational and voluntary programs related to bird hazards. The standards define two types of bird hazards: location-related hazards and feature-related hazards.

Location-related hazards are buildings located inside of, or within a clear flight path of less than 300 feet from, an Urban Bird Refuge.¹²⁰ In such locations, bird-safe treatments are required for new buildings; for additions to existing buildings; or for existing buildings in which 50 percent or more of the glazing within the “bird collision zone” is to be replaced.¹²¹ The standards require implementation of the following treatments for façades facing, or located within, an Urban Bird Refuge:

- No more than 10 percent untreated glazing is allowed on building façades within the bird collision zone.
- Lighting must be shielded, and no uplighting is permitted. No event searchlights are permitted.
- Sites are not permitted to use horizontal access windmills or vertical access wind generators that do not appear solid.

Feature-related hazards include building- or structure-related features that are considered potential “bird traps” regardless of location (e.g., glass courtyards, transparent building corners, or clear glass walls on rooftops or balconies). These features must be fully treated (100 percent) with bird-safe glazing.

San Francisco Bay Plan

The *San Francisco Bay Plan* specifies goals, objectives, and policies for existing and proposed waterfront land use and other areas under the jurisdiction of BCDC. Major policies of the *San Francisco Bay Plan* applicable to wildlife include, but are not limited to, the following:

4. Justifiable Filling. Some Bay filling may be justified for purposes of providing substantial public benefits if these same benefits could not be achieved equally well without filling. Substantial public benefits are provided by:
 - a. Developing adequate port terminals, on a regional basis, to keep San Francisco Bay in the forefront of the world’s great harbors during a period of rapid change in shipping technology.
 - b. Developing adequate land for industries that require access to shipping channels for transportation of raw materials or manufactured products.

¹²⁰ An Urban Bird Refuge is defined in the *Standards for Bird-Safe Buildings* as any area of open space 2 acres or larger that is dominated by vegetation, including vegetated landscaping, forest, meadows, grassland, water features, or wetlands; open water; and some green rooftops.

¹²¹ The “bird collision zone” is that portion of the building that begins at grade and extends upward for 60 feet.

- c. Developing new recreational opportunities – shoreline parks, marinas, fishing piers, beaches, hiking and bicycling paths, and scenic drives.
 - d. Developing expanded airport terminals and runways if regional studies demonstrate that there are no feasible sites for major airport development away from the Bay.
 - e. Developing new freeway routes (with construction on pilings, not solid fill) if thorough study determines that no feasible alternatives are available.
 - f. Developing new public access to the Bay and enhancing shoreline appearance over and above that provided by other Bay Plan policies – through filling limited to Bay-related commercial recreation and public assembly.
5. Effects of Bay Filling. Bay filling should be limited to the purposes listed above [see no. 4] because any filling is harmful to the Bay, and thus to present and future generations of Bay Area residents. All Bay filling has one or more of the following harmful effects:
- a. Filling destroys the habitat of fish and wildlife. Future filling can disrupt the ecological balance in the Bay, which has already been damaged by past fills, and can endanger the very existence of some species of birds and fish. The Bay, including open water, mudflats, and marshlands, is a complex biological system in which microorganisms, plants, fish, waterfowl, and shorebirds live in a delicate balance created by nature, and in which seemingly minor changes, such as a new fill or dredging project, may have far-reaching and sometimes highly destructive effects.

San Francisco Bay Subtidal Habitat Goals Project

In 2010, BCDC, the California Ocean Protection Council/California State Coastal Conservancy, NOAA, and the San Francisco Estuary Partnership, in collaboration with the broader scientific community, managers, restoration practitioners, and stakeholders, published a set of restoration planning goals and guidelines for the subtidal areas and habitats of San Francisco Bay.¹²² Though currently neither a policy nor regulatory document, this report offers guidance on opportunities for subtidal restoration and protection. Implementation will occur through a number of avenues; for example, local governments may incorporate these recommendations into their planning processes and documents, and regulatory agencies may use this report to evaluate, revise, or implement their policies.

Subtidal habitat consists of all the submerged area beneath San Francisco Bay water surface and includes mud, shell, sand, rocks, artificial structures, shellfish beds, submerged aquatic vegetation, macroalgal beds, and the water column above the bay bottom. Submerged habitats are important for threatened species such as green sturgeon and Chinook salmon, commercial species like Dungeness crab and Pacific herring, and a host of other fish, shrimp, crabs, migratory waterfowl, and marine mammals.

¹²² Shellfish Conservation and Restoration.

The San Francisco Bay Subtidal Habitat Goals Project takes a Bay-wide approach in setting science-based goals for maintaining a healthy, productive, and resilient ecosystem. Where possible, these subtidal goals are designed to connect with intertidal habitats and with goals developed by other projects, including goals for San Francisco Bay submerged and upland habitats. The goals and recommendations contained within the Subtidal Habitat Goals Project are not binding by regulation but are intended to serve as guidance to local, State, and Federal agencies when evaluating projects and their potential ecological effects, and when issuing permits.

The principal habitat conservation goals included in the Subtidal Habitat Goals Report that apply to Proposed Project include the following:

Soft Substrate:

- Promote no net increase to disturbance to San Francisco Bay soft bottom habitat.
- Promote no net loss to San Francisco Bay subtidal and intertidal sand habitats.

Rock Habitats:

- Promote no net loss of natural intertidal and subtidal rock habitats in San Francisco Bay.

Artificial Structures:

- Enhance and protect habitat function and the historical value of artificial structures in San Francisco Bay.
- Improve San Francisco Bay subtidal habitats by minimizing placement of artificial structures that are detrimental to subtidal habitat function.

Shellfish Beds:

- Protect San Francisco Bay native shellfish habitats (particularly native Olympia oyster) through no net loss to existing habitats.

Submerged Aquatic Vegetation:

- Protect existing eelgrass habitat in San Francisco Bay through no net loss to existing beds.

Macroalgal Beds:

- Protect San Francisco Bay *Fucus* beds through no net loss to existing beds.
- Protect San Francisco Bay *Gracilaria* beds through no net loss to existing beds.

IMPACTS AND MITIGATION MEASURES

SIGNIFICANCE THRESHOLDS

The thresholds for determining the significance of impacts in this analysis are consistent with the environmental checklist in Appendix G of the State CEQA Guidelines, which has been modified by the San Francisco Planning Department. For the purpose of this analysis, the following applicable thresholds were used to determine whether implementing the Proposed Project would

result in a significant impact on biological resources. Implementation of the Proposed Project would have a significant effect on biological resources if the project would:

- M.1 Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS;
- M.2 Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS;
- M.3 Have a substantial adverse effect on federally protected wetlands as defined by CWA Section 404 (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- M.4 Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;
- M.5 Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- M.6 Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

APPROACH TO ANALYSIS

Impacts on biological resources are identified and evaluated based on relevant CEQA and local standards, policies, and guidelines; on the likelihood that special-status species, sensitive habitats, wetlands and waters, and wildlife corridors are present within the project area (as described in the Environmental Setting discussion on pp. 4.M.2-4.M.33); and on the likely effects that project construction, operation, and maintenance might have on these resources. Special-status resources that were determined to have a low or no potential to occur in the study area (individual plant and animal species as presented in Appendix E, Tables E-1 through E-3) are not considered in the impact analysis.

This section analyzes potential project impacts to biological resources during the construction phase (short-term) and the operations and maintenance phases (long-term) of the Proposed Project. The impact analysis does not discuss phasing of project construction activities because adverse effects associated with construction activities are assumed equally as each parcel is developed, and associated mitigation measures identified to avoid or reduce such effects would be implemented as parcels are developed, regardless of the development's phasing.

This analysis addresses potential direct, indirect, and cumulative impacts of the Proposed Project to special-status species, sensitive natural communities, waters of the U.S., and other biological resources. Direct impacts are impacts that would result from the Proposed Project and would

occur at the same time and place. Indirect impacts are impacts that would be caused by the Proposed Project, but could occur later in time or farther removed in distance while still reasonably foreseeable and related to the Proposed Project. Impact analyses typically characterize effects to biological resources as temporary or permanent, with a permanent impact referring to areas that are developed or otherwise precluded from restoration to a pre-project state.

For the purposes of this EIR, the word “substantial” as used in the significance thresholds above is defined by the following three principal components.

1. Magnitude and duration of the impact (e.g., substantial/not substantial)
2. Uniqueness of the affected resource (rarity)
3. Susceptibility of the affected resource to disturbance

The evaluation of significance must also consider the interrelationship of these three components. For example, a relatively small magnitude impact on a State or Federally listed species could be considered significant because the species is rare and believed to be very susceptible to disturbance. Conversely, a natural community such as California annual grassland is not necessarily rare or sensitive to disturbance, and thus a much larger magnitude of impact might be required to result in a significant impact. Impacts on biological resources are considered *significant* when project-related habitat modifications (e.g., development, introduction of non-native plant and animal species, increased human intrusion, barriers to movement, or landscape management) could reduce species populations to the extent that they become locally less numerous; impacts on habitats are considered *significant* when the habitats could not continue to support viable populations of associated plant and animal species as a result of project implementation. *Potentially significant* impacts are those that may not be sufficiently reduced through non-discretionary regulatory standards (see below); in those cases the lead agency would need to implement mitigation measures to reduce the potential level of an impact to less than significant.

This impact analysis is divided into two broad categories: Terrestrial and Marine. Generally speaking, environmental impacts on biological resources could result from implementation of any of the Proposed Project elements described in this EIR, including demolishing existing buildings and other structures, relocating streets, making shoreline improvements and adding access, making infrastructure improvements, and constructing new infrastructure, buildings, and proposed open spaces.

Those features of the Proposed Project that could have an effect on biological resources, either terrestrial or marine, as described below under “Project Features,” are the same or substantially similar under the Maximum Residential Scenario and the Maximum Commercial Scenario, the three options for sewer/wastewater treatment, and the three options for grading around

Building 12 that are analyzed in this EIR. To the extent that these features may differ somewhat from one to another, they are generally included and accounted for in an analysis of maximum disturbance within the project site or adjacent waters. Where the three options for sewer/wastewater would differ, they are discussed. The same biological regulatory requirements and mitigation measures applicable to the Proposed Project are equally applicable under the Proposed Project's scenarios and options. Therefore, this analysis of impacts on biological resources applies to both scenarios and the options, and no separate analysis of impacts under each scenario or option is necessary.

PROJECT FEATURES

The following is a general summary of the Proposed Project elements pertinent to the biological resources impact analysis.

