IV. ENVIRONMENTAL SETTING AND IMPACTS

This chapter is organized by environmental topic and addresses potential environmental impacts on the following topics: Land Use and Land Use Planning; Aesthetics; Population and Housing; Cultural and Paleontological Resources; Transportation; Noise; Air Quality; Greenhouse Gas Emissions; Wind and Shadow; Recreation; Utilities and Service Systems; Public Services; Biological Resources; Geology and Soils; Hydrology and Water Quality; Hazards and Hazardous Materials; Mineral and Energy Resources; and Agricultural Resources and Forest Land. In each of these environmental sections, existing conditions in the Redevelopment Plan Project Area are described first, under the heading Setting. These existing conditions serve as the baseline for analysis of potential environmental impacts from the Proposed Project under the heading Impacts. Cumulative impacts from the Proposed Project are analyzed for each environmental topic when appropriate. Mitigation measures are identified to avoid, eliminate, or reduce significant adverse impacts of the Proposed Project. Where called for, improvement measures are also identified to reduce the effects of impacts that would be less than significant.

A. LAND USE AND LAND USE PLANNING

This section examines the effects of the Proposed Project related to Land Use. The Setting discussion describes the existing land uses in the region. Nearby uses are described first, followed by land uses within the Redevelopment Plan Project Area. The Impacts discussion identifies significance criteria for land use impacts, discusses changes in land use that would occur if the Proposed Project were implemented, and examines the potential for the Proposed Project to physically divide an established community or have a substantial adverse impact upon the existing character of the vicinity. Finally, cumulative impacts with the Proposed Project and other reasonably foreseeable development projects are discussed.

SETTING

REGIONAL AND CITYWIDE CONTEXT

Treasure Island and Yerba Buena Island are in the middle of San Francisco Bay and are surrounded by four counties in the San Francisco Bay region (see Figure II.1: Regional Location, in Chapter II, Project Description, p. II.2). The Islands are within the jurisdictional boundaries of the City and County of San Francisco. Surrounding uses are predominantly located along and adjacent to the Bay waterfront and include a variety of industrial, residential, commercial, institutional, and open space uses. The City and County of San Francisco mainland is approximately 2 miles southwest[1] of the Redevelopment Plan Project Area, and the Alameda

[1] All distances from the Redevelopment Plan Project Area are measured from the existing semicircular Administration Building (Building 1) in the southwest corner of Treasure Island.

County mainland is approximately 2.5 miles east of the Redevelopment Plan Project Area. Contra Costa County is approximately 6 miles to the north and northeast, and Marin County is approximately 6 miles to the west and northwest.

City and County of San Francisco

Uses along the San Francisco waterfront include The Embarcadero Promenade, pier bulkhead buildings and sheds, and the San Francisco downtown financial district. The Embarcadero runs along the waterfront from Townsend Street near AT&T Park to Powell Street in Fisherman's Wharf. The Ferry Building is located along The Embarcadero at the foot of Market Street. The Ferry Building has been renovated into a ground-floor public market with commercial office space above; its adjoining piers provide ferry service and aTransit Hub that connects San Francisco to the surrounding bayside communities. The Northern Waterfront is a neighborhood along The Embarcadero that begins about 0.5 mile north of the Ferry Building and continues north and west along the waterfront to Pier 45. The east side of The Embarcadero features commercial, industrial, and maritime uses housed in the pier bulkhead and shed buildings. There are also some publicly accessible open space uses on and adjacent to some of the piers. The west side of The Embarcadero is characterized by a mix of residential, retail, and office uses.

South of The Embarcadero is AT&T Park, a 41,500-seat ballpark for Major League Baseball's San Francisco Giants baseball team, located on the north side of the China Basin channel.[2] The Central Waterfront, which is south of the China Basin channel, includes a mix of heavy industrial, light industrial, and production/distribution/repair uses.[3] Mission Bay, which is the area north of the Central Waterfront and surrounding the China Basin channel, is currently developed with a mix of residential, retail, office, research and development, and light industrial uses, and the Mission Bay campus of the University of California at San Francisco.

North and west of the northern end of The Embarcadero are the Russian Hill and Marina District neighborhoods. Aquatic Park, part of the Golden Gate National Recreation Area, is located east of Pier 45. Further west is the 13-acre Fort Mason Campus, a historic Port of Embarkation, which is now used for programs and events, including providing space for nonprofit organizations.

Alameda County

Nearby jurisdictions to the east include the Cities of Berkeley and Emeryville, the City of Oakland and the former Oakland Army Base and Oakland Naval Supply Depot, the Port of Oakland, and the City of Alameda, which includes the former Alameda Naval Air Station.

---

[2] San Francisco Giants website, History of AT&T Park, http://sanfrancisco. giants.mlb.com/sf/ ballpark/history.jsp, accessed April 9, 2010.

[3] San Francisco Planning Department, *Central Waterfront Area Plan, Draft for Citizen Review*, December 2007.

The City of Berkeley waterfront is located northeast of the Redevelopment Plan Project Area. The Berkeley Marina, the Eastshore State Park and Cesar Chavez Park, a restaurant, and a hotel are located at the west end of University Avenue. Berkeley Aquatic Park is on the east side of the Eastshore Freeway (Interstate 80 [I-80] and Interstate 580 [I-580]), and a pedestrian and bicycle path is located along the Berkeley waterfront on the west side of the freeway between University Avenue and Ashby Avenue, extending into Emeryville.

The City of Emeryville is located south of Berkeley and primarily north of the San Francisco-Oakland Bay Bridge ("Bay Bridge"). It is bisected by the Eastshore Freeway, which runs north-south. A marina, low-rise residential and high-rise office buildings, and a hotel are located along Powell Street west of the freeway in Emeryville, including small neighborhood-serving retail spaces. East of the freeway in Emeryville there are several retail centers with national retailers and movie theaters (Powell Street Plaza, Bay Street Emeryville, and the Emeryville Marketplace) as well as mid-rise and high-rise housing and hotels. Bay Street Emeryville is a recent mixed-use development that includes approximately 400,000 sq. ft. of retail space, a 16-screen movie theater, a 230-room hotel, and approximately 350 apartments and townhouses.[4] Pacific Park Plaza, a 30-story residential building with apartments and condominiums, is a prominent feature of the Emeryville skyline. An Ikea warehouse store and parking garage are located at the east end of the Bay Bridge on the Emeryville border with Oakland.

The former Oakland Army Base, which is just south of the Bay Bridge toll plaza, was an active military facility until it was closed in 1999. In recent years, the site has been the subject of various redevelopment proposals.[5]

The Port of Oakland, which is south of the former Oakland Army Base, is an active container seaport that includes approximately 25 deep-water vessel berths, approximately 35 gantry container cranes, railroad yards, and warehouses.[6] The Port of Oakland consists of three harbors: the Outer Harbor, the Middle Harbor, and the Inner Harbor. The shoreline of the Middle Harbor is occupied by Middle Harbor Shoreline Park. This 38-acre park, which was built by the Port of Oakland and is operated by the East Bay Regional Park District, includes an amphitheater, a fishing pier, an observation tower, picnic areas, and trails for cyclists and hikers. The park is at the mouth of the Oakland Estuary, an east-west channel that leads to the Inner Harbor.

The north side of the Oakland Estuary is occupied by the former Oakland Naval Supply Depot, which is adjacent to and east of Middle Harbor Shoreline Park and approximately 2.5 miles

[4] Bay Street Emeryville website, http://www.baystreetemeryville.com/info/mallinfo.cfm, accessed April 9, 2010.
[5] Oakland Community and Economic Development Agency website, http://www.business2oakland.com/main/oaklandarmybase.htm, accessed April 9, 2010.
[6] East Bay Regional Park District website, Middle Harbor Shoreline Park, http://www.ebparks.org/parks/middle_harbor#history, accessed April 9, 2010.

southeast of the Redevelopment Plan Project Area. From World War II until it was closed in 1998, the Oakland Naval Supply Depot was an important supply center for the United States Navy's Pacific Fleet. After the depot was closed, it was transferred to the Port of Oakland. Today, the depot is used as an intermodal shipping facility.

The south side of the Oakland Estuary is occupied by the former Alameda Naval Air Station, which is approximately 2.5 miles southeast of the Redevelopment Plan Project Area. This former military facility at the west end of Alameda is the subject of various mixed-use redevelopment proposals.

Contra Costa County

Contra Costa County, which is north and northeast of the Redevelopment Plan Project Area, includes the nearby communities of El Cerrito, Richmond, and San Pablo. Contra Costa County is connected to Marin County to the west by the Richmond-San Rafael Bridge ("San Rafael Bridge"). There are industrial uses, including oil refineries, near the east end of the San Rafael Bridge.

Marin County

Marin County, which is west and northwest of the Redevelopment Plan Project Area, includes Angel Island State Park and the nearby bayfront communities of Belvedere, Sausalito, and Tiburon.

Surrounding Open Space and Recreation Uses

Nearby open space and recreation uses include Alcatraz Island, Angel Island, and Eastshore State Park.

Alcatraz Island, which is approximately 1.8 miles west of the Redevelopment Plan Project Area, is part of the Golden Gate National Recreation Area and is operated by the National Park Service. From 1850 until 1934, Alcatraz was used as a military outpost. In 1934, Alcatraz was converted to a maximum-security Federal penitentiary. The prison was closed in 1963, and Alcatraz was transferred to the National Park Service in 1972. Today, Alcatraz is a popular tourist destination that attracts approximately 1.3 million visitors a year.[7]

Angel Island State Park, which is an island in the Bay approximately 3.9 miles northwest of the Redevelopment Plan Project Area, is under the jurisdiction of the California Department of Parks and Recreation. From 1863 to 1963, the United States Government used Angel Island for various military purposes, including a discharge depot, a recruitment processing center, and a World War II immigration station. In 1963, the island was transferred to the California

[7] Alcatraz Cruises website, http://www.alcatrazcruises.com/website/history.aspx, accessed April 9, 2010.

Department of Parks and Recreation. Today, Angel Island is a State park that features boat docks, campgrounds, picnic areas, 13 miles of hiking trails, and 9 miles of paved bike paths. The United States Immigration Station, in the northeast corner of the island, reopened as a museum in March 2009.