Terrestrial

Those elements of the Proposed Project that could have an effect, either directly or indirectly, on terrestrial biological resources of the project site include:

- Building and infrastructure demolition or relocation;
- Ground disturbance from demolition of buildings, roadways, and other project site infrastructure; and grading on portions of Irish Hill;
- New building construction and materials that would present collision hazards to birds and bats; and
- Repair or replacement of the steel sheet pile bulkhead in Reach II with either a new sheet pile wall or a soldier pile wall.

Marine

As discussed in Chapter 2, Project Description, most project activities would occur inland from the high tide mark of San Francisco Bay. As a consequence, the Proposed Project would have few anticipated effects on the marine resources of San Francisco Bay. The following elements could have an effect, either directly or indirectly, on the marine resources of San Francisco Bay:

- Construction of the shoreline improvements, including location of the extended Bay Trail, waterfront promenades, the construction and operation of planned viewing pavilions adjacent to Bay waters, construction of hardscape steps leading down to San Francisco Bay waters, and riprap revetment upgrading;
- Repair or replacement of the steel sheet pile bulkhead in Reach II with either a new sheet pile wall or a soldier pile wall;

- Improvements to existing stormwater and sanitary sewer systems and existing stormwater outfalls at the bases of 20th and 22nd streets and/or construction and operation of a new storm drain outfall at the base of 21st Street that would discharge into San Francisco Bay;
- Use of land located immediately adjacent to San Francisco Bay for construction of park improvements and for staging of demolition or construction equipment, materials, or wastes prior to the completion of shoreline improvements; and
- Debris cleanup, pile removal, and reconstruction of a waterfront area seaward of the high tide mark and the marine intertidal zones in Reach I.

IMPACT EVALUATION

Project Impacts

Special-Status and Migratory Birds

Impact BI-1: Construction and operation of the Proposed Project would have a substantial adverse effect either directly or through habitat modifications on migratory birds and/or on bird species identified as special status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. (*Less than Significant with Mitigation*)

Construction Impacts

Construction activities within both the 20th/Illinois Parcel and the 28-Acre Site, especially those that involve heavy machinery, may adversely affect nesting bird species within 0.25 mile of the project site during the nesting season (January 15–August 15). Caspian tern and western gull nesting is documented at Piers 60 and 64, north of the project site and within this radius. Dilapidated piers northeast of the project site could provide potential nesting sites for these species and for double-crested cormorant. Osprey has previously nested south of the project site at Pier 80, also within 0.25 mile of the Proposed Project, and could forage or nest within the terrestrial study area. Although not previously documented in the project vicinity, American peregrine falcon could nest in or on existing buildings on the project site. Project activities would not disrupt foraging activities of California least tern or California brown pelican, which may use open water habitat and shorelines of the project study area; these species do not nest locally. Common species, such as mourning dove, house finch, Anna’s hummingbird, black phoebe, barn swallow, cliff swallow, red-tailed hawk, and red-shouldered hawk, also have the potential to nest on the ground, within ruderal vegetation, eucalyptus trees, or in existing buildings on the project site.

Project construction activities and an increased human presence at the project site are expected to generate noise and visual disturbance that could adversely affect bird breeding and nesting behaviors at the project site and nearby. Proposed Project construction activities that may cause

visual disturbance, alter the ambient noise environment, or introduce short-term loud noise events resulting in avoidance response (flushing) include, but are not limited to, making shoreline protection improvements; constructing new buildings; making improvements to existing structures; constructing transportation and circulation improvements; adding new and upgraded utilities and infrastructure; constructing geotechnical and shoreline improvements (that require soldier pile driving or impact pile driving); and making improvements to publicly owned open space. A variety of construction activities, equipment, and schedules would be associated with each of these general types of construction.

Both long- and short-term loud noises can affect bird foraging and roosting by temporarily disturbing these behaviors, and may deter bird use of an area (including nesting) if such noises persist over the long term. However, overall avian activity within the study area is not expected to substantially change with project implementation because habitat value for birds foraging and nesting within the project site and vicinity would not substantially change (e.g., in-water foraging and nesting in eucalyptus trees on Irish Hill). Noise disturbance generally falls into two main categories: impulse and continuous. Impulse disturbances often used in demolition activities include single actions like blasts, or multiple actions like jackhammers and pile drivers. Continuous noise includes typical construction work area activities and roadway noise. Bird disruption from visual or noise disturbance varies, but typically birds will avoid disturbance areas and move to more preferable environments. However, some species inhabit noisy areas and may indirectly benefit from reduced competition and predation.¹²³

Birds currently residing in both the terrestrial and marine study areas are accustomed to varying levels of ambient noise emanating from existing human activities in the area. For example, pedestrians and vehicular traffic are constant throughout the day and various Port activities are ongoing in the project vicinity on a regular basis. The primary sources of noise in the project vicinity are BAE Systems ship repair facilities, various industrial activities (e.g., American Industrial Center operations), construction activities along Illinois Street, and traffic on local streets surrounding the project site (Illinois, 20th, and 22nd streets) and the I-280 freeway corridor, located 0.25 mile west of the project site. Typical noise levels for some construction activities anticipated during project implementation would exceed ambient levels in the project vicinity. Construction activities that would substantially alter the noise environment could disrupt birds attempting to nest, disrupt parental foraging activity, or displace mated pairs with territories in the project vicinity.

¹²³ Francis, Clinton D., Catherine P. Ortega, and Alexander Cruz, Noise Pollution Changes Avian Communities and Species Interactions. *Current Biology* 19:1415–1419. August 25, 2009.

The loss of an active nest attributable to project activities would be considered a significant impact under CEQA. Moreover, disruption of nesting migratory or native birds is not permitted under the MBTA or California Fish and Game Code. Thus, the loss of any active nest by, for example, removing a tree, shrub, or building containing an active nest or causing visual or noise disturbance which leads to nest abandonment must be avoided under Federal and California law. Mitigation Measure M-BI-1: Worker Environmental Awareness Program Training, shown below, requires all project personnel involved in demolition or ground-disturbing work to attend an environmental training session prior to beginning work to educate workers on sensitive resources within and surrounding the project site and the regulatory environment protecting them, general protection measures and protocols to be implemented during construction, and consequences for non-compliance with project-specific protection measures. This measure, in combination with compliance with the MBTA and California Fish and Game Code, would avoid or reduce potential impacts on migratory and special-status birds to a less-than-significant level.

Mitigation Measure M-BI-1: Worker Environmental Awareness Program Training

Project-specific Worker Environmental Awareness Program (WEAP) training shall be developed and implemented by a qualified biologist and attended by all project personnel performing demolition or ground-disturbing work prior to beginning demolition or ground-disturbing work on site. The WEAP training shall generally include, but not be limited to, education about the following:

- a) Applicable State and Federal laws, environmental regulations, project permit conditions, and penalties for non-compliance.
- b) Special-status plant and animal species with the potential to be encountered on or in the vicinity of the project site during construction.
- c) Avoidance measures and a protocol for encountering special-status species including a communication chain.
- d) Preconstruction surveys and biological monitoring requirements associated with each phase of work and at specific locations within the project site (e.g., shoreline work) as biological resources and protection measures will vary depending on where work is occurring within the site, time of year, and construction activity.
- e) Known sensitive resource areas in the project vicinity that are to be avoided and/or protected as well as approved project work areas, access roads, and staging areas.
- f) Best management practices (BMPs) (e.g., straw wattles or spill kits) and their location around the project site for erosion control and species exclusion, in addition to general housekeeping requirements.

Operational Impacts

The project site is located within the Pacific Flyway along the western shoreline of San Francisco Bay. The waters of San Francisco Bay provide valuable stopover habitat for migratory birds that forage and replenish energy stores during spring and fall migrations. Open space, even in highly

urbanized areas, attracts avifauna, and any habitat that could be used for foraging, roosting, or rest by birds on the wing (in flight), such as park lands, landscape vegetation, or even the San Francisco Bay, in proximity to proposed new buildings may increase the risk of bird collisions, particularly from large amounts of reflective or artificially lighted surfaces.

Many bird collisions are induced by artificial night lighting. The tendency of birds to move toward lights at night when migrating, and their reluctance to leave the sphere of light influences for hours or days once encountered, have been well documented.¹²⁴ It has been suggested that structures located at key points along migratory routes may present a greater hazard than those at other locations.¹²⁵ Other research suggests that fatal bird collisions increase as light emissions increase, that weather often plays an important part in increasing the risk of collisions,¹²⁶ and that nights with heavy cloud cover and/or precipitation present the conditions most likely to result in high numbers of collisions.¹²⁷ The type of light used may affect its influence on the birds; for example, studies have indicated that blinking lights or strobe lights affect birds significantly less than non-blinking lights.^{128, 129} Collisions with lighted buildings and other structures are not the only danger that nighttime lighting has for migratory birds. Birds can become “trapped” by a light source and, disoriented, continue to fly around the source until they become exhausted and drop to the ground, where they may be killed by predators¹³⁰ or die from stress or exhaustion.¹³¹ Light attraction in birds is positively related to light intensity, and studies have shown that reduction in lighting intensity and changing fixed lighting to a flashing or intermittent light system can dramatically reduce avian mortality at lighted structures.¹³² At least one controlled experiment has shown avian mortality can be dramatically reduced through shielding upward radiance of

¹²⁴ Gauthreaux, S.A., and C.G. Belsler, 2006, *Effects of Artificial Night Lighting on Migrating Birds* (hereinafter referred to as *Effects of Artificial Night Lighting*). In: Rich, C., and T. Longhorn, *Ecological Consequences of Night Lighting*, Island Press, Covelo, CA, pp. 67-93.

¹²⁵ Ogden, L.E., 2002, Summary Report on the Bird Friendly Building Program: Effect of Light Reduction on Collision of Migratory Birds, Special Report for the Fatal Light Awareness Program (hereinafter referred to as Summary Report on the Bird Friendly Building Program). Available at www.flap.org.

¹²⁶ Verheijen, F.J., 1981, Bird kills at lighted man-made structures: not on nights close to a full moon. *American Birds* 35(3):251-254.

¹²⁷ Ogden, L.E., Summary Report on the Bird Friendly Building Program.

¹²⁸ Gauthreaux, S.A., and C.G. Belsler, *Effects of Artificial Night Lighting*.

¹²⁹ Evans, W.R., Y. Akashi, N.A. Altman, and A.M. Manville, 2007, Response of night-migrating songbirds in cloud to colored and flashing light. *North American Birds* 60(4):476–88.