Eastshore State Park, which is approximately 3.9 miles east of the Redevelopment Plan Project Area, is under the jurisdiction of the California Department of Parks and Recreation. The park includes tidal marshes and upland property along 8.5 miles of the eastern shoreline of San Francisco Bay. The north end of the park is in the City of Richmond, and the park extends south through the cities of Albany, Berkeley, and Emeryville, ending near the eastern anchorage of the Bay Bridge. Recreational activities include birdwatching, cycling, and hiking.[8]

Regional recreation facilities and open space uses in the vicinity of the Proposed Project are further discussed in Section IV.J, Recreation.

Transportation Infrastructure

Due to its location in the San Francisco Bay, the Redevelopment Plan Project Area is surrounded by major bridges, including the Bay Bridge, the Golden Gate Bridge, and the San Rafael Bridge.

The Bay Bridge is an 8.4-mile-long bridge that passes through Yerba Buena Island and connects San Francisco to Oakland. It consists of two segments linked by the Yerba Buena Island Tunnel. The east span was damaged during the 1989 Loma Prieta earthquake. A new east span that will replace the existing one is currently under construction and is scheduled to open in 2013.[9] Seismic retrofit work on the western span was completed in 2004. The Bay Bridge is part of I-80, and it is owned by the Federal Highway Administration and operated and maintained by the California Department of Transportation (Caltrans).[10]

The Golden Gate Bridge, which is approximately 5.8 miles west of the Redevelopment Plan Project Area, is a 1.7-mile-long suspension bridge that connects San Francisco to Marin County. The Golden Gate Bridge is part of United States Route 101 and California State Route 1, and it is owned, operated, and maintained by the Golden Gate Bridge, Highway, and Transportation District.[11] It is visible from many locations on Treasure Island, and it is an internationally known and visited feature of the San Francisco Bay Area.

---

[8] California Department of Parks and Recreation website, Eastshore State Park, http://www.parks.ca.gov/default.asp?page_id=520, accessed April 9, 2010.

[9] The improvement/replacement of the existing off-ramps and on-ramps on the east side of Yerba Buena Island is not part of the Proposed Project.

[10] Bay Area Toll Authority, Bridge Facts, San Francisco-Oakland Bay Bridge, http://bata.mtc.ca.gov/bridges/sf-oak-bay.htm, accessed April 9, 2010.

[11] Golden Gate Bridge, Highway, and Transportation District website, http://goldengatebridge.org/, accessed April 9, 2010.

The San Rafael Bridge, which is approximately 8.9 miles north of the Redevelopment Plan Project Area, is a 5.5-mile-long bridge that connects the City of Richmond in Contra Costa County to the City of San Rafael in Marin County. The San Rafael Bridge is part of I-580, and it is owned, operated, and maintained by Caltrans.[12]

A more detailed discussion of transportation infrastructure in the Redevelopment Plan Project Area vicinity is presented in Section IV.E, Transportation.

ADJACENT LAND USES

The U.S. Coast Guard maintains an active station that covers approximately 39 acres on the southeast side of Yerba Buena Island.[13] This station includes housing, administrative facilities, buoy maintenance facilities, docks, storage, and a lighthouse that was built by the U.S. Army. The station is not part of the Redevelopment Plan Project Area or the Development Plan Area and would not undergo any changes as part of the Proposed Project.

PROJECT AREA

Treasure Island

Treasure Island is a man-made island that was constructed from fill between 1936 and 1939. The U.S. Navy ("Navy") took possession of Treasure Island from the City and County of San Francisco in 1941 and operated a military base, Naval Station Treasure Island ("NSTI"), until it was closed in 1997. Treasure Island encompasses approximately 367 acres of residential, open space/recreation, community/institutional, office/retail, and industrial uses, as well a 37-acre Job Corps campus operated by the U.S. Department of Labor. An approximately 100-slip marina is located along the southern shoreline of Treasure Island in Clipper Cove. See Figure IV.A.1: Existing Land Uses on Treasure Island and Yerba Buena Island, and Table IV.A.1 for a description of uses by square footage.

A number of interim uses currently occupy buildings on Treasure Island, some of which are vacant. Some of the existing buildings are not occupiable because of ongoing remediation by the Navy, soil conditions, or other reasons.

[12] Bay Area Toll Authority website, Bridge Facts, Richmond-San Rafael Bridge, http://bata.mtc.ca.gov/bridges/richmond-sr.htm, accessed April 9, 2010.
[13] The Coast Guard also owns about 94 acres of submerged area, for a total of 133 acres.

SOURCE: BKF, Turnstone Consulting

FIGURE IV.A.1: EXISTING LAND USES ON TREASURE ISLAND AND YERBA BUENA ISLAND

Table IV.A.1: Existing Land Uses on Treasure Island and Yerba Buena Island

Land Use	Treasure Island[1] (Units or Acres[2])	Yerba Buena Island (Units or Acres)	Total (Units or Acres)
Residential	908 units[3] / 110 acres	97 units[4] / 19 acres	1,005 units[5]
Community and Institutional	30	—	30
Office and Retail	20	—	20
Industrial	20	—	20
Open Space and Recreation Facilities	90	80	170
Other[6]	37	57	94

Notes:
[1] Total acreage on Treasure Island equals approximately 404 acres; totals shown above are rounded.
[2] Does not include approximately 95 acres dedicated to parking and roads.
[3] Approximately 725 units are available for occupancy.
[4] Approximately 80 units are available for occupancy.
[5] Approximately 805 total units are available for occupancy.
[6] Includes the 37-acre Job Corps campus on Treasure Island, approximately 18 acres occupied by the California Department of Transportation, and 39 acres occupied by the U.S. Coast Guard station on Yerba Buena Island.

Source: San Francisco Planning Department, 2005; Treasure Island Development Authority, 2010

Residential Uses

There are approximately 908 dwelling units on Treasure Island, of which about 725 are suitable for occupancy (excluding residential units on the Job Corps campus). The family housing units consist of four- to eight-unit buildings with driveways and lawns. These units are concentrated in the northwest corner of the island. In addition, there are former Navy barracks consisting of two star-shaped buildings on the central western portion of the island; none of these buildings are currently occupied.

Community and Institutional Uses

Community and institutional uses on Treasure Island include educational, public service, and public works facilities. Educational facilities consist of a former elementary school, a portion of which is occupied by the Glide Foundation's YouthBuild Program, the San Francisco Sheriff’s Five Keys Charter School, and the San Francisco Police Department’s motorcycle training unit. Other educational facilities include the Life Learning Academy, the Treasure Island Clubhouse of the Boys and Girls Clubs of San Francisco, and a child development center. Public service facilities include a fire station, fire training academy, a police station, and a post office. The educational and public service facilities are concentrated in the interior of the island in the northwest quadrant. Existing public works facilities include two emergency power generators, steam plant substations, a wastewater treatment plant, and one water storage tank for both domestic and firefighting use.

Office and Retail Uses

Office uses on Treasure Island mostly consist of the administrative offices of the Treasure Island Development Authority ("TIDA"), the Treasure Island Homeless Development Initiative ("TIHDI"), and the Navy, all of which are located in Building 1. Existing retail uses on Treasure Island are limited but include a convenience store and a deli/cafe.

Industrial Uses

Industrial uses, which are generally located in the northeast and southeast quadrants of Treasure Island, include fuel storage and warehouses, several of which are used by movie production and management companies. There are two former aircraft hangars, currently used for temporary commercial activities such as film and TV production, parties, and similar events.

Open Space and Recreation Facilities

There are approximately 90 acres of existing open space and recreational facilities on Treasure Island, including a variety of open spaces, water-related recreation facilities, and indoor and outdoor recreation facilities.

Open spaces on the island include four parks and picnic areas as well as multi-use trails for walking, running, and cycling. The berm around the perimeter of the island is also used as a trail.

There are several water-related recreation facilities on the island. Clipper Cove, which is between Treasure Island and Yerba Buena Island, includes an approximately 100-slip marina and both landside and waterside facilities to support the Treasure Island Sailing Center's programs. There is a fishing pier on the west side of the island and two recreational boat ramps on the south side of the island. Pier 1, on the southeastern corner of the island, was previously used to moor large military vessels. Neither pier is currently open to the public. The northeastern corner of the island features a launch site for windsurfers.

The indoor recreation facilities, which are primarily located on the eastern side of the island, include a fitness center, a gymnasium, a skating rink, a 1,000-seat theater, and a 12-lane bowling alley. TIHDI occupies the fitness center and gymnasium. The skating rink, bowling alley, and theater were former uses in a set of three adjacent buildings that are now considered to be unsafe because of hazardous conditions such as mold. In addition, none of these buildings have transformers; thus, they lack electricity and could not be reoccupied even if they were safe.[14] An indoor batting cage is located in the center of Treasure Island. The outdoor recreation facilities, which are concentrated in the interior of the island, include rugby and Gaelic football fields, baseball fields, basketball courts, two playgrounds, and two tennis courts.

[14] Treasure Island Development Authority, Treasure Island Property Inventory, October 24, 2007.

The Great Lawn, a 3-acre open space area on the western shore of Treasure Island, is the venue for special events and music festivals.

Job Corps

The Job Corps campus, which is owned and operated by the U.S. Department of Labor, occupies approximately 37 acres in the central portion of Treasure Island. This facility was formerly used by the U.S. Department of Defense and other Federal agencies to screen military personnel. Job Corps is a residential, live-in program that offers career planning, on-the-job training, job placement, housing, food service, and childcare programs. While the Job Corps property is located within the Redevelopment Plan Project Area, the Job Corps program and campus are not part of the Development Plan Area and would not undergo any changes as part of the Proposed Project. Current uses on this site include educational and residential facilities and on-site recreational facilities for the use of Job Corps participants.

Clipper Cove Marina

Clipper Cove, which is between Treasure Island and Yerba Buena Island and east of the causeway that connects the Islands, features an approximately 100-slip marina and an approximately 1,200-sq.-ft. yacht club. The marina is bordered by Treasure Island on the north, the causeway connecting Treasure Island and Yerba Buena Island on the west, and open water on the south and the east. The marina would not undergo any changes as part of the Proposed Project. All improvements associated with the Proposed Project would occur on the land side of the marina. A proposal to redevelop and expand the existing marina from 100 slips to 400 slips was previously analyzed in the *Transfer and Reuse of Naval Station Treasure Island Final EIR*, which was certified on May 5, 2005, but this proposal has not yet been approved for development. The marina expansion is not part of the Proposed Project, but the landside facilities and improvements are included in the Proposed Project.

The Treasure Island Sailing Center, which occupies a building near Pier 1, is a nonprofit organization that provides access, facilities, and sailing instruction to people of all socioeconomic backgrounds, skill levels, and physical abilities.[15]

Yerba Buena Island

Unlike Treasure Island, Yerba Buena Island is a natural island that features steep slopes and dense vegetation. The island has been used by private parties and by the U.S. Army and Navy since the 1840s. Land uses on the island include residential, open space, and a portion of the Bay Bridge structure (see Figure IV.A.1).

---

[15] Treasure Island Sailing Center website, http://www.tisailing.org/about/, accessed June 10, 2010.

Residential Uses

There are 97 dwelling units on Yerba Buena Island, of which 80 are suitable for occupancy. The residential units are in two- to eight-unit buildings, and the housing is concentrated in the interior of the island and north of the Bay Bridge.

In addition to these 97 dwelling units, there are approximately 10 single-family dwellings that were former Navy Officers' Quarters. Seven of these quarters, together with associated garages and landscape elements, constitute a historic district that is listed on the National Register of Historic Places (the Senior Officers' Quarters Historic District, or "Great Whites"). Among the Great Whites, Quarters One, or the "Nimitz House," is also listed individually on the National Register. The Nimitz House is available for use as a conference center and events venue, and the other Great Whites are vacant.

Open Space and Recreation Facilities

The northeast and southwest edges of Yerba Buena Island are undeveloped due to the steeply sloping terrain. There are approximately 80 acres of open space on Yerba Buena Island. Except for picnic grounds in the beach areas at the foot of Clipper Cove and some lawns with play equipment near the residential areas, there are no formal recreation facilities on Yerba Buena Island.

The Bay Bridge

The Bay Bridge passes through and bisects Yerba Buena Island via the Yerba Buena Island Tunnel. Caltrans holds approximately 18 acres of easements for the bridge, the tunnel, and related structures on land owned by the Federal Highway Administration. Caltrans also holds a temporary construction easement on an additional 9 acres of land for the construction of the east span of the Bay Bridge. The easement will terminate around 2013.

REGULATORY FRAMEWORK

State

California Tidelands Trust Doctrine

The Tidelands Trust Doctrine is a legal doctrine that governs the use of tidal and submerged lands, including former tidal and submerged lands that have been filled. It is not a codified set of laws but a doctrine primarily established on a case-by-case basis in Court decisions and in decisions and interpretations by the California State Lands Commission and the California Attorney General. The purpose of the Tidelands Trust Doctrine is to ensure that land which adjoins the State's waterways or is actually covered by those waters remains committed to water-oriented uses that benefit and attract the greatest number of people to the waterfront. Uses of

Tidelands Trust land are generally limited to waterborne commerce, navigation, fisheries, water-oriented recreation, including commercial facilities that must be located on or adjacent to water, and environmental preservation and recreation, such as natural resource protection, wildlife habitat and study, and facilities for fishing, swimming, and boating. Ancillary or incidental uses that promote trust uses or accommodate the public's enjoyment of trust lands are also permitted, such as hotels, restaurants, and specialty retail.[16]

Because the Tidelands Trust is based on judicial cases, there is no zoning code or general statute setting forth a list of permitted Trust uses on the Islands. However, in addition to the decided cases, the permitted uses of the granted tidelands are also governed by the statutory trust created by the Conversion Act.[17] The Tidelands Trust Doctrine and the use restrictions imposed under the Conversion Act are collectively referred to in this document as the "Tidelands Trust" or the "Trust."

The Conversion Act designates TIDA as the agency responsible for administering Tidelands Trust property on the Islands once the property is transferred to it by the Navy.[18] Upon transfer, about 367 of the approximately 404 acres of land on Treasure Island would become subject to the Tidelands Trust; the 37 acres of land remaining under Federal jurisdiction on the Job Corps campus would not be subject to the Tidelands Trust.[19] Except for approximately 2 acres of existing tidelands, land on Yerba Buena Island transferred from the Navy to TIDA would not be subject to the Tidelands Trust upon transfer.

The Conversion Act gives TIDA the authority to use the Tidelands Trust property for any use consistent with the Tidelands Trust and the Conversion Act. It provides that existing uses on Treasure Island that are inconsistent with the Tidelands Trust, such as the existing residential buildings, are permitted to continue for their remaining useful life, defined as no less than 25 years or no more than 40 years from the date of the Act (1997).

---

[16] California State Lands Commission, Public Trust Policy. http://www.slc.ca.gov/Policy_Statements/Public_Trust/Public_Trust_Policy.pdf, accessed April 9, 2010.

[17] In 1997, the Treasure Island Conversion Act (Assembly Bill 699, amending California Health and Safety Codes Section 33492.5 and adding Section 2.1 to Chapter 1333, Statutes of 1968) authorized the City and County of San Francisco to establish TIDA as the redevelopment agency with jurisdiction over the redevelopment of NSTI. Under the Treasure Island Conversion Act, TIDA was also granted the authority to administer and control Tidelands Trust property located on or about NSTI.

[18] The 1942 legislation that authorized the State to convey Treasure Island to the Federal Government removed the Tidelands Trust use restrictions from the property. However, the California Attorney General has opined that the Tidelands Trust would apply to Treasure Island once conveyed out of Federal ownership.

[19] Perkins+Will, Treasure and Yerba Buena Island Land Use Plan, Draft December 9, 2009; and BKF, Treasure Island Redevelopment - Treasure Island and Yerba Buena Island Land Areas Exhibits, January 15, 2009.

Portions of the Islands proposed for residential and other non-Trust land uses are located within areas that would be subject to the Tidelands Trust upon conveyance from the Navy. In order to implement the *Redevelopment Plan*, the State legislature has authorized a Tidelands Trust exchange, whereby Tidelands Trust restrictions would be lifted from the portions of Treasure Island that are planned for residential and other non-permitted Trust uses and transferred to and imposed on those portions of the Development Plan Area on Yerba Buena Island that would not be subject to the Tidelands Trust upon transfer to TIDA (see Figure II.3: Tidelands Trust Land Exchange, in Chapter II, Project Description, p. II.15).[20] The Tidelands Trust exchange would be implemented by an Exchange Agreement between TIDA and the California State Lands Commission (the "Exchange Agreement").

Pursuant to the Conversion Act, TIDA must review all uses on Tidelands Trust lands within its jurisdiction for compliance with the Tidelands Trust and TIDA policies. TIDA has some discretion in interpreting the uses permitted under the Conversion Act; however, both the California Attorney General and the California State Lands Commission provide oversight. The San Francisco Bay Conservation and Development Commission ("BCDC") would also review those portions of the Islands that are within BCDC jurisdiction for compliance with BCDC's laws and policies as further described below.

Regional

McAteer Petris Act – Bay Conservation and Development and Development Commission

The *San Francisco Bay Plan* (*Bay Plan*), prepared by BCDC in 1968 in accordance with the McAteer-Petris Act of 1965 (Government Code Sections 66600-66682), is an enforceable plan that guides the protection and use of San Francisco Bay and its shoreline. The *Bay Plan* includes policies related to the protection of the Bay's economic and natural resources; the provision, enhancement, or preservation of views of the Bay and shoreline; the siting and location of ferry terminals; and the protection and improvement of the Bay's water quality (see Chapter III, Plans and Policies, p. III.9). Under the McAteer-Petris Act, BCDC has the authority to issue or deny permit applications for placing fill, extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction[21] and to enforce policies aimed at protecting the Bay and its shoreline. BCDC's authority over the water of the San Francisco Bay is related primarily to Bay fill, which can be approved by the Commission only for water-oriented uses or for improving the shoreline appearance or public access to the Bay. In the 100-foot shoreline band (100 feet inland from the mean high water line) within the Redevelopment Plan Project Area,

[20] Senate Bill 1873 signed into law on September 15, 2004, and subsequently amended in 2007 and 2009.

[21] Defined by the McAteer-Petris Act, the area over which the BCDC has jurisdiction can be generally described as: 1) the San Francisco Bay and all areas that are subject to tidal action from the south end of the Bay to the Golden Gate and to the Sacramento River; 2) a 100-foot-wide shoreline band located immediately landward of the edge of the Bay; 3) salt ponds; 4) managed wetlands; and 5) certain waterways and tributaries to the Bay.

BCDC's land use authority is related primarily to public access to the Bay. Treasure Island has an approximately 3.35-mile-long shoreline area (36 acres), and Yerba Buena Island has an approximately 1.8-mile-long shoreline area (21 acres) within the 100-foot shoreline band that would be under BCDC permit jurisdiction.[22]

<u>Local</u>

As discussed in "San Francisco Plans and Policies," in Chapter III, Plans and Policies, p. III.1, neither the *San Francisco General Plan* and its related planning and policy documents nor the San Francisco Planning Code addresses land uses on Treasure Island and Yerba Buena Island. As such, specific objectives and policies pertaining to land use within the Redevelopment Plan Project Area are not included in the *General Plan*. Furthermore, Treasure Island and Yerba Buena Island are not shown or included in the use districts or height and bulk districts of the Zoning Map and thus are subject to Sections 105 (e) and (f) of the Planning Code. As discussed on p. III.3, the Development Plan Area is currently zoned P (Public Use) under Section 105 (e) of the Planning Code, and is included in the 40-X height and bulk district under Section 105 (f) of the Planning Code. These sections of the Planning Code address property within the City and County of San Francisco that are not explicitly included in the Planning Code.

IMPACTS

SIGNIFICANCE CRITERIA

The City and County of San Francisco has not formally adopted significance thresholds for impacts related to land use and land use planning. The Planning Department Initial Study Checklist form provides a framework of topics to be considered in evaluating potential impacts under CEQA. Implementation of a project could have a potentially significant impact related to land use and land use planning if it were to:

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect;
- Physically divide an established community; or
- Have a substantial impact upon the existing character of the vicinity.