¹³⁰ Ogden, L.E., *Collision Course: The Hazards of Lighted Structures and Windows to Migrating Birds*, Special Report for the World Wildlife Fund and the Fatal Light Awareness Program, www.flap.org, September 1996.

¹³¹ Reed, J.R., J.L. Sincock, and J.P. Hailman, 1985, Light Attraction in Endangered Procellariiform Birds: Reduction by Shielding Upward Radiation (hereinafter referred to as Light Attraction in Endangered Procellariiform Birds). *The Auk* 102:377–38.

¹³² Jones, J., and C.M. Francis, 2003, The effects of light characteristics on avian mortality at lighthouses. *Journal of Avian Biology* 34:328–333.

lighting fixtures. In an experiment with fledgling seabirds in Hawaii, shielding the upward radiation of lights resulted in a 40 percent reduction in attraction to lights as the fledglings made their way from their nesting colonies to the sea.¹³³ Furthermore, during the study the sides of large buildings and the grounds remained fully lit by the shielded lights, suggesting that birds are not attracted to lighted areas, but to point-sources of light, which may be related to the use of stars and the moon as navigational aids.¹³⁴ Although the project site is located within the Pacific Flyway and in close proximity to the San Francisco shoreline, specific migratory corridors in the vicinity of the project site are unknown. It can be assumed, however, that numerous birds pass overhead or in the project vicinity during spring and fall migrations.

Direct effects on migratory as well as resident birds moving through the project site could include bird death or injury from collisions with lighted structures, and bird exhaustion and death due to light attraction, as well as bird collisions with glass during the daytime. Indirect effects to migratory birds could include delayed arrival at breeding or wintering grounds, and reduced energy stores necessary for migration, winter survival, or subsequent reproduction.¹³⁵ Development of the Proposed Project could increase the amount of light and glare at the project site and vicinity, including from building façades, internal night lighting, sources visible through windows of building exteriors, new streetlights and pedestrian lights within and adjacent to the site, nighttime lighting of building exteriors, and headlights from project-generated traffic. Buildings and structures at the project site may present a heightened risk of avian collisions due to a number of factors, including location along a known migratory route, proximity to migratory stopover locations, proximity to open space (natural habitat and those created under the Proposed Project), and being located in a region which experiences frequent fog which can adversely affect avian navigational awareness.¹³⁶

Due to the surrounding urban setting, the Proposed Project is not expected to appreciably increase the overall amount of lighting along the San Francisco waterfront as a whole, considering existing nighttime lighting conditions within the project site and adjacent development along the eastern shoreline from San Francisco Bay to AT&T Park; however, avian collisions with glass or reflective surfaces used in the proposed buildings could result in mortality, which would be a significant impact under CEQA.

¹³³ Reed, et al., Light Attraction in Endangered Procellariiform Birds.

¹³⁴ Reed, et al., Light Attraction in Endangered Procellariiform Birds.

¹³⁵ Gauthreaux, S.A., and C.G. Belser, *Effects of Artificial Night Lighting*.

¹³⁶ Brown, H., S. Caputo, E.J. McAdams, M. Fowle, G. Phillips, C. Dewitt, and Y. Gelb, 2007, Bird Safe Building Guidelines, New York City Audubon Society. Available online at www.nycadubon.org/pdf/BirdSafeBuildingGuidelines.pdf.

The Proposed Project would comply with the City of San Francisco's adopted *Standards for Bird-Safe Buildings*¹³⁷ (Planning Code Section 139) and would incorporate specific design elements into the development to avoid or minimize avian collisions with buildings or other project features. The City's *Standards for Bird-Safe Buildings* reflect the most current and accepted measures to prevent bird strikes.

The *Standards for Bird-Safe Buildings* address location-related hazards and/or feature-related hazards for birds on the wing and describe glass and façade treatments, wind generators and grates, and lighting treatments for buildings that can reduce avian collisions. The standards state that all buildings within an Urban Bird Refuge¹³⁸ present location-related hazards for birds. The proposed 5-acre waterfront park and 2-acre open space around Irish Hill qualify as Urban Bird Refuges. Thus, new building façades or additions to existing structures located inside of, or within a clear flight path less than 300 feet of the shoreline or Irish Hill (sufficient areas of open space to attract avifauna) would require certain treatments within the "bird collision zone."¹³⁹ Some examples include creating a visual signal or a visual noise barrier that alerts birds to the presence of glass objects, such as ceramic dots, or frits¹⁴⁰ applied between layers of insulated glass to reduce transmission of light.

Feature-related hazards include building- or structure-related features that are considered potential "bird traps" (e.g., glass courtyards, transparent building corners, or clear glass walls on rooftops or balconies) regardless of location. If these elements are used in the proposed buildings or structures, they must be fully treated (100 percent) with bird-safe glazing.

Project compliance with the *Standards for Bird-Safe Buildings*, as administered by the San Francisco Planning Department, would avoid or minimize the adverse effects of avian collisions; therefore, no additional mitigation is necessary.

¹³⁷ San Francisco Planning Department, *Standards for Bird-Safe Buildings*, 2011. Available online at http://www.sf-planning.org/ftp/files/publications_reports/bird_safe_bldgs/Standards%20for%20Bird%20Safe%20Buildings%20-%202011-30-11.pdf.

¹³⁸ An Urban Bird Refuge is defined in the *Standards for Bird-Safe Buildings* as: any area of open space 2 acres or larger that is dominated by vegetation, including vegetated landscaping, forest, meadows, grassland, water features, or wetlands; within 300 feet of open water; and some green rooftops.

¹³⁹ The "bird collision zone" is that portion of the building that begins at grade and extends upward for 60 feet. This zone also applies to glass façades directly adjacent to large landscaped roofs (2 acres or larger) and extending upward 60 feet from the level of the subject roof.

¹⁴⁰ Frits are lines, dots, or other patterns incorporated into the glass or applied on its surface to make it more visible.

Special-Status and Otherwise Protected Bats

Impact BI-2: Construction of the Proposed Project would have a substantial adverse effect either directly or through habitat modifications on bats identified as special-status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the United States Fish and Wildlife Service. (*Less than Significant with Mitigation*)

Common bats (Mexican free-tailed bat) and special-status bats (Pallid bat and Yuma myotis) have the potential to roost in existing vacant or underutilized buildings, other human-made structures, and trees within or near the 20th/Illinois Parcel and 28-Acre Site of the Proposed Project. Bats and other non-game mammals are protected in California under the State Fish and Game Code (described above in Regulatory Framework on pp. 4.M.37-4.M.39). Maternity roosts are roosts occupied by pregnant females or females with non-flying young. Non-breeding roosts are day roosts without pregnant females or non-flying young. Destruction of an occupied, non-breeding bat roost, resulting in the death of bats; disturbance that causes the loss of a maternity colony of bats (resulting in the death of young); or destruction of hibernacula¹⁴¹ are prohibited under the California Fish and Game Code and would be considered a significant impact (although hibernacula generally are not formed by bat species in the Bay Area due to sufficiently high temperatures year round). This may occur due to direct or indirect disturbances. Direct disturbance could include building removal (demolition), tree removal, or roost destruction by any other means. Indirect disturbance to bat species could result in behavioral alterations due to construction-associated noise or vibration, or increased human activity in the area.

The Proposed Project would involve building demolition, relocation, or rehabilitation and site grading prior to construction. Although the eucalyptus trees adjacent to Irish Hill would not be removed under the Proposed Project, the trees could be trimmed or disturbed during construction. Demolition of Buildings 11, 15, 16, 19, 25, 32, and 66, and rehabilitation of Buildings 2, 12, and 21 could result in direct mortality of or indirect disturbance to roosting special-status bats, if present. Additionally, any bats roosting in eucalyptus trees in the project site could be disturbed by periphery construction activity. Direct mortality of special-status bats would be a significant impact. Additionally, common bats may establish maternity roosts in these same locations. Implementation of Mitigation Measure M-BI-2: Avoidance and Minimization Measures for Bats, shown below, would reduce potential impacts on special-status bats and common bat maternity roosts to a less-than-significant level by requiring preconstruction surveys and implementing avoidance measures if potential roosting habitat or active roosts are located.

¹⁴¹ Hibernaculum refers to the winter quarters of a hibernating animal.

Mitigation Measure M-BI-2: Avoidance and Minimization Measures for Bats

A qualified biologist (as defined by CDFW¹⁴²) who is experienced with bat surveying techniques (including auditory sampling methods), behavior, roosting habitat, and identification of local bat species shall be consulted prior to demolition or building relocation activities to conduct a pre-construction habitat assessment of the project site (focusing on buildings to be demolished or relocated) to characterize potential bat habitat and identify potentially active roost sites. No further action is required should the pre-construction habitat assessment not identify bat habitat or signs of potentially active bat roosts within the project site (e.g., guano, urine staining, dead bats, etc.).

The following measures shall be implemented should potential roosting habitat or potentially active bat roosts be identified during the habitat assessment in buildings to be demolished or relocated under the Proposed Project or in trees adjacent to construction activities that could be trimmed or removed under the Proposed Project:

- a) In areas identified as potential roosting habitat during the habitat assessment, initial building demolition, relocation, and any tree work (trimming or removal) shall occur when bats are active, approximately between the periods of March 1 to April 15 and August 15 to October 15, to the extent feasible. These dates avoid the bat maternity roosting season and period of winter torpor.¹⁴³
- b) Depending on temporal guidance as defined below, the qualified biologist shall conduct pre-construction surveys of potential bat roost sites identified during the initial habitat assessment no more than 14 days prior to building demolition or relocation, or any tree trimming or removal.
- c) If active bat roosts or evidence of roosting is identified during pre-construction surveys, the qualified biologist shall determine, if possible, the type of roost and species. A no-disturbance buffer shall be established around roost sites until the qualified biologist determines they are no longer active. The size of the no-disturbance buffer would be determined by the qualified biologist and would depend on the species present, roost type, existing screening around the roost site (such as dense vegetation or a building), as well as the type of construction activity that would occur around the roost site.

If special-status bat species or maternity or hibernation roosts are detected during these surveys, appropriate species- and roost-specific avoidance and protection measures shall be developed by the qualified biologist in coordination with CDFW. Such measures may include postponing the removal of buildings or structures, establishing exclusionary work buffers while the roost is active (e.g., 100-foot no-disturbance buffer), or other compensatory mitigation.

¹⁴² CDFW defines credentials of a “qualified biologist” within permits or authorizations issued for a project. Typical qualifications include a minimum of five years of academic training and professional experience in biological sciences and related resource management activities, and a minimum of two years of experience conducting surveys for each species that may be present within the project area.