[22] San Francisco Bay Conservation and Development Commission, Memorandum Re: Treasure Island and Yerba Buena Island Redevelopment Project, City and County of San Francisco; Pre-Application Review from Will Travis, Executive Director, and Karen Weiss, Coastal Program Analyst to BCDC Design Review Board Members, October 29, 2009, p. 3. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

PROJECT IMPACTS

Certain aspects of the Proposed Project, such as the proposed land uses and the proposed height limits, would conflict with the existing zoning controls and height and bulk controls of the San Francisco Planning Code that are applicable to the Development Plan Area and would require amendments to the *General Plan* and Planning Code. Those conflicts with local regulations, plans, and policies are discussed in Chapter III, Plans and Policies, and the physical impacts of the Proposed Project related to these amendments are discussed in Section IV.A, Land Use and Land Use Planning; Section IV.B, Aesthetics; Section IV.C, Population and Housing; Section IV.D, Cultural and Paleontological Resources; Section IV.E, Transportation; Section IV.F, Noise; Section IV.G, Air Quality; Section IV.H, Greenhouse Gas Emissions; Section IV.I, Wind and Shadow; Section IV.K, Utilities and Service Systems; Section IV.L, Public Services; Section IV.N, Geology and Soils; and Section IV.O, Hydrology and Water Quality. Potential conflicts with Federal, State, and regional regulations, plans, and policies are also identified and discussed in Chapter III, which finds no inconsistencies with applicable Federal, State or regional regulations, plans, or policies.

The Proposed Project, which includes Treasure Island and Yerba Buena Island, consists of a total of up to 8,000 dwelling units, up to 140,000 sq. ft. of new commercial retail space, up to 100,000 sq. ft. of new office space, and up to 500 hotel rooms (see Table IV.A.2). Buildings 1, 2, and 3 on Treasure Island would be rehabilitated and converted to approximately 311,000 sq. ft. of commercial, retail, entertainment, and community services space. In addition, the Proposed Project would include approximately 300 acres of open space in the form of athletic fields, bicycle and pedestrian paths, parks, playgrounds, plazas, shoreline trails, stormwater wetlands, an approximately 20-acre Urban Agricultural Park, and wildlife habitat. Approximately 220 acres of open space would be on Treasure Island, and the remaining 80 acres would be on Yerba Buena Island.

Treasure Island

Currently, there are approximately 908 dwelling units on Treasure Island, and about 725 are suitable for occupancy. In addition, there are approximately 100 buildings that contain former and existing nonresidential uses, open space, and a wastewater treatment facility. The Proposed Project would demolish the existing 908 dwelling units and replace them with approximately 7,700 to 7,850 dwelling units. Most of the other existing nonresidential buildings would be demolished and replaced with new buildings containing new retail space, 100,000 sq. ft. of new office space, 450 hotel rooms, 75,000 sq. ft. of cultural/museum space, and 30,000 sq. ft. of new community service uses. Of the 202,000 sq. ft. of total retail space on Treasure Island, 135,000 sq. ft. would be new retail space, a portion of which would be in the new residential and office buildings, and some may be freestanding. The total proposed retail space on Treasure Island

Table IV.A.2: Proposed Uses on Treasure Island and Yerba Buena Island

Land Use	Treasure Island	Yerba Buena Island	Total
Residential	7,700 to 7,850 units	150 to 300 units	8,000 units
Retail[1]	202,000 sq. ft.	5,000 sq. ft.	207,000 sq. ft.
Entertainment	150,000 sq. ft.	—	150,000 sq. ft.
Office	100,000 sq. ft.	—	100,000 sq. ft.
Hotel	450 rooms	50 rooms	500 rooms
School	105,000 sq. ft.	—	105,000 sq. ft.
Community Center	48,500 sq. ft.	—	48,500 sq. ft.
Community Services	30,000 sq. ft.	—	30,000 sq. ft.
Cultural/Museum	75,000 sq. ft.	—	75,000 sq. ft.
Police/Fire Station	30,000 sq. ft.	—	30,000 sq. ft.
Food Production	22,000 sq. ft.	—	22,000 sq. ft.
Sailing Center[2]	15,000 sq. ft.	—	15,000 sq. ft.
Athletic Fields	40 acres	—	40 acres
General Open Space	180 acres	80 acres	260 acres

Notes:
[1] Approximately 67,000 sq. ft. of the retail space would be part of the adaptive reuse of Buildings 1, 2, and 3. The retail square footage does not include approximately 42,000 sq. ft. of circulation space in Buildings 1 and 2.
[2] Landside facilities, including restrooms, laundry facilities, and other improvements, to support the Treasure Island Sailing Center and the existing marina.

would also include 67,000 sq. ft. of adaptively reused space in Buildings 1, 2, and 3. A 105,000-sq.-ft. elementary/middle school[23] would be rehabilitated and/or rebuilt, and a 30,000-sq.-ft. combined police and fire station facility would also be constructed. Buildings 1, 2 and 3 along the southern perimeter of Treasure Island would be rehabilitated and reused for approximately 311,000 sq. ft. of commercial, retail, entertainment, community services, and food production uses. Building 111, an ancillary building attached to Building 3, would be demolished. The remaining approximately 67,000 sq. ft. of retail space located in this rehabilitated space makes up the total of approximately 202,000 sq. ft. proposed on Treasure Island (see Figure IV.A.2: Proposed Land Use Plan for Treasure Island).

The Proposed Project would change the existing height limit of 40 feet as described below, and it would create three distinct districts on Treasure Island: the Island Center District, the Cityside District, and the Eastside District. These three districts would surround the existing Job Corps campus on three sides while integrating the campus into the larger proposed community (see Figure IV.A.3: Proposed Districts).

[23] Portions of the existing public grammar school, currently being used by the Glide YouthBuild Program, the San Francisco Sheriff's Five Keys Charter School, and the San Francisco Police Department's motorcycle training unit, would be improved or rebuilt as part of the proposed Development Program.

SOURCE: Perkins+Will

FIGURE IV.A.2: PROPOSED LAND USE PLAN FOR TREASURE ISLAND

SOURCE: Perkins+Will

FIGURE IV.A.3: PROPOSED DISTRICTS

Proposed Districts

The Island Center District would occupy the southern portion of Treasure Island and would abut the southern and southeastern boundary of the Job Corps campus. This new district encompasses Blocks B1 through B3, Block C1, Block C2-H, Blocks IC1 through IC4, and Block M1 (see Figure IV.A.2). The Island Center would be the most intensely developed mixed-use district on Treasure Island, featuring a dense mix of residential, retail, restaurant, office, and hotel uses, and community services. The Island Center would include a proposed Ferry Terminal and would serve as a Transit Hub for access to and from the Islands with direct links to regional buses, ferry services and on-island shuttles. The existing marina in the cove between Treasure Island and Yerba Buena Island would remain and be expanded as a separate project, as discussed in Chapter II, Project Description, p. II.9).

The proposed height limits for this district range from 30 to 125 feet with designated flex zones of 240, 350, 450, and 650 feet (see Figure II.6a: Treasure Island Maximum Height Limit Plan, in Chapter II, p. II.25). These proposed height limits would allow low-rise development (30 feet to 50 feet) along the southern perimeter of Treasure Island and mid-rise/high-rise development (70 feet to 450 feet) in the area bounded by California Avenue on the south, the Job Corps campus on the west and the north, and the Eastside District on the east. Block C-1 is designated with a height limit of 650 feet for the proposed Main Tower. These proposed height limits and flex zones within the Island Center District would allow buildings that are taller than those that would be allowed in the Cityside and Eastside districts.

The proposed Cityside District (Blocks C2 through C13) would occupy the western portion of Treasure Island, east of the Cityside Waterfront Park. The Cityside District would abut the western and northern boundaries of the Job Corps campus. This new district would be primarily residential, but it would include up to about 15,000 sq. ft. of neighborhood-serving retail uses (see Figure IV.A.2). Residential uses would be sited around neighborhood parks and internal pedestrian-oriented street networks called Shared Public Ways (see Chapter II, Project Description, p. II.21). The proposed height limits for this district range from 40 to 125 feet with designated flex zones of 240 feet, and in one location, 450 feet (see Figure II.6a). These proposed flex zones would allow buildings that are shorter than those allowed in the Island Center District but generally the same height as those allowed in the Eastside District; the one exception to this is one 450-foot flex zone on Block C2-A, which would be taller than all other buildings permitted in the Eastside District and the same height as those permitted in several locations in the Island Center District.

The Eastside District (Blocks E1 through E8) would be centered around a six-block-long linear park, referred to as the Eastside Commons. It would be adjacent to and northeast of the Island Center District and would abut the southern boundary of the proposed regional Sports Park. This new district would consist primarily of residential uses (see Figure IV.A.2), with a range of small-scale retail, community space or professional office space on the ground floor of residential buildings. The proposed height limits for this district range from 40 feet to 85 feet, with designated flex zones of 240 feet (see Figure II.6a). These proposed height limits would allow buildings that are generally the same height as those in the Cityside District.

Open Space

Treasure Island would include approximately 220 acres of open space and recreation facilities. The northern/northeastern portion of Treasure Island would be occupied by an approximately 100-acre open space known as the Great Park, which would include the Northern Shoreline Park, The Wilds, and the stormwater wetlands. The Great Park would include passive open space, the existing windsurfing launch area, stormwater wetlands, and space for an environmental education center. Approximately 10 acres of land within this area would not be accessible to the public. These 10 acres would be occupied by a wastewater treatment plant as well as other potential facilities that would be operated by the San Francisco Public Utilities Commission ("SFPUC"), as described in Section IV.K, Utilities and Service Systems. The SFPUC would use approximately 4 to 6 of the 10 acres adjacent to the treatment plant for a range of uses that may include infrastructure improvements that further the sustainability objectives of the Proposed Project. Refer to Section J, Proposed Sustainability Plan, in Chapter II, p. II.77, for a description of these objectives. The Cityside Waterfront Park would occupy a 350-foot setback that runs along the entire length of the western perimeter of Treasure Island and would provide continuous public access to the shoreline. The Eastern Shoreline Park and Northern Shoreline Park would run along the eastern and northern perimeter of Treasure Island and would provide continuous public access to the shoreline (see Figure II.7: Proposed Open Space, in Chapter II, Project Description, p. II.30). A continuous shoreline trail would extend along the entire perimeter of Treasure Island, connecting residents and visitors to various parks and open spaces, and recreational opportunities. This trail would provide a future opportunity to extend and connect the San Francisco Bay Trail to the new pedestrian and bicycle path on the east span of the Bay Bridge via the road, path, and trail networks on Yerba Buena Island.

Yerba Buena Island

Currently, there are 97 dwelling units on Yerba Buena Island, of which 80 are suitable for occupancy. The Proposed Project would demolish the existing dwelling units and replace them with up to 300 dwelling units, approximately 5,000 sq. ft. of neighborhood-serving retail uses, a hotel, and public and community uses on the sites of the historic Nimitz House and Senior Officers' Quarters Historic District (the Great Whites). A new hilltop park of approximately

6 acres would be developed in addition to approximately 74 acres of managed natural open space (see Figure IV.A.4: Proposed Land Use Plan for Yerba Buena Island). The proposed buildings on Yerba Buena Island would generally be less than 4 stories tall, except on Block 4Y. Block 4Y would be the one location on which a building up to 8 stories tall could be constructed, as long as the building is oriented to preserve public views as they existed on January 1, 2010 (see Figures II.5 and II.6b).