¹⁴³ Torpor refers to a state of decreased physiological activity with reduced body temperature and metabolic rate.

- d) The qualified biologist shall be present during building demolition, relocation, or tree work if potential bat roosting habitat or active bat roosts are present. Buildings and trees with active roosts shall be disturbed only under clear weather conditions when precipitation is not forecast for three days and when daytime temperatures are at least 50 degrees Fahrenheit.
- e) The demolition or relocation of buildings containing or suspected to contain bat roosting habitat or active bat roosts shall be done under the supervision of the qualified biologist. When appropriate, buildings shall be partially dismantled to significantly change the roost conditions, causing bats to abandon and not return to the roost, likely in the evening and after bats have emerged from the roost to forage. Under no circumstances shall active maternity roosts be disturbed until the roost disbands at the completion of the maternity roosting season or otherwise becomes inactive, as determined by the qualified biologist.
- f) Trimming or removal of existing trees with potential bat roosting habitat or active (non-maternity or hibernation) bat roost sites shall follow a two-step removal process (which shall occur during the time of year when bats are active, according to a) above, and depending on the type of roost and species present, according to c) above).
 - i. On the first day and under supervision of the qualified biologist, tree branches and limbs not containing cavities or fissures in which bats could roost shall be cut using chainsaws.
 - ii. On the following day and under the supervision of the qualified biologist, the remainder of the tree may be trimmed or removed, either using chainsaws or other equipment (e.g., excavator or backhoe).
 - iii. All felled trees shall remain on the ground for at least 24 hours prior to chipping, off-site removal, or other processing to allow any bats to escape, or be inspected once felled by the qualified biologist to ensure no bats remain within the tree and/or branches.

Special-Status Marine Species

Impact BI-3: Construction of the Proposed Project would have a substantial adverse effect, either directly or through habitat modifications, on aquatic species identified as candidate, sensitive, or special-status species in local, regional, or Federal plans, policies, or regulations, or by California Department of Fish and Wildlife, United States Fish and Wildlife Service, or National Oceanic and Atmospheric Administration. (*Less than Significant with Mitigation*)

San Francisco Bay waters adjacent to the Proposed Project are used by multiple special-status marine species known to be present in the project site, including longfin smelt, green sturgeon, Pacific herring, harbor seals, California sea lions, and native Olympia oysters. In addition to FESA-, CESA-, and MMPA-listed species, as well as species of special concern, San Francisco

Bay waters adjacent to the project site are used by 16 fish species managed by one of three Fisheries Management Plans under the Magnuson-Stevens Act.¹⁴⁴

Accidental Discharge and Stormwater Run-Off Impacts

The potential accidental discharge of hydrocarbon-containing materials (fuel, lubricating oils, construction materials), construction debris, and packing materials from staged equipment, building materials, and demolition debris that might be located or staged close to or adjacent to San Francisco Bay waters could pose a short-term and temporary risk of exposing these taxa to toxic contaminants and non-edible forage. Normal BMPs implemented as part of City of San Francisco, BCDC, and State Water Quality Control Board permits, such as conducting vehicle maintenance and refueling at a location away from the water's edge, installing surface runoff containment, and storing all hydrocarbon materials within secondary spill containment enclosures, etc., are expected to make the impact of these potential sources of contamination and their impact on special-status marine species less than significant. Other BMPs include installing secondary containment under all temporary fuel storage; using drip pans; using secondary containment or drip sheeting under parked construction equipment; using drain covers to seal off on-site storm drains; and adhering to specific requirements issued by the RWQCB for stormwater discharges within the City and County of San Francisco and in accordance with the Statewide stormwater permit, which contains additional actions to prevent and/or reduce project site sediment and other contaminants from reaching San Francisco Bay waters and causing any effect on resident offshore biological resources.

Demolition activities at the project site could also result in extensive ground disturbance and increased surface run-off through existing and future stormwater drains to San Francisco Bay, resulting in increased sedimentation and organic and inorganic contaminant loading to San Francisco Bay waters with low-level exposure to protected species. Potential impacts on special-status fish and marine mammal species due to increased contaminant loading to San Francisco Bay waters from low-level contaminated sediments could be significant if uncontrolled.

Implementation of normal construction and demolition BMPs required as part of City of San Francisco, regional (BCDC), and State (State Water Quality Control Board) permits to prevent disturbed sediments from reaching storm drains, such as using sediment curtains and storm drain covers and regularly sweeping streets, would be expected to reduce these impacts to a less-than-significant level. In addition, specific requirements issued by the RWQCB for stormwater discharges within the City and County of San Francisco in accordance with the Statewide

¹⁴⁴ AMS, Fish Species Inhabiting the Central San Francisco Bay Region.

stormwater permit contain additional actions to prevent and/or reduce project site sediment from reaching Bay waters and causing any significant effect on resident offshore biological resources.

Sewer/Stormwater Options

As presented in detail in Chapter 2, Project Description, pp. 2.59-2.66, and in Section 4.O, Hydrology and Water Quality, pp. 4.O.45-4.O.46, the Proposed Project proposes to upgrade the sewer and stormwater collection and transport system according to one of three options: a combined sewer and stormwater system, a separated sewer and stormwater system, and a hybrid option where a combined sewer and stormwater system would be located only in the eastern portion of the project site, with the rest of the site having a separated sewer and stormwater system. All three options would include repaired or improved outfalls at 20th and 22nd streets; however, in a separated and hybrid system option, a potential new outfall at 21st Street would be constructed in San Francisco Bay. The repair and potential construction of these outfalls would be expected to result in short-term disturbance to existing subtidal¹⁴⁵ soft and hard substrate habitat and associated biological communities. Although the potential disturbance and/or loss of these habitats and associated marine communities could have an effect on special-status fish and marine mammal foraging, the overall effect would be minor and less than significant because of the very small area being disturbed and the temporary nature of the disturbance. Once installed and repaired, these stormwater outfalls and any temporarily disturbed subtidal habitat associated with them would be expected to recover naturally and quickly to pre-disturbance conditions.¹⁴⁶

Additionally, planned upgrades to the project site stormwater and sanitary waste collection, transport, and treatment system would ultimately reduce the contaminant loading of organic, inorganic, and fecal bacteria into San Francisco Bay waters (see Section 4.O, Hydrology and Water Quality, pp. 4.O.54-4.O.64). Therefore, potential impacts to special-status species from the improved stormwater and sanitary wastewater system and discharges to San Francisco Bay would be less than significant.

¹⁴⁵ Subtidal means occurring below the surface of the water.

¹⁴⁶ Blake, N.J., L.J. Doyle, and J.J. Culter, 1996, Impacts and Direct Effects of Sand Dredging for Beach Renourishment on the Benthic Organisms and Geology of the West Florida Shelf (hereinafter referred to as Impacts and Direct Effects of Sand Dredging for Beach Renourishment). U.S. Department of the Interior, Minerals Management Service, Office of International Activities and Marine Minerals, Herndon, VA, OCS Final Report MMS 95-0005, 109 pp.

Sheet Pile and Soldier Pile Impacts

Temporary Loss of Intertidal Habitat

Planned shoreline improvements at the project site (Chapter 2, Project Description, pp. 2.71-2.74) would primarily occur shoreward or upland of the high tide mark and their implementation is not anticipated to have any effect on marine resources with the exception of the reconstruction of the steel sheet pile bulkhead in Reach II and repair and improvement of shoreline protective riprap.¹⁴⁷ The repair of the bulkhead would entail the installation of either a new sheet pile bulkhead or a soldier pile wall seaward of the existing bulkhead. The construction activities associated with either option would be expected to result in the temporary loss of the sessile¹⁴⁸ marine invertebrate community currently present, loss of a small area of soft substrate intertidal habitat in Reach I and associated marine communities, and potential temporary disturbance to soft and hard substrate habitat and associated marine communities where personnel and equipment transit to work on the reconstructed bulkhead. Recovery of disturbed intertidal habitat to pre-disturbance conditions is expected to occur naturally within 6 to 18 months with no remediate actions required.¹⁴⁹ Consequently, these disturbances are expected to be less than significant, and no mitigation is required.

Temporary Underwater Noise

The installation of either the sheet pile or soldier wall bulkhead (using precast H-piles) for improving Reach II, could result in the generation of potential underwater noise from either vibratory or impact pile-driving hammers used to install the pilings. This underwater noise could have a damaging effect on special-status fish species and marine mammals. High-intensity noise can result in acute damage to soft tissues, such as gas bladders or eyes (barotraumas), and/or in harassment that causes altered swimming, sleeping, or foraging behavior or temporary abandonment of forage habitat.

When a pile-driving hammer strikes a pile or sheet piling, it creates a pulse of sound that propagates through the pile, radiating out through the water column, seafloor, and air. Sound pressure pulses as a function of time are referred to as a waveform. Peak waveform pressure underwater is typically expressed in decibels (dB) referenced to 1 microPascal (μPa). Sound levels are generally reported as peak levels (peak) and sound exposure levels (SEL). In addition to the pressure pulse of the waveform, the frequency of the sound, expressed in hertz (Hz), is also

¹⁴⁷ Moffatt & Nichol, Preliminary Shoreline Improvements Report.

¹⁴⁸ Sessile means permanently attached or established and not free to move about (e.g., *sessile* sponges, algae, barnacles, etc.).

¹⁴⁹ Blake et al., Impacts and Direct Effects of Sand Dredging for Beach Renourishment.

important to evaluating the potential for sound impacts. Low-frequency sounds are typically capable of traveling over greater distances with less reduction in the pressure waveform than high-frequency sounds.

Installing steel sheet piling by a pile driver during the reconstruction of the bulkhead in Reach II can be expected to generate in-water noise levels of up to 177 dB (peak), 163 dB (root mean square [RMS]) and 162 dB (SEL) if a vibratory hammer is used, and 205 dB (peak), 189 dB (RMS), and 179 dB (SEL) if an impact hammer is used.¹⁵⁰ Similarly, installation of H-piling, depending on the size required for the bulkhead reconstruction, can be expected to generate 165 to 205 dB peak, 150 to 189 dB RMS, and 162 to 179 dB SEL depending on the size of the H-pile and whether an impact or vibratory hammer is used, as presented in Table 4.M.1: Estimated Near-Source Underwater Noise Levels from Pile Driving, below. Ambient underwater noise for a major harbor like San Francisco is estimated at approximately 150 dB.¹⁵¹

Scientific investigations on the potential effect of noise on fish indicate that peak underwater sound levels below 206 dB or accumulated SEL sound levels below 183 to 187 dB do not appear to result in any acute physical damage or mortality to fish (barotraumas) depending on their size.^{152,153} Smaller fish (less than 2 grams in size) experience acute effects at accumulated SEL sound levels over 183 dB and larger fish (more than 2 grams in size) at 187 dB. Noise levels that result in startle responses in steelhead trout and salmon have been documented to occur at sound levels as low as 140 dB at a frequency of 100 Hz and between 180 and 186 dB in Pacific herring.¹⁵⁴ Any disturbance to FESA-listed fish species that results in altered swimming, foraging, movement along a migration corridor, or any other altered normal behavior would be considered harassment and a significant impact.

¹⁵⁰ Caltrans, Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish (hereinafter referred to as Technical Guidance for Assessment and Mitigation). Final Report, 2009. Prepared for California Department of Transportation by ICF Jones & Stokes and Illingworth and Rodkin, Inc. February 2009. Available online at http://www.dot.ca.gov/hq/env/bio/files/Guidance_Manual_2_09.pdf.

¹⁵¹ Caltrans, Technical Guidance for Assessment and Mitigation.

¹⁵² Dalen, J., and G.M. Knutsen, *Scaring Effects of Fish and Harmful Effects on Eggs, Larvae and Fry from Offshore Seismic Explorations*. ICA Associated Symposium on Underwater Acoustics, July 16-18, 1986, Halifax, Canada.

¹⁵³ CalTrans, Technical Guidance for Assessment and Mitigation.

¹⁵⁴ San Luis and Delta Mendota Water Authority and C.H. Hanson, *Georgina Slough Acoustic Barrier Applied Research Project: Results of 1994 Phase II Field Tests*. Interagency Ecological Program for the San Francisco Bay/Delta estuary. Technical Report 44. May 1996.

Table 4.M.1: Estimated Near-Source Underwater Noise Levels from Pile Driving

Pile Size/Type	Relative Water Depth	Distance from Piling Measurement Taken	Average Sound Pressure			Attenuation Device
			Peak (dB)	RMS	SEL (dB)	
Vibratory Hammer						
10-inch steel H pile	~7 feet (2 meters)	~30 feet (10 meters)	161	147	NA	None
10-inch steel H pile	~7 feet (2 meters)	~65 feet (20 meters)	152	137	NA	None
24-inch AZ steel sheet	~50 feet (15 meters)	~30 feet (10 meters)	177	163	162	None
Impact Hammer						
10-inch steel H pile	~7 feet (2 meters)	~30 feet (10 meters)	190	175	NA	None
10-inch steel H pile	~7 feet (2 meters)	~65 feet (20 meters)	170	160	NA	None
12-inch steel H pile	~7 feet (2 meters)	~100 feet (30 meters)	179	165	NA	None
12-inch steel H pile	~7 feet (2 meters)	~180 feet (55 meters)	178	164	NA	None
12-inch steel H pile	~7 feet (2 meters)	~280 feet (85 meters)	165	150	NA	None
12-inch steel H pile	~16 feet (5 meters)	~230 feet (70 meters)	168	156	NA	None
12-inch steel H pile	~16 feet (5 meters)	~300 feet (90 meters)	170	158	NA	None
15-inch steel H pile, thin battered	~7-10 feet (2-3 meters)	~30 feet (10 meters)	190	165	155	None
15-inch steel H pile, thick vertical	~7-10 feet (2-3 meters)	~30 feet (10 meters)	195	180	170	None
24-inch AZ steel sheet	~50 feet (15 meters)	~30 feet (10 meters)	205	189	179	None

Notes:

Db = decibels

RMS = root mean square

SEL = sound exposure level

Source: CalTrans 2009

Table 4.M.2: Potential Effects of Varying Noise Levels to Fish and Marine Mammals, provides information about some known acute and sub-lethal effects of noise on fish and marine mammals. Table 4.M.3: Summary of NOAA Established Permanent Threshold Shift and Temporary Threshold Shift Sound Levels from Underwater Noise Levels for Marine Mammals, p. 4.M.65, presents recently adopted underwater noise levels that may cause both acute and sub-lethal effects for different groupings of marine mammals, as determined by NOAA.¹⁵⁵

During pile-driving activities associated with reconstruction of the bulkhead in Reach II, fish are not expected to be present within a zone of 6 to 8 feet of the sheet piling or H-piles, since the movement of the piling through the shallow water and initial contact with the San Francisco Bay seafloor would cause any fish that are present to quickly leave the immediate area. Therefore, any longfin smelt, green sturgeon, Pacific herring, or Magnuson-Stevens Act-managed fish species swimming near pile-driving activities associated with reconstruction of the bulkhead in Reach II are not expected to experience any acute effects or barotraumas from vibratory pile driving. However, longfin smelt, Pacific herring, and green sturgeon have been observed in shallow water regions of San Francisco Bay, so there is a greater probability that they would be present in the project area during pile driving associated with reconstruction of the bulkhead in Reach II. Although the potential for acute barotrauma to occur is limited, behavioral changes in fish movement or activity can be expected. The use of vibratory pile drivers rather than impact pile drivers, or the application of established industry BMPs to reduce underwater noise generation from either equipment type, would be expected to substantially reduce underwater pile-driving noise, so that the potential impact would be less than significant.

Table 4.M.4: Estimated Vibratory and Impact Hammer Pile Driving Sound Levels and Disturbance to Criteria Levels, p. 4.M.66, lists estimated distances from the point of contact between the pile driver and the sheet piling or H-piling associated with reconstruction of the bulkhead in Reach II that sound levels can be expected to travel underwater in excess of 183 and 187 dB (SEL) for both impact and vibratory hammers. As discussed above on p. 4.M.60-4.M.61 and shown in Table 4.M.4, installing either steel sheet piling or steel H-piling for the bulkhead refurbishment would be expected to result in underwater noise levels that exceed 183 or 187 dB (SEL) depending on the final design approach used, whether an impact or vibratory hammer is used, and what size and type of piling is used for the soldier wall. It is unknown what size H-pile

¹⁵⁵ National Marine Fisheries Service (NMFS) 2016. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Department of Commerce, NOAA. NOAA Technical Memorandum NMFS-OPR-55, 178p.

Table 4.M.2: Potential Effects of Varying Noise Levels to Fish and Marine Mammals

Taxa	Sound Level (dB)	Effect	Reference
Fish			
All fish >2 grams in size	206 (peak) 187 (SEL)	Acute barotraumas ¹	Fisheries Hydroacoustic Working Group 2008
All fish <2 grams	186 (SEL)	Acute barotraumas	Fisheries Hydroacoustic Working Group 2008
Pacific herring	180–186 (peak)	Avoidance behavior	Dales and Knudsen 1986
Salmon, steelhead	166 (SEL)	Avoidance behavior	Loeffelman et al. 1991
Salmon, steelhead	140–160 (SEL)	Startle response	San Luis and Delta Mendota Water Authority and C.H. Hanson 1996
Marine Mammals			
Marine mammals	180 (RMS) for cetaceans 190 (RMS) for pinnipeds	Level A ² harassment out to 65 feet from sound source	NOAA Fisheries 2011
Marine mammals	160 RMS from impact hammer	Level B ³ harassment out to 328 feet from sound source	NOAA Fisheries 2011
Marine mammals	120 RMS from vibratory hammer	Level B ³ harassment out to 1.2 miles	NOAA Fisheries 2011
Harbor seals	166–195 (peak)	Can be detected at distances up to 2.9 miles	Terhung et al. 2002
Harbor seals	>155 (peak)	Avoidance behavior	Terhung et al. 2002
Harbor seals	107 at 12 kHz (peak)	Discomfort zone out 66 feet from the sound source	Kastelein et al. 2008
Harbor seals	>75 (SEL)	Threshold level of detection	Kastak and Schusterman 1998

Notes:

dB = decibels

kHz = kilohertz

SEL = sound exposure level

¹ Barotrauma - High-intensity underwater noise that can result in acute damage to soft tissues, such as gas bladders, hearing membranes, or eyes of fish and other marine animals.

² Level A harassment is defined as any act of pursuit, torment, or annoyance with has the potential to injure a marine mammal or marine mammal stock in the wild.

³ Level B harassment is defined as any act of pursuit, torment, or annoyance with has the potential to disturb a marine mammals or marine mammal stock in the wild.

Table 4.M.3: Summary of NOAA Established Permanent Threshold Shift¹ and Temporary Threshold Shift² Sound Levels³ from Underwater Noise Levels for Marine Mammals

Hearing Group	Impulsive ⁴	Non-impulsive ⁵
Low-Frequency (LF) Cetaceans⁶ (Baleen whales)	$L_{pk, flat}$: 219 dB $L_{E, LF, 24H}$: 183 dB	$L_{E, LF, 24H}$: 199 dB
Mid-Frequency (MF) Cetaceans (Dolphins, toothed whales, beaked whales, bottlenose dolphins)	$L_{pk, flat}$: 230 dB $L_{E, LF, 24H}$: 185 dB	$L_{E, LF, 24H}$: 198 dB
High-Frequency (HF) Cetaceans (True porpoises, Kogia, river dolphins, cephalohynchid, <i>Lageniorhynchus cruciger</i> , and <i>L. asuustralis</i>)	$L_{pk, flat}$: 202 dB $L_{E, LF, 24H}$: 155 dB	$L_{E, LF, 24H}$: 173 dB
Phocid Pinnipeds⁷ (True Seals) (Underwater)	$L_{pk, flat}$: 218 dB $L_{E, LF, 24H}$: 185 dB	$L_{E, LF, 24H}$: 201 dB
Otariid Pinnipeds (Sea lions and fur seals) (Underwater)	$L_{pk, flat}$: 232 dB $L_{E, LF, 24H}$: 203 dB	$L_{E, LF, 24H}$: 219 dB

Notes:

dB = decibels

- ¹ Permanent Threshold Shift is when a permanent reduction in hearing occurs or the frequencies at which sound can be detected is permanently reduced.
- ² Temporary Threshold Shift is when a short-term (temporary) reduction in hearing or the frequency at which sound can be detected occurs.
- ³ Peak sound pressure (L_{pk}) has a reference value of 1 μPa , and cumulative sound exposure level (L_E) has a reference value of 1 $\mu\text{Pa}^2\text{s}$. In this table, thresholds are abbreviated to reflect American National Standards Institute (ANSI) standards. However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript “flat” is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.
- ⁴ Impulsive noise is a category of noise which includes unwanted, almost instantaneous sharp sounds.
- ⁵ All noise not included in the definition of impulsive noise.
- ⁶ Cetaceans - Marine mammals in the cetacean family that include whales, dolphins, and porpoises.
- ⁷ Pinnipeds – Marine mammal group that includes seals, sea lions, and walruses.