Construction Impacts

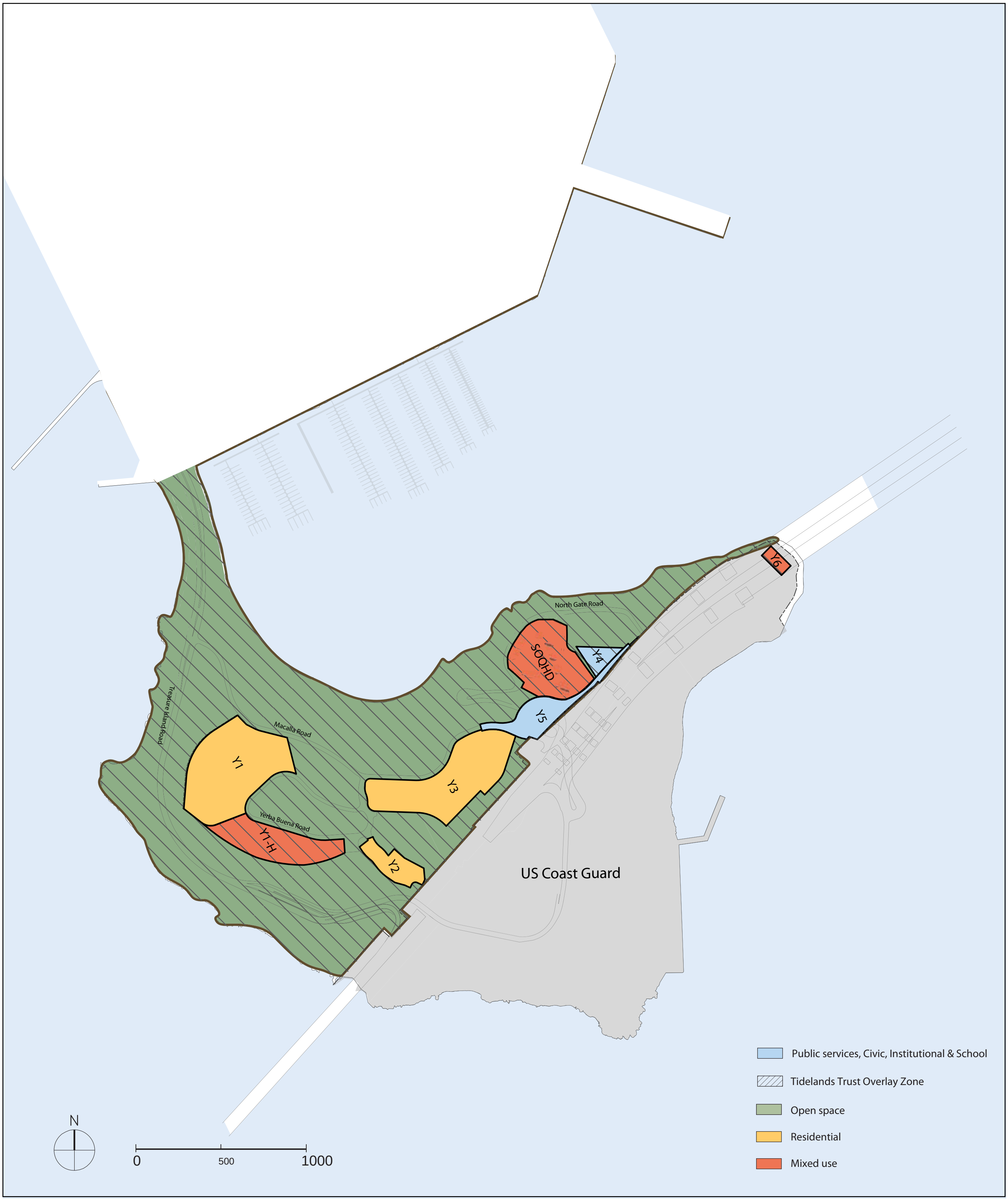
Impact LU-1: Construction of the Proposed Project would not physically divide an established community or have a substantial adverse impact on the character of the vicinity. *(Less than Significant)*

Construction and buildout of the proposed Development Plan would be phased and is expected to occur over a period of 15 to 20 years, with completion by about 2030. During the demolition and construction phases of the Proposed Project, there could be temporary and intermittent physical disruptions to the existing land uses that would remain on Treasure Island and Yerba Buena Island, but these impacts would not be permanent in nature.

Within the Redevelopment Plan Project Area, the Job Corps campus and the existing marina, both of which are outside the Development Plan Area, would continue to operate during construction of the Proposed Project. The Job Corps campus, including its on-site outdoor recreation facilities, could be affected intermittently by construction activities occurring within the Cityside, Island Center, and Eastside districts, particularly on those building sites that abut the Job Corps campus. However, construction, as stated above would not occur on the campus. In addition, these impacts would not be permanent in nature, and potential disruption would be associated with the physical effects of construction-related noise, air quality emissions, and traffic, which are discussed in Section IV.E, Transportation, Section IV.F, Noise, and Section IV.G, Air Quality, of this EIR.

The U.S. Coast Guard station on the southern portion of Yerba Buena Island is an adjacent land use that is outside of the Redevelopment Plan Project Area. The physical topography and separation of the U.S. Coast Guard station would limit potential construction impacts on this facility. Construction activities would not result in the physical disruption or division of the U.S. Coast Guard facilities.

The project sponsors anticipate entering into cooperative agreements with both the U.S. Department of Labor and the U.S. Coast Guard to identify and limit any potential construction impacts and establish protocols to manage and coordinate construction period activities to minimize the disruption experienced by the U.S. Department of Labor and the U.S. Coast Guard.



SOURCE: Perkins+Will

FIGURE IV.A.4: PROPOSED LAND USE PLAN FOR YERBA BUENA ISLAND

While construction of the Proposed Project may impact the Job Corps campus and the existing marina, construction of the Proposed Project would not permanently physically divide an established community or have a substantial adverse impact on the character of the vicinity; therefore, construction-related land use impacts would be less than significant.

Once the Proposed Project has been completed, there would be no further disruptions from demolition or construction activities. For these reasons, construction of the Proposed Project would have less-than-significant land use impacts on Treasure Island and Yerba Buena Island, and no mitigation measures would be required.

Operational Impacts

Impact LU-2: Operation of the Proposed Project would not physically divide an established community. *(Less than Significant)*

The Proposed Project would not physically divide the established community that currently exists on Treasure Island and Yerba Buena Island. There are existing buildings with interim uses, as well as 805 existing residential units, currently housing about 1,820 residents on Treasure Island and Yerba Buena Island, that would be demolished and replaced. Although the existing dwelling units in the Development Plan Area would be demolished, the Proposed Project would include a transitional housing program for current residents of Treasure Island and Yerba Buena Island who are in good standing at the time the Disposition and Development Agreement ("DDA") is signed between TIDA and TICD and who choose to continue living on Treasure Island or Yerba Buena Island until new housing is made available (refer to Chapter II, Project Description, p. II.28, for a discussion of the transitional housing program). Because existing eligible residents on Treasure Island and Yerba Buena Island would have the opportunity to relocate and transition into new housing within the Development Plan Area, the Proposed Project would not physically divide or disrupt this established community.

The proposed improvements would not physically divide the established community on Treasure Island. The new development on Treasure Island would consist of three distinct districts surrounding the Job Corps campus. Additionally, a new network of streets, bicycle and pedestrian paths, and open space would be incorporated into the Proposed Project to link the three Treasure Island districts and integrate proposed uses with the Job Corps campus. The existing causeway connecting Treasure Island and Yerba Buena Island would remain and be seismically improved, linking the districts on Treasure Island with the district on Yerba Buena Island.

It is anticipated that the Job Corps campus would continue to operate during and after construction of the Proposed Project. The Job Corps campus, including its on-site outdoor recreation facilities, would not be adversely affected by the proposed Development Program. Rather, the Proposed Project includes a wide array of improvements that would provide ancillary retail and community service and recreational opportunities to the Job Corps facilities and population. If the Job Corps campus were to be vacated in the future, it is expected that the development program being proposed as part of the Proposed Project would incorporate the land occupied by the Job Corps campus with no increases in intensity or types of land uses.

The new development would not physically divide the established community on Yerba Buena Island. The existing approximately 80 occupiable residential units on Yerba Buena Island would be demolished and replaced with 150 to 300 units clustered and located within previously developed residential areas. The existing Yerba Buena Island street system would remain in almost the same geometric configuration, with minor changes to roadway widths and lengths, and would continue to be connected to Treasure Island and its new districts via the existing causeway. The new 6-acre Hilltop Park would serve as a gathering place for residents of this community, as well as an attraction to visitors from around the region.

Therefore, the Proposed Project would not physically divide the established community on Treasure Island and Yerba Buena Island, and would result in a less-than-significant impact on land use. Thus, no mitigation measures would be required.

Impact LU-3: Implementation of the Proposed Project would not have a substantial adverse impact on the character of the vicinity. *(Less than Significant)*

The Proposed Project would not have a substantial adverse impact upon the existing character of the vicinity of Treasure Island and Yerba Buena Island. The former NSTI was a military base with a residential community that included supporting commercial, industrial, institutional, and open space uses. The Proposed Project would transform the former NSTI into a dense, mixed-use community that would include commercial, industrial, institutional, and open space uses supported by retail, community services, cultural facilities, and improved transit service. The land uses would be substantially altered and intensified; however, these changes are intended to achieve the Proposed Project's land use objectives to implement a land use program with high-density, compact residential and commercial development located within walking distance of a Transit Hub in order to maximize transit use and maximize pedestrian and bicycle travel modes (see Chapter II, Project Description, pp. II.4-II.5). These changes would not adversely affect land use character in the vicinity. Historic Buildings 1, 2, and 3 would be retained and adaptively reused as part of the Proposed Project, thus maintaining some of the existing land use character of the vicinity. Although the Proposed Project would result in a substantial material change from existing conditions on the Islands, it would not be considered to have a significant adverse effect on the character of the vicinity.