Sources: National Marine Fisheries Service 2016. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Department of Commerce, NOAA, NOAA Technical Memorandum NMFS-OPR-55

Table 4.M.4: Estimated Vibratory and Impact Hammer Pile-Driving Sound Levels and Disturbance to Criteria Levels

Pile Type	Estimated Number of Strikes	Equipment Type	Distance to Sound Level Threshold ¹ (feet)				Attenuation Equipment
			206 dB (Peak)	187 dB (SEL) (Fish ≥2g)	183 dB (SEL) (Fish <2g)	150 dB (SEL) (Behavioral)	
24-inch AZ steel sheet	100–200	Vibratory	0	16-23	29.5-46	243	None
10-inch steel H pile	580	Vibratory	0	0	0	9.8–20	None
24-inch AZ steel sheet	100–200	Impact	30	207–328	384-607	13,061	None
10-inch steel H pile	580	Impact	3	0	0	305–1,522	None
12-inch steel H pile	580	Impact	0–3	0	0	279–1,549	None
15-inch steel H pile, thin battered	580	Impact	3	5	9	328	None
15-inch steel H pile, thick vertical	580	Impact	7	51	95	3,280	None

Notes:

dB = decibels

g = gram

SEL = sound exposure level

¹ Estimated number of strikes and distance to sound level thresholds area are calculated according to protocols outlined in Caltrans 2009.

would be used to build the soldier wall option or whether it might be built in-place or pile driven by either an impact or vibratory hammer.¹⁵⁶ As illustrated in the table, driving steel sheet piling with a vibratory hammer can generate noise levels of 183 dB (SEL) at a distance of 46 feet and 187 dB at a distance of 23 feet. If a vibratory hammer is used to drive the steel H-piles, the noise generated is expected to be minimal and only behavioral effects to fish and marine mammals might occur. If an impact hammer is used for H-piling 15 inches or larger, then noise levels of 183 dB and 187 dB (SEL) can be expected to travel 312 feet and 167 feet, respectively. If the sheet piling or H-piling installation occurs when the tide is in, the potential exists to generate underwater noise levels that could result in significant impacts to special-status fish species,

¹⁵⁶ Moffatt & Nichol, Preliminary Shoreline Improvements Report.

including Magnusson-Stevens Act-managed fish species, longfin smelt, green sturgeon, and Pacific herring. In addition, San Francisco Bay waters adjacent to the 28-Acre Site are regularly used by multiple marine mammal species, including harbor seals and California sea lions.

Consequently, underwater noise generated by vibratory or impact hammer installation of steel sheet or H-piling during the repair of the Reach II bulkhead has the potential to significantly impact special-status fish species, including Magnusson-Stevens Act-managed fish species, longfin smelt, Pacific herring, and green sturgeon, and multiple marine mammal species, including harbor seals and California sea lions. Implementation of Mitigation Measure M-BI-3: Pile Driving Noise Reduction for Protection of Fish and Marine Mammals, shown below, would reduce the potential impact to a less-than-significant level.

Mitigation Measure M-BI-3: Pile Driving Noise Reduction for Protection of Fish and Marine Mammals

Prior to the start of reconstruction of the bulkhead in Reach II, the project sponsors shall prepare a detailed Construction Plan that outlines the details of the piling installation approach. This Plan shall be reviewed and approved by the City of San Francisco or other designated City, State, or Federal agency, as determined by the San Francisco Planning Department. The information provided in this plan shall include, but not be limited to, the following:

- The type of piling to be used (whether sheet pile or H-pile);
- The piling size to be used;
- The method of pile installation to be used;
- Noise levels for the type of piling to be used and the method of pile driving;
- Recalculation of potential underwater noise levels that could be generated during pile driving using methodologies outlined in CalTrans 2009;¹⁵⁷ and
- When pile driving is to occur.

If the results of the recalculations provided in the detailed Construction Plan for pile driving discussed above indicate that underwater noise levels are less than 183 dB (SEL) for fish at a distance of 33 feet (less than or equal to 10 meters) and 160 dB (RMS) sound pressure level or 120 dB (RMS) re 1 μ Pa impulse noise level for marine mammals for a distance 1,640 feet (500 meters), then no further measures are required to mitigate underwater noise. If recalculated noise levels are greater than those identified above, then the project sponsors shall develop a sound attenuation reduction and monitoring plan. This plan shall be reviewed and approved by the Planning Department Environmental Review Officer or other City-designated person. This plan shall provide detail on the sound attenuation system, detail methods used to monitor and verify sound levels during pile-driving activities, and all BMPs to be taken to reduce impact hammer pile-driving sound in the marine environment to an intensity level of less than 183 and

¹⁵⁷ Caltrans, Technical Guidance for Assessment and Mitigation.

160/120 dB (as identified above) at distances of 33 feet (less than or equal to 10 meters) for fish and 1,640 feet (500 meters) for marine mammals. The sound-monitoring results shall be made available to NOAA Fisheries. If, in the case of marine mammals, recalculated noise levels are greater than 160 dB (peak) at less than or equal to 1,640 feet (500 meters), then the project sponsors shall consult with NOAA to determine the need to obtain an Incidental Harassment Authorization (IHA) under the MMPA. If an IHA is required by NOAA, an application for an IHA shall be prepared by the project sponsor.

The plan shall incorporate as appropriate, but not be limited to, the following BMPs:

- Any impact-hammer-installed soldier wall H-pilings or sheet piling shall be conducted in strict accordance with the Long-Term Management Strategy (LTMS) work windows for Pacific herring,¹⁵⁸ during which the presence of Pacific herring in the project site is expected to be minimal unless, where applicable, NOAA Fisheries in their Section 7 consultation with the Corps determines that the potential effect to special-status fish species is less than significant.
- If pile installation using impact hammers must occur at times other than the approved LTMS work window for Pacific herring or result in underwater sound levels greater than those identified above, the project sponsors shall consult with both NOAA Fisheries and CDFW on the need to obtain incidental take authorizations to address potential impacts to longfin smelt and green sturgeon associated with reconstruction of the steel sheet pile bulkhead in Reach II, and to implement all requested actions to avoid impacts.
- A 1,640-foot (500-meter) safety zone shall be established and maintained around the sound source to the extent such a safety zone is located within in-water areas, for the protection of marine mammals in the event that sound levels are unknown or cannot be adequately predicted.
- In-water work activities associated with reconstruction of the steel sheet pile bulkhead in Reach II shall be halted when a marine mammal enters the 1,640-foot (500-meter) safety zone and shall cease until the mammal has been gone from the area for a minimum of 15 minutes.
- A “soft start” technique shall be used in all pile driving, giving marine mammals an opportunity to vacate the area.
- A NOAA Fisheries-approved biological monitor shall conduct daily surveys before and during impact hammer pile driving to inspect the safety zone and adjacent San Francisco Bay waters for marine mammals. The monitor shall be present as specified by NOAA Fisheries during the impact pile-driving phases of construction.
- Other BMPs shall be implemented as necessary, such as using bubble curtains or an air barrier, to reduce underwater noise levels to acceptable levels.

Alternatively, the project sponsors may consult with NOAA directly and submit evidence to the satisfaction of the Environmental Review Officer of NOAA consultation. In such

¹⁵⁸ U.S. Army Corps of Engineers, Programmatic Essential Fish Habitat (EFH) Assessment for the Long-Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region. July 2009.

case, the project sponsors shall comply with NOAA recommendations and/or requirements.

Jurisdictional Waters

Impact BI-4: The Proposed Project would have a substantial adverse effect on Federally protected waters as defined by Section 404 of the Clean Water Act through direct removal, filling, hydrological interruption, or other means. (*Less than Significant with Mitigation*)

San Francisco Bay is considered a navigable water of the United States and is therefore considered jurisdictional waters of the U.S. regulated by the Corps under Section 404 of the CWA up to the high tide line, and under Section 10 of the Rivers and Harbors Act up to the mean high water mark. These waters also are regulated by the RWQCB as Waters of the State and by BCDC, which has jurisdiction over all areas of San Francisco Bay that are subject to tidal action, as well as a 100-foot shoreline band.

Project activities such as demolition, extensive ground disturbance, grading, and shoreline improvements could result in increased surface run-off through stormwater drains to San Francisco Bay, or erosion or siltation into San Francisco Bay. In the case of soil erosion or an accidental release of damaging materials during construction, the Proposed Project could indirectly impact water quality, a significant impact. However, as described in Section 4.O, Hydrology and Water Quality, pp. 4.O.27-4.O.28, because the project site exceeds 1 acre in size, the project sponsors or future developers would be required to apply for coverage under the Construction General Stormwater Permit to comply with Federal National Pollutant Discharge Elimination System (NPDES) regulations (NPDES permit), and would be required to develop and implement a Stormwater Pollution Prevention Plan (SWPPP) that identifies appropriate construction BMPs designed to prevent pollutants from coming into contact with stormwater and to keep all products of erosion and stormwater pollutants from moving offsite into receiving waters. As described on pp. 4.O.46-4.O.54, implementation of the SWPPP would maintain the potential for degradation of water quality in wetlands and other jurisdictional waters at a less-than-significant level.

The Proposed Project includes shoreline improvements to the 28-Acre Site that would repair or replace existing shoreline protection and the existing bulkhead along Reach II with a new sheet piling or soldier wall adjacent to the east (seaward) of the existing concrete bulkhead. Additionally, planned upgrades to the project site's stormwater and sanitary waste collection, transport, and treatment system could include rebuilding the outfalls at 20th and 22nd streets or the installation of a new outfall at 21st Street under the separated system approach or the hybrid system approach (see Chapter 2, Project Description, pp. 2.59-2.66, and Section 4.O, Hydrology and Water Quality, pp. 4.O.46-4.O.47), and possible cleanup and rehabilitation of the intertidal

areas in Reaches I and IV. Should this option be selected, these activities would result in both temporary impacts to jurisdictional waters during repair of the existing shoreline protection, bulkhead, or 20th and 22nd streets outfalls, or installation of the new 21st Street outfall, as well as potential permanent impacts through placement of fill material associated with a new bulkhead and/or a new 21st Street stormwater outfall, which would be considered a significant impact. Installation of a new 21st Street outfall would result in permanent fill of jurisdictional waters. Permanent impacts resulting from placement of San Francisco Bay fill associated with the repair of the existing, or construction of a new, bulkhead, would occur only if the repaired or new bulkhead exceeded the current extent (footprint and/or volume) of existing structures within jurisdictional waters. Minor deviations in the structure's configuration or filled area—including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards—that are necessary to make the repair, rehabilitation, or replacement is considered fill, but typically would be authorized as a non-substantial change to the marine environment. No other project work is planned to occur below the high tide line that would affect jurisdictional waters.