The proposed changes in land use would not adversely impact the Job Corps campus and would not substantially affect San Francisco Bay that surrounds the Redevelopment Plan Project Area. The proposed Development Program on Treasure Island would include residential, neighborhood-serving retail, entertainment, and park and open space uses that would be expected to enhance the residential and job training facilities on the Job Corps campus. The campus would no longer be isolated from other residential uses and services and would be integrated into a larger community by a new network of streets, bicycle and pedestrian paths, and open space. The Proposed Project would not physically expand into the waters of San Francisco Bay, except for the proposed ferry service that would add activity on the Bay, and some waterside improvements (a new pier and floating docks) associated with the Treasure Island Sailing Center. Neither the proposed Ferry Terminal nor the waterside improvements associated with the Treasure Island Sailing Center would substantially change the character of the shoreline or the Bay as a whole.

Approximately 4 to 6 acres of land adjacent to the wastewater treatment plant could potentially be used for the installation of renewable energy facilities. These 4 to 6 acres would be within a 10-acre area designated for the operation of utilities infrastructure by the SFPUC. The potential installation of renewable energy facilities within this 10-acre area would be compatible and consistent with the wastewater treatment plant and other utiltities infrastructure, and the installation of such facilities would not have a significant adverse impact on the character of the vicinity.

Much of Yerba Buena Island is natural open space, currently in need of repair and restoration. The Proposed Project would preserve, enhance, and restore extensive habitat areas throughout the island. The new residential buildings would be clustered and located primarily on the sites of the existing residential buildings proposed for demolition, and would not result in a change in land use, although the new residential buildings would be taller and would be different in character (e.g., attached townhouses). Existing historic buildings, such as the Nimitz House, the Great Whites, and the Torpedo Assembly Building, would be retained, renovated, and adaptively reused for commercial and public-serving uses, consistent with the Tidelands Trust. In addition, the gardens adjacent to the Nimitz House would be retained and improved.

The only uses near the proposed Development Plan Area on Yerba Buena Island are the existing U.S. Coast Guard station and the Bay Bridge span and structure on the southern portion of Yerba Buena Island. Because new construction and adaptive reuse of historic buildings would be focused in existing developed areas on Yerba Buena Island, the Proposed Project would not substantially impact the existing character of these uses.

Since the proposed changes in land use would be contained within the boundaries of the Development Plan Area, there would be no adverse land use impacts on nearby communities surrounding San Francisco Bay. For these reasons, the Proposed Project would have less-than-significant impacts on existing land use character in the vicinity of Treasure Island and Yerba Buena Island, and no mitigation measures would be required.

The visual impacts related to building forms and heights of proposed new land uses are discussed in Section IV.B, Aesthetics.

Tidelands Trust Exchange

Impact LU-4: Operation of the Proposed Project would not have a substantial adverse impact on the character of land uses subject to the Tidelands Trust Doctrine. ***(Less than Significant)***

Treasure Island

Under the ownership of TIDA, approximately 367 acres[24] on Treasure Island would be subject to the Tidelands Trust. After the proposed exchange has been completed, approximately 150 acres would be removed from the Tidelands Trust, and approximately 217 acres would continue to be subject to the Tidelands Trust. The 150 acres that would be removed from the Trust include the school site, the Sports Park, and development Blocks IC1 through IC4, M1-A and M1-B, C-1, and B1-A through B3-A in the proposed Island Center District. All of the residential development blocks in the proposed Cityside District, except for Block C2-H, which would be a mixed-use hotel development consistent with the Trust, and all of the residential development on Blocks E-1 through E-8 in the proposed Eastside District would also be removed from the Trust. Proposed land uses on these 150 acres would no longer be subject to the Trust. For the remaining 217 acres on Treasure Island that would be subject to the Trust, TIDA would determine if the proposed land uses conform to the Exchange Agreement and are compatible with the Trust as part of the entitlement process for the Proposed Project. Uses of Trust property that are not consistent with the Trust would be disallowed.

Yerba Buena Island

Currently, only approximately 2 of the 150 acres on Yerba Buena Island would be subject to the Tidelands Trust upon transfer. Approximately 94 acres on the north side of the Bay Bridge are included in the Development Plan Area. After the Tidelands Trust exchange has been completed pursuant to the Exchange Agreement, approximately 80 acres would be designated as Trust property, and the remaining 14 acres would not be subject to the Trust. The proposed residential and commercial uses on Yerba Buena Island would be located on the 14 acres that are not subject to the Trust. TIDA would determine if the other proposed land uses on Yerba Buena Island, such as the hotel, the proposed hilltop park and other publicly accessible open spaces, conform to the Exchange Agreement and are compatible with the Trust as part of the entitlement process for the Proposed Project. Uses on Trust property that are not consistent with the Trust would be disallowed.

In total, there would be about 299 acres on both islands subject to the Trust and about 164 acres free from the Trust after the conveyances under the Exchange Agreement have been completed.

[24] The 37-acre Job Corps campus, which would remain under the ownership of the Federal Government, is not included in this total.

The Trust designation would be transferred to portions of Yerba Buena Island that would be used for Trust purposes, including natural resources and recreation.

Because the proposed Development Program would be required to conform to the Tidelands Trust and Exchange Agreement, the Proposed Project would not have a substantial adverse impact on the character of land uses subject to the Tidelands Trust, and no mitigation measures would be required.

CUMULATIVE IMPACTS

Impact LU-5: The Proposed Project, when combined with other cumulative projects, would not disrupt or divide an existing community or substantially change the land use character in the vicinity. ***(Less than Significant)***

There are two separate projects that could contribute to combined land use effects of the Proposed Project. The first project is the Yerba Buena Island Ramps Improvement Project ("Ramps Project"), which includes the replacement of the freeway ramps on the east side of the Yerba Buena Island Tunnel and the seismic upgrade of the viaduct connecting the Yerba Buena Island causeway to the Bay Bridge westbound ramps and to Hillcrest Road.[25] The second project is the development of an expanded 400-slip marina at Clipper Cove.[26] The landside services necessary to support the expanded marina are part of the Proposed Project. Neither of these projects would physically divide an established community or have a substantial adverse impact on the land use character of the vicinity. Therefore, there would be no significant cumulative land use impacts as a result of these projects. The cumulative transportation effects of these two projects are analyzed in Section IV.E, Transportation.

The Job Corps campus on Treasure Island is within the Redevelopment Plan Project Area but is not part of the Proposed Project. The Job Corps campus is not considered in the cumulative analysis, because there is no plan to expand the facility, and it is assumed that it will remain on Treasure Island. Should the 37-acre Job Corps campus be vacated in the future, it is expected that land occupied by the Job Corps campus would be incorporated into the Development Plan Area. That is, the overall Development Program (e.g., number of units, types of uses, etc.) would not be

---

[25] There are one off-ramp and two on-ramps in the westbound direction, and two off-ramps and one on-ramp in the eastbound direction. The ramps are accessed from a series of short bridges, or viaducts, on Yerba Buena Island. The existing eastbound on-ramp (on the east side of the Yerba Buena Island Tunnel) is being replaced as part of the Bay Bridge East Span Seismic Safety Project. The Ramps Project, which includes the replacement of the other ramps on the east side of the Yerba Buena Island Tunnel and the seismic upgrade of the viaduct connecting the Yerba Buena Island causeway to the Bay Bridge westbound ramps and to Hillcrest Road, is a separate project from the Proposed Project and the Bay Bridge East Span Seismic Safety Project.

[26] A proposal to redevelop and expand the existing marina from 100 to 400 slips was previously analyzed in the *Transfer and Reuse of Naval Station Treasure Island Final Environmental Impact Report*, certified on May 5, 2005. The marina expansion is not part of the Proposed Project; however, the landside facilities and improvements associated with the expanded marina are included in the Proposed Project.

changed but would expand onto the site. The U.S. Coast Guard station, which is outside of the Redevelopment Plan Project Area, is expected to remain and continue to operate at its existing site on Yerba Buena Island.

Because the Redevelopment Plan Project Area is physically separated from other development sites in the region by San Francisco Bay and is not situated near land that could accommodate new large-scale development, the Proposed Project would not have an incremental impact on land use that would be cumulatively considerable when combined with other major development within the City and County of San Francisco and the Bay Area region. Due to its geographical and physical separation from adjoining land uses, the Proposed Project would not contribute to cumulative land use effects that would divide or disrupt an existing community or substantially change the existing land use character in the vicinity. For these reasons, the Proposed Project would have less-than-significant cumulative land use impacts, and no mitigation measures are required.

The primary cumulative effects of the Proposed Project combined with other major development in the City and Bay Area region would be project development resulting in an increase in population, an increase in demand for jobs and housing, and an increase in traffic that could lead to noise, air quality, and climate change effects. The effects of cumulative development on population, jobs, and housing; transportation; noise; and air quality and climate are analyzed in the cumulative impact discussions in Section IV.C, Population and Housing; Section IV.E, Transportation; Section IV.F, Noise; and Section IV.G, Air Quality, respectively. Indirect growth-inducing effects related to these topics are addressed in Section V.A, Growth-Inducing Impacts.

B. AESTHETICS

The Setting discussion in this section describes existing visual conditions as a baseline against which project impacts are identified and evaluated under Impacts. It describes the existing visual character of the Redevelopment Plan Project Area and its visual setting within San Francisco Bay; presents and describes photographic views showing existing visual conditions of the Redevelopment Plan Project Area; and identifies visual resources within the Redevelopment Plan Project Area that would be potentially affected by implementation of the Proposed Project.

The Impacts discussion identifies the considerations applied when evaluating the significance of impacts on aesthetic resources, and describes and evaluates impacts on scenic vistas, visual and scenic resources and visual quality with reference to visual simulations prepared for the Proposed Project.

SETTING

VISUAL CHARACTER OF SAN FRANCISCO BAY

Views of the Bay that include the Redevelopment Plan Project Area are of particularly high visual quality. San Francisco Bay is a prominent and unique scenic resource, comprising one of the most scenic areas of the world. This is particularly so at the central portion of the Bay, where water, dramatic topographic features, weather conditions, and distinctive built environment features combine to form highly recognizable, even iconic, scenic vistas. The wide, flat expanse of Bay water opens panoramic vistas across it and provides a visual counterpoint to the varied and dramatic topography that surrounds the Bay. The Bay water unifies the landforms within it (such as Yerba Buena Island, Alcatraz Island, and Angel Island) and surrounding it (such as the hills of San Francisco, Mt. Tamalpais and the Marin Hills, and the East Bay Hills), providing linear continuity along the shoreline. Reflectivity, color, and movement are also properties of water that contribute visual interest and variety to the visual setting. Views of the Bay are often enhanced by the movement of dense coastal fog and by dramatic light conditions that contribute to the distinctiveness of scenic vistas.

Distinctive and recognizable built environment features within the landscape (“landmarks” in the visual sense) provide a clear sense of geographic orientation. Waterside views of the “City by the Bay” are highly readable and coherent, characterized by a strong visual hierarchy. The familiar San Francisco skyline is a clear visual marker of San Francisco’s regional importance. The compact high-rise San Francisco skyline rises abruptly from the western Bay shoreline, echoing the landforms that surround the Bay and providing a dramatic counterpoint to the flatness of the Bay water. The Golden Gate Bridge and the Bay Bridge west span are suspension bridges characterized by lightness, structural clarity, and the graceful parabolic curves of their suspension cables. As linear features in the landscape, they bound and direct views. These bridges converge at, and radiate from, the City, visually reinforcing the centrality of San Francisco as a regional node. These features of the built environment contribute to the visual coherence and quality of San Francisco Bay, providing the viewer with a clear sense of orientation.

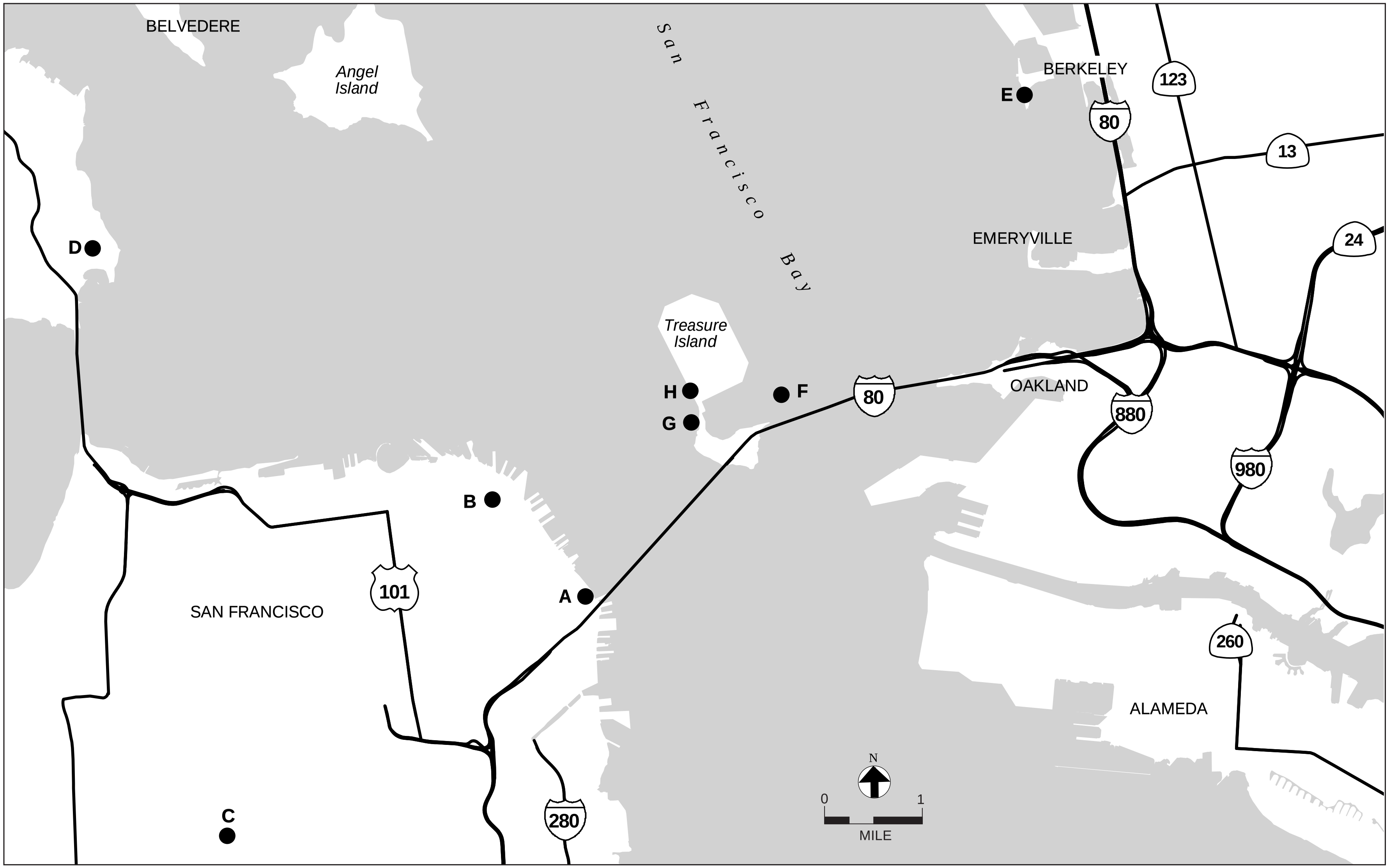
Panoramic scenic vistas of San Francisco Bay that include Treasure Island and Yerba Buena Island are also available to motorists from major transportation corridors such as the Golden Gate Bridge, the Bay Bridge, and Interstate 80 in Emeryville, Berkeley, and Albany. Passengers on ferries, tour boats, cruise ships, and recreational craft are also afforded excellent views of the Bay that include Treasure Island and Yerba Buena, as are visitors to Alcatraz and Angel Islands.

SCENIC VISTAS OF THE REDEVELOPMENT PLAN PROJECT AREA FROM AROUND SAN FRANCISCO BAY

The Planning Department has selected photographic views from eight locations as representative of existing visual conditions of the Redevelopment Plan Project Area and its visual setting within San Francisco Bay as viewed from publicly accessible vantage points within and around San Francisco Bay. See Figure IV.B.1: Viewpoint Locations. In the subsequent figures, each existing view (denoted as “Existing”) is presented at the top of the page to show the existing visual setting of the Redevelopment Plan Project Area. Below this image is a representative simulation of the maximum allowable massing (height and bulk of proposed buildings) for the proposed new construction superimposed onto the same view (denoted as “Proposed”), discussed later in this section under “Impacts.” Representative massing simulations illustrate the general location, height, and overall massing of development under the Redevelopment Plan. They do not represent any specific design for individual buildings, which would be determined in the future.

Due to the prominent position of the Redevelopment Plan Project Area within scenic vistas of the Bay, the area that may be potentially affected by visual changes under the Proposed Project is regional in scope. Treasure Island and Yerba Buena Island’s position in the middle of San Francisco Bay, surrounded by a broad, flat, unobstructed expanse of water, allows Treasure Island and Yerba Buena Island to be visible from numerous public vantage points around the rim of the Bay, as well as from numerous elevated public vantage points away from the Bay shoreline (like San Francisco’s hills to the west, the East Bay Hills to the east, and the Marin Hills to the north and northwest).

Scenic vistas of the Redevelopment Plan Project Area and beyond are also available to the public from the surface of the Bay (i.e., from ferries, cruise ships, tour boats and private recreational craft). Such views are similar in character to views from the Bay shoreline, although the Yerba Buena Island landform and the existing buildings of Treasure Island are more prominent within such views, while distant features beyond are comparatively less so. Views from boats are



SOURCE: Turnstone Consulting

FIGURE IV.B.1: VIEWPOINT LOCATIONS

transitory, changing through time as the boat moves through space. Surrounded by flat expanses of water on all sides, persons on boats have access to views that are not available to viewers on land.

Views from the San Francisco Peninsula

San Francisco's eastern waterfront affords panoramic vistas of the Bay, the Bay Bridge, and the East Bay Hills rising in the distance. See Figure IV.B.2: Viewpoint A – View from The Embarcadero at Rincon Park (Existing). In this view, the lawn of Rincon Park occupies the foreground. In the middleground are Herb Caen Way and the Bay water beyond.

The Bay Bridge bounds views to the southeast, directing views to the western slopes of Yerba Buena Island rising prominently in the distance (about 1.6 miles). The western and southern shoreline of Treasure Island is visible as a flat expanse to the north of Yerba Buena Island (left in this view). Because of their size, prominent location, and light color, Buildings 1 and 2 are recognizable in the distance. The East Bay Hills rise in the distant background (about 10 miles away). At the far left in the photograph is the Port of San Francisco's pedestrian-access Pier 14.

From the elevated vantage point atop Telegraph Hill, the regional geography of the Bay is readable. See Figure IV.B.3: Viewpoint B – View from Telegraph Hill at Pioneer Park (Existing) – Yerba Buena Island and Treasure Island are more clearly seen as islands surrounded by water on all sides. The East Bay waterfront (in the cities of Albany, Berkeley, Emeryville, and Oakland) is visible at the western shoreline of the Bay. The ridgeline of the East Bay Hills is visible rising in the distance. Mt. Diablo (about 28 miles away) is visible rising beyond the East Bay Hills. From Twin Peaks, the Redevelopment Plan Project Area (about 6 miles away) is not prominent. See Figure IV.B.4: Viewpoint C – View from Twin Peaks (Existing). Much of the northern portion of Yerba Buena Island and all of Treasure Island are obscured beyond the high-rise downtown core of San Francisco.

View from the Marin Headlands

Vista Point is a popular scenic viewpoint within the Marin Headlands at the northern landing of the Golden Gate Bridge. See Figure IV.B.5: Viewpoint D – View from the Marin Headlands at Vista Point (Existing). The foreground in this view is occupied by Horseshoe Bay at Vista Point. The San Francisco skyline and Telegraph Hill/Coit Tower are prominent and recognizable features at the northern end of the San Francisco peninsula (about 5 miles away), as is Alcatraz Island in the Bay. The East Bay shoreline and hills beyond are visible in the background. Yerba Buena Island (about 6 miles away) is a prominent feature at the midpoint of the Bay between the East Bay and the San Francisco Peninsula, flanked by the east and west spans of the Bay Bridge. The low and flat Treasure Island is not a prominent feature in this view.