Project activities resulting in the discharge of Bay fill¹⁵⁹ or other disturbance to jurisdictional waters (i.e., below the high tide line) require permit approval from the Corps, and a water quality certification and/or waste discharge requirements from the RWQCB. Those projects within San Francisco Bay or within the shoreline band require a permit from BCDC. Collectively, these regulatory agencies and the permits and authorizations they issue for the Proposed Project would require that placement of new fill in jurisdictional waters be avoided or minimized to the maximum extent practicable while still accomplishing the Proposed Project's purpose, and would specify an array of measures and performance standards as conditions of Proposed Project approval. These permits would require water quality protection measures to avoid and/or minimize temporary impacts from in-water and above-water construction activities that would be implemented in conjunction with water quality protection mitigation measures identified in Section 4.O, Hydrology and Water Quality, pp. 4.O.60-4.O.61. These permits would also require protection measures for special-status marine species to ensure the necessary in-water work is not likely to cause adverse effects to Federally protected waters. Measures would include working within work "windows" for fish and marine mammals as specified by NMFS (June 15–November

¹⁵⁹ Under CWA Section 404, a permit is required for the 'discharge of dredged or fill material' into waters of the United States. Fill material is any substance placed (also described as discharged) in waters of the United States where the material has the effect of either replacing any portion of a water of the United States with dry land or changing the bottom elevation of any portion of a water. Examples of fill material include rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mining or other excavation activities, and materials used to create any structure or infrastructure (such as outfall pipes and/or bulkheads under the Proposed Project) in waters of the United States. [USACE SPN-2003-01 and 33 CFR 323.2(5) (e)(1)]

30), implementing noise minimization strategies for in-water work (e.g., pile driving as discussed under Impact BI-4, pp. 4.M.69-4.M.71), and monitoring behavioral response to in-water work.

In addition, permanent placement of new fill resulting in the loss of jurisdictional waters in excess of that necessary for normal maintenance may trigger a requirement for compensatory mitigation that will be aimed at restoring or enhancing similar ecological functions and services as those displaced. The types, amounts, and methods of compensatory measures required will differ between the permitting agencies depending on the specific resources they regulate and the policies and guidelines they implement.

Implementation of Mitigation Measure M-BI-4: Compensation for Fill of Jurisdictional Waters, shown below, would reduce potential Proposed Project-related impacts on jurisdictional waters to a less-than-significant level by requiring restoration or enhancement of the San Francisco shoreline or intertidal/subtidal habitat along the eastern waterfront as compensation for the permanent fill of jurisdictional waters in support of the Proposed Project if it is determined, through review by regulatory agencies, that the placement of permanent fill in San Francisco Bay exceeds the minimum threshold for repair and replacement or new, permanent fill is placed.

Mitigation Measure M-BI-4: Compensation for Fill of Jurisdictional Waters

To offset temporary and/or permanent impacts to jurisdictional waters of San Francisco Bay adjacent to the 28-Acre Site, construction associated with repair or replacement of the Reach II bulkhead shall be conducted as required by regulatory permits (i.e., those issued by the Corps, RWQCB, and BCDC) and in coordination with NMFS as appropriate. If required by regulatory permits, compensatory mitigation shall be provided as necessary, at a minimum ratio of 1:1 for fill beyond that required for normal repair and maintenance of existing structures. Compensation may include on-site or off-site shoreline improvements or intertidal/subtidal habitat enhancements along San Francisco's eastern waterfront through removal of chemically treated wood material (e.g., pilings, decking, etc.) by pulling, cutting, or breaking off piles at least 1 foot below mudline or removal of other unengineered debris (e.g., concrete-filled drums or large pieces of concrete).

Improvements would be implemented in accordance with NMFS as appropriate. On-site or off-site restoration/enhancement plans, if required, must be prepared by a qualified biologist prior to construction and approved by the permitting agencies prior to beginning construction, repair, or replacement of the Reach II bulkhead. Implementation of restoration/enhancement activities by the permittee shall occur prior to project impacts, whenever possible.

Wildlife Movement

Impact BI-5: The Proposed Project would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. (*Less than Significant with Mitigation*)

Terrestrial

As discussed under Impact BI-2, pp. 4.M.55-4.M.57, construction of the Proposed Project could affect birds attempting to nest within the project site directly through nest destruction or avian mortality, and indirectly through an increase in the ambient noise environment that might disrupt breeding behavior, discourage nesting, or cause nest abandonment. Through City-required bird-safe building design standards, operation of the Proposed Project would not adversely affect resident or migratory birds through an increased risk of collision with new buildings or structures presenting location-related or feature-related hazards. Compliance with the MBTA and California Fish and Game Code, and compliance with the San Francisco Planning Code Section 139 (*Standards for Bird-Safe Buildings*) are expected to reduce potential construction-related effects on birds nesting within the project site and surrounding vicinity and potential collision hazards for migrating birds to less-than-significant levels.

Marine

As discussed in Impact BI-3, pp. 4.M.57-4.M.69, underwater noise levels from impact hammers that could be used to install steel sheet piling or steel H-piling for the renovation of the bulkhead in Reach II could be high enough to result in avoidance behavior by marine mammals as they move throughout San Francisco Bay to forage or to reach pupping sites. As illustrated in Table 4.M.4, p. 4.M.66, underwater noise levels greater than 150 dB, the documented noise level at which marine mammals exhibit altered behavioral actions, can occur at distances between 279 and 3,281 feet from an impact hammer.

Harbor seals have permanent colonies at Castro Rocks in San Pablo Bay, Yerba Buena Island in the Central Bay basin, and Mowry Slough in the South Bay.¹⁶⁰ The year-round harbor seal “haul-out” on Yerba Buena Island’s southwestern corner is located approximately 3.6 miles north of the project site. As a result, adult and juvenile harbor seals can be expected to be present in San Francisco Bay waters adjacent to the project site. Additionally, harbor seals and California sea lions forage throughout San Francisco Bay, feeding on schooling fish such as smelt, anchovies, herring, rockfish, sculpin, perch, and midshipmen, along with squid and mysid shrimp, many of

¹⁶⁰ NOAA, National Marine Fisheries Service, Report on the Subtidal Habitats and Associated Biological Taxa in San Francisco Bay, June 2007. Santa Rosa, California.

which are present in the waters adjacent to the project site. Consequently, if impact hammers are used for pile driving, harbor seals and California sea lions could be subjected to underwater noise levels high enough to cause avoidance behavior while they migrate to or from haul-out or pupping locations or during normal foraging.

Recent studies conducted by NMFS¹⁶¹ and CDFW¹⁶² indicate that the primary migration corridor for salmon and steelhead in San Francisco Bay is through Raccoon Strait and north of Yerba Buena Island (the northern reaches of the Central Bay basin). This is in part because any spawning habitat in the Central Bay basin and South Bay basin streams and watersheds is inaccessible to salmon and steelhead. Additionally, a recent study evaluating 30 years of IEP monthly mid-water fish trawl data and 3 years of acoustic tag data of hatchery-raised salmonids suggests that the presence of out-migrating juvenile salmonids (steelhead and salmon) along the Port of San Francisco waterfront appears to be more the result of capture by tidal flow rather than active foraging or intentional swimming to those areas of San Francisco Bay.¹⁶³ This study also indicates that there is a very low probability of any salmonids being present in the shallow waters adjacent to the project site where potential underwater noise levels would be high enough to result in any behavioral disturbance. As a consequence, any potential disturbance to migrating salmonids (steelhead and salmon) would be very minimal in the waters adjacent to the project site.

The potential impact from impact-hammer-generated noise on special-status marine mammal species, including harbor seals and California sea lions, migrating to or from haul-out and pupping sites or foraging could be significant. Implementation of Mitigation Measure M-BI-3: Pile Driving Noise Reduction for Protection of Fish and Marine Mammals, pp. 4.M.67-4.M.69, would reduce this potential impact to a less-than-significant level.

¹⁶¹ National Marine Fisheries Service (NMFS), Biological Opinion for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, 2001.

¹⁶² Baxter, R., K. Hieb, S. DeLeon, K. Fleming, and J. Orsi, *Report on the 1980-1995 Fish, Shrimp, and Crab Sampling in the San Francisco Estuary, California*, 1999. Prepared for The Interagency Ecological Program for the Sacramento-San Joaquin Estuary. California Department of Fish and Game, Stockton, California.

¹⁶³ Jahn, A., *Young Salmonid Out-Migration Through San Francisco Bay with Special Focus on Their Presence at the San Francisco Waterfront*. Draft Report, January 2011. Prepared for the Port of San Francisco.

Plans and Policies

Impact BI-6: The Proposed Project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, and would not have a substantial conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or State habitat conservation plan. (*Less than Significant*)

No adopted habitat conservation plan or natural community conservation plan covers the project site, and therefore the Proposed Project could not conflict with these plans. There are no protected street trees, significant trees, or landmark trees on the project site. Therefore, the Proposed Project would have no impact.

Marine

The San Francisco Bay Subtidal Habitat Goals Report, as discussed in “Local Regulations and Plans,” pp. 4.M.44-4.M.45, provides a scientific foundation and approach for the conservation and enhancement of submerged areas of San Francisco Bay and was prepared in collaboration with BCDC, California Ocean Protection Council/California State Coastal Conservancy, NOAA, and the San Francisco Estuary Partnership.¹⁶⁴ As such, it contains many recommended conservation goals for San Francisco Bay subtidal habitats that potentially could be affected by the Proposed Project, including the installation of the new sheet piling or soldier wall adjacent to the concrete bulkhead in Reach II. Conservation goals also include removal of old creosote wood pilings, wood, concrete, brick debris, and assorted trash and discarded materials currently present along the 28-Acre Site’s shoreline. Replacing the existing debris (concrete and brick) in Reaches I and IV with quarry rock would be consistent with the resource management goals of the San Francisco Bay Subtidal Habitats Goals Report; however, these measures currently are not proposed by the project sponsors as part of the Proposed Project.

These goals can be used by multiple agencies when evaluating proposed projects within their jurisdiction. The Subtidal Habitat Goals Report includes habitat conservation goals that promote no net loss or disturbance to soft bottom and rock habitats (subtidal and intertidal zones), enhancing habitat function of artificial structures, minimizing placement of artificial structures detrimental to subtidal habitat function, protecting native shellfish habitat and existing eelgrass habitat, and protecting macroalgal beds (*Fucus* and *Gracilaria* spp.). Although the San Francisco Bay Subtidal Habitat Goals Project has no regulatory authority, any detrimental changes to Bay–

¹⁶⁴ San Francisco Bay Subtidal Habitat Goals Project, San Francisco Bay Subtidal Habitat Goals Report – Conservation Planning for the Submerged Areas of the Bay; 50-Year Conservation Plan, 2010. Available online at <http://www.sfbaysubtidal.org/report.html>.

Delta subtidal habitats could also have potential negative effects to special-status species, managed fish species, essential fish habitat (EFH), or important forage for marine mammals.

At present, with the exception of the proposed repair of the bulkhead in Reach II and the repair and construction of a new stormwater outfall, no major project work is planned to occur below the high tide mark. The reconstruction of the Reach II bulkhead can be expected to have a very minor and short-term effect on any of the subtidal or intertidal habits and conservation goals outlined in the San Francisco Bay Subtidal Habitats Goals Report. The temporary loss of artificial hard bottom sessile habitat currently existing on the vertical surface of the bulkhead would be replaced with new artificial habitat of similar size and area. Any disturbance or loss of intertidal sand or hard bottom habitat (intertidal rocks) and associated biological communities from construction personnel and equipment during reconstruction of the bulkhead would be temporary and minimal in comparison to the extent of undisturbed intertidal habitat fronting the project site.

Finally, no additional actions or mitigation measures to prevent the introduction or spread of harmful invasive species are required for either of these project activities since no invasive species were observed inhabiting the intertidal areas of the project waterfront that are not already well-established members of the intertidal and subtidal biological communities of San Francisco Bay.¹⁶⁵

Cumulative Impacts

Geographic Extent/Context

The geographic scope of potential cumulative impacts on biological resources encompasses the species occurrences, habitats, and sensitive natural communities within the project study area, as well as biologically linked areas sharing the eastern waterfront of San Francisco and San Francisco Bay. The cumulative analysis uses a list-based approach to analyze the effects of Proposed Project construction and operation in combination with other past, present, and reasonably foreseeable future projects in the immediate vicinity.

The cumulative impact analysis assumes that construction and operation of other projects in the geographical area would have to comply with the same regulatory requirements as the Proposed Project, which would serve to avoid or reduce many impacts to less-than-significant levels on a project-by-project basis. The analysis then considers whether or not there would be a significant, adverse cumulative impact associated with implementation of the Proposed Project in combination with past, present, and probable future projects in the geographical area, and if so,

¹⁶⁵ AMS, Intertidal Habitat and Biological Community Survey.

whether or not the Proposed Project's incremental contribution to the cumulative impact would be considerable. Both conditions must apply in order for a project's cumulative effects to rise to the level of significance.

Past, Present, and Reasonably Foreseeable Projects

The following current and reasonably foreseeable projects may result in impacts to biological resources and are included in the analysis of the Proposed Project's cumulative impacts.

Section 4.A, Introduction to Chapter 4, pp. 4.A.12-4.A.18, provides a summary description of each project and its status and schedule. Figure 4.A.1: Location of Foreseeable Future Projects, p. 4.A.7, depicts their locations.

Waterfront Projects:

- Golden State Warriors Event Center and Mixed Use Development
- Future Crane Cove Park
- Seawall Lot 337 / Pier 48 Mission Rock Development
- Mariposa Pump Station Interim Repairs
- San Francisco Port BAE Lease Renewal
- Mission Bay Ferry Landing

Landside Redevelopment near the Pier 70 Project Site:

- 2177 Third Street
- 2051 Third Street / 650 Illinois Street
- Demolition of Building 117 (Orton Historic Core Sub Area)¹⁶⁶

Past cumulative projects, including the development of civic facilities, residences, commercial and industrial areas, and infrastructure, have already caused substantial adverse cumulative changes to biological resources in the San Francisco peninsula. For example, portions of the project study area were converted from their original tidal wetland habitat beginning over a century ago for industrial uses, with near complete loss of the original habitat types and any of the species that once occurred.

Unpaved, open areas have matured over time and provide a “new normal” in terms of habitat, often simplified in terms of diversity, and supporting a different suite of species than once existed. Overall, this is true of many areas throughout the region. The effects of these past

¹⁶⁶ San Francisco Planning Department, Notification of Project Receiving Environmental Review, Illinois and 20th Streets/Pier 70 (“20th Street Historic Core”), Case No. 2016-000346ENV, September 8, 2016.

projects are reflected in the baseline conditions described in Environmental Setting, pp. 4.M.2-4.M.33.

With the exception of Seawall Lot 337 / Pier 48 Mission Rock Development, Mission Bay Ferry Landing, and demolition of Building 117, all of the projects listed above have undergone environmental review and environmental impacts have been avoided or minimized to the extent feasible. Some of these projects are expected to have mostly temporary impacts on biological resources during the construction phase of the project. Other projects, such as the future Crane Cove Park, which would provide an open space area, would include elements likely to result in beneficial effects on biological resources. Such elements include improved foraging opportunity and nesting or roosting habitat for terrestrial wildlife, and improved shoreline diversity and subtidal and intertidal habitat associated with removal of non-engineered debris at the boat ramp and pier replacement/refurbishing. Seawall Lot 337 / Pier 48 Mission Rock Development is currently undergoing environmental review and is expected to result in potential adverse effects on terrestrial and marine biological resources similar to those with the Proposed Project, but not to a degree that would alter the cumulative significance of implementing the proposed projects. Similarly, the proposed demolition of Building 117 is undergoing environmental review, as required by CEQA, but is not expected to result in significant adverse effects on either terrestrial or marine biological resources. Funding has been secured for the Mission Bay Ferry Landing project, which would also undergo environmental review and is not expected to result in significant adverse effects on either terrestrial or marine biological resources.

Impact C-BI-1: The Proposed Project, in combination with past, present, and reasonably foreseeable future projects in the site vicinity, would result in a cumulatively considerable contribution to significant biological resources impacts. (*Less than Significant with Mitigation*)

Terrestrial

The Proposed Project would have a limited effect on terrestrial biological resources that inhabit the project site and surrounding vicinity primarily because the existing built-out environment of the study area offers marginal habitat value to resident species. Short-term construction impacts identified in “Impact Evaluation,” pp. 4.M.49-4.M.55, include potential disturbance to nesting birds and roosting bats. Long-term operational impacts include a potential increased risk of bird collisions with project buildings or features. Project compliance with the City’s Bird Safe Building Standards would reduce the Proposed Project’s long-term impact on birds resulting from collisions, and implementation of identified mitigation measures would reduce the Proposed Project’s impact on nesting birds and roosting bats during construction; together these ensure the Proposed Project’s incremental effect on such resources would not be cumulatively considerable. Mitigation Measure M-BI-1: Worker Environmental Awareness Program Training, p. 4.M.51,

would educate project personnel about the biological resources on the project site, the laws and regulations protecting them and penalties for non-compliance, and avoidance or protection measures to be employed during construction to minimize project-related impacts to these resources. Potential impacts to nesting birds or roosting bats within the trees or buildings of the project site associated with development would be minimized through project compliance with MBTA and California Fish and Game Code, and implementation of Mitigation Measure M-BI-2, pp. 4.M.56-4.M.57, where active nests or roosts would be identified during preconstruction survey efforts and protective buffers established until they are no longer in use. Similar foraging and roosting opportunities for these species would be available on-site after completion of the Proposed Project, so the long-term incremental effects of the Proposed Project would not be cumulatively considerable.

Development of the projects on San Francisco's eastern waterfront listed above on p. 4.M.76 is likely to have limited effects on nesting birds and roosting bats, similar to those with the Proposed Project; however, given the limited extent of existing habitat and poor habitat quality in these planned development areas, project implementation would not result in a cumulatively considerable impact on terrestrial resources. Mitigation measures similar to those for the Proposed Project would reduce the incremental effect of the individual projects on such resources. Project compliance with the City's *Standards for Bird-Safe Buildings* for buildings within 300 feet of the San Francisco Bay shoreline or adjacent to parks or open space would reduce the location-related hazards to resident and migratory birds posed by waterfront development projects, and treatments applied to reflective or transparent building elements would reduce bird collisions with project features.

Landside redevelopment projects in the vicinity of the Proposed Project may result in similar temporary impacts to biological resources considered under the project analysis; however, given their existing conditions and location away from the eastern waterfront, these project sites likely offer even less habitat for terrestrial resources than the Proposed Project site.

None of the potential adverse effects identified for the Proposed Project would result in a cumulative effect with other approved or anticipated projects considered in this analysis.

Marine

The Proposed Project would have limited activities and potential effects on marine habitats and associated biological communities within the Central Bay basin waters and marine habitats adjacent to the project site, primarily because limited project components would occur below the high tide mark. Potential effects on marine habitat and biological taxa identified in "Impact Evaluation," pp. 4.M.57-4.M.73, include potential temporary loss of intertidal habitat, noise from pile-driving activities to repair an existing bulkhead in Reach II, and the potential for accidental

discharges from stored construction and demolition equipment, supplies, and materials near San Francisco Bay waters.

The potential effects of these activities on the marine taxa and communities present at or adjacent to the project site, including special-status species such as longfin smelt, Pacific herring, green sturgeon, and native oysters, would be expected to be temporary, with the exception of the reconstruction of the Reach II bulkhead, the 20th and 22nd streets combined sewer discharge outfalls, and 21st Street stormwater outfall. These activities are not expected to result in the cumulative permanent loss of habitat or species associated with those habitats, such as the native oyster. Potentially, the clean-up and refurbishment of the shoreline could result in an overall improvement of the subtidal and intertidal habitat and the associated reestablished community.

Additionally, the implementation of established BMPs and mitigation measures (Mitigation Measure M-BI-3: Pile Driving Noise Reduction for Protection of Fish and Marine Mammals, and Mitigation Measure M-BI-4: Compensation for Fill of Jurisdictional Waters) identified in the EIR are anticipated to reduce all of these potential impacts to a less-than-significant level.

All of these potential impacts are common to any project sited on the San Francisco Bay shoreline. Despite this commonality with other similar projects, none of these Proposed Project impacts are anticipated to result in a cumulatively considerable contribution to a significant cumulative impact with other approved or reasonably foreseeable projects.

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