Existing

Proposed

SOURCE: Square One Productions

FIGURE IV.B.2: VIEW POINT A - VIEW FROM THE EMBARCADERO AT RINCON PARK

Existing

Proposed

SOURCE: Square One Productions

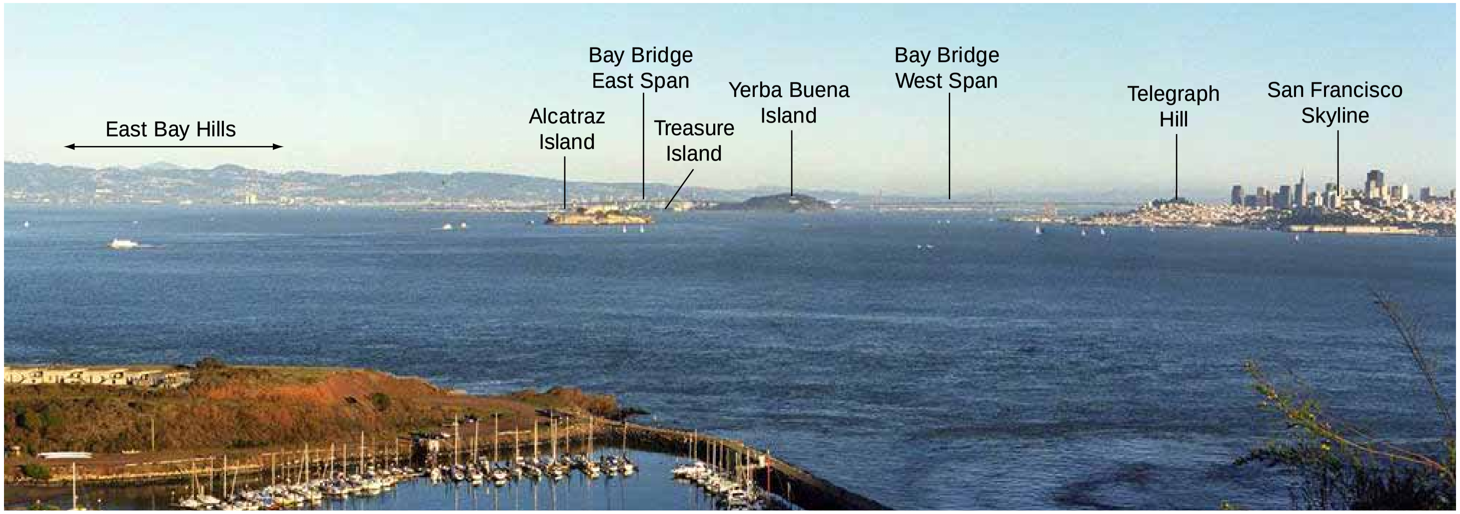
FIGURE IV.B.3: VIEW POINT B - VIEW FROM TELEGRAPH HILL AT PIONEER PARK

Existing

Proposed

SOURCE: Square One Productions

FIGURE IV.B.4: VIEW POINT C - VIEW FROM TWIN PEAKS



Existing


Proposed

SOURCE: Square One Productions

FIGURE IV.B.5: VIEW POINT D - VIEW FROM THE MARIN HEADLANDS AT VISTA POINT

Views from the East Bay

Views from the East Bay Shoreline

The Berkeley Marina, Shorebird Park, and the Berkeley Municipal Fishing Pier are located at the foot of University Avenue on the Berkeley shoreline. Panoramic west-facing views of a vast expanse of water and of familiar visual landmarks are available from this and other locations along the East Bay shoreline. See Figure IV.B.6: Viewpoint E – View from the Berkeley Marina (Existing). In this view, the Bay Bridge east span is seen landing on Yerba Buena Island (the Bay Bridge west span is obscured beyond Yerba Buena Island). The San Francisco skyline rises from the opposite shore of the Bay. Familiar skyscrapers, such as the Transamerica Pyramid and the Bank of America Building, are recognizable. Twin Peaks rises beyond. The Golden Gate Bridge spans the gap between the San Francisco peninsula and the Marin Headlands. This visual setting is often enhanced by dramatic red skies at sunset.

Except for Buildings 1, 2, and 3, Treasure Island is generally not prominent to viewers from the East Bay shoreline because of its distance from the shoreline (about 3.5 miles) and its low and flat position in the Bay. This allows the island to be a minimal visual presence within the foreground of the San Francisco skyline. From this Bay-level vantage point it is difficult to visually discern Treasure Island as a separate landform from the San Francisco peninsula, although Yerba Buena Island is prominent.

Views from the Bay Bridge East Span

The visual quality of scenic vistas of the Bay from the Bay Bridge east span will change considerably when the new Bay Bridge east span (now under construction) is completed and opened to the public. See Figure IV.B.7: Viewpoint F – View Looking West from the New Bay Bridge East Span (currently under construction) (Existing). This is particularly so for passengers of commuter and tour buses who would be seated high above the guard rail and would not be driving. This view from the new Bay Bridge east span would be from an open viaduct segment, without the lattice of steel beams that support the existing cantilever segment of the old east span through which westbound travelers on the Bay Bridge east span now view the Bay. Bay water is seen in the foreground. Treasure Island is seen in the middle-ground as a flat expanse of land. From this vantage point, Building 2 and Building 3 are the most prominent visual features, occupying the southern edge of Treasure Island at Clipper Cove. The northern waterfront of San Francisco (with Telegraph Hill and Russian Hill rising beyond), the Golden Gate Bridge, and hills of Marin County are seen in the background in this view.

Existing

Proposed

SOURCE: Square One Productions

FIGURE IV.B.6: VIEW POINT E - VIEW FROM THE BERKELEY MARINA

Existing

Proposed

SOURCE: Square One Productions

FIGURE IV.B.7: VIEW POINT F -
VIEW LOOKING WEST FROM THE NEW BAY BRIDGE EAST SPAN
(CURRENTLY UNDER CONSTRUCTION)

VISUAL CHARACTER AND SCENIC RESOURCES OF THE REDEVELOPMENT PLAN PROJECT AREA

Treasure Island

Treasure Island has a rectilinear form oriented generally north/south. Its northwest, northeast, and southeast corners are chamfered (cut off at a 45 degree angle). Topography on the island is low and flat. Existing development is characterized by various low-scale, widely spaced military support facilities of a generally utilitarian character without a strong sense of spatial or design cohesiveness. (See Section IV.D, Cultural and Paleontological Resources, “D.2, Historic Architectural Resources,” pp. IV.D.36 - IV.D.38.) Large expanses of open land contribute to a sense of spaciousness.

Treasure Island’s approximately 3 miles of shoreline is protected by a rock-filled berm. The berm height, relative to existing finish grades in the interior of the island, limits ground-level views of the surrounding Bay from many Treasure Island locations. Pier 23, a public access fishing and sightseeing pier, is on the west side of the island across from the San Francisco’s northern waterfront. Public access is restricted at the pier on the island’s southeast corner where Navy vessels were once moored. Clipper Cove is a protected area with a private marina on the east side of the causeway connecting Treasure Island with Yerba Buena Island.

The visual gateway to Treasure Island is the Treasure Island Causeway. See Figure IV.B.8: Viewpoint G – View Looking North to Treasure Island from the Causeway (Existing). This view is the “first impression” upon arriving at the island. Buildings 1, 2, and 3, at the southern end of Treasure Island, are remnants of the 1939 - 1940 Golden Gate International Exposition. They are each listed on the National Register of Historic Places as individual resources for their historic and architectural significance. Building 1 is a three-story Art Deco building. This building was originally constructed as the administrative headquarters for the Exposition and was intended for use as an airport passenger terminal after the Exposition closed. The most prominent and architecturally significant building on Treasure Island, Building 1, functions as the island’s visual centerpiece. It is U-shaped in plan. See Figure IV.B.9: Viewpoint H – View Looking East to Building 1 (Existing). A colonnade of vertical pilasters that alternate with double-height vertical window openings is arranged across the central portion of the façade as a counterpoint to the overall horizontality of the building’s profile. Buildings 2 and 3 were originally constructed as exhibition halls for the Exposition and were intended for use as airplane hangars after the Exposition closed.

Avenue of the Palms (also a remnant of the Exposition but not included on the National Register) is a roadway along the western edge of Treasure Island. See Figure IV.B.8 (Existing). Its bayward side is lined with regularly spaced palms, which lend it a formal character that defines

Existing

Proposed

SOURCE: Square One Productions

**FIGURE IV.B.8: VIEW POINT G -
VIEW LOOKING NORTH TO TREASURE ISLAND FROM THE CAUSEWAY**

Existing

Proposed

SOURCE: Square One Productions

FIGURE IV.B.9: VIEW POINT H - VIEW LOOKING EAST TO BUILDING 1

the western edge of Treasure Island. The Clipper Cove Marina occupies the protected cove between Treasure Island and Yerba Buena Island to the east of the causeway (right in this view). The marina currently has about 100 slips for pleasure craft. (As discussed in Chapter II, Project Description, p. II.9, improvements and expansion of the marina to 400 slips was fully analyzed in the 2005 *Transfer and Reuse of Naval Station Treasure Island FEIR*.) Rising from beyond the masts of the marina and east of Building 1 (right in this view) is Building 180, constructed by the Navy during World War II as an airplane hangar.

Yerba Buena Island

In contrast to Treasure Island, Yerba Buena Island is a natural island characterized by high topographic relief. It is a prominent landform contributing to scenic vistas of the Bay. Most of the island is steeply sloped, with a few low-lying areas of fill along its eastern side. Considerable soil erosion and disturbance are visible as exposed rock bluffs in the vicinity of the ramps and causeway on the steep west-facing slopes of the island. In contrast to the regular rectilinear street grid of Treasure Island, the street pattern of Yerba Buena Island is characterized by curves and switchbacks that follow the contours of the island's steep topography.

The island has a variety of buildings constructed by the Army, Navy, and Coast Guard. Buildings on Yerba Buena Island are generally not prominent when viewed from off-island locations, due to their low scale, distance, and the screen of vegetation covering much of the island. Likewise, buildings on Yerba Buena Island are not prominent to travelers on the Bay Bridge/Interstate 80 due to the raised position of the roadway high above the eastern end of the island, although motorists on the Bay Bridge/Interstate 80 may have transitory glimpses of buildings and structures that are located near the Interstate 80 roadway.

The upland portions of the island are occupied by attached, two-story townhouse residential units constructed in the 1960's. Toward the lower and flatter eastern end of the island is the Senior Officers' Quarters Historic District, or "the Great Whites," a distinctive and cohesive concentration of historic buildings that is listed as a historic district on the National Register of Historic Places. The district is comprised of distinguished Colonial Revival houses and associated outbuildings and landscape features that were constructed in 1900-1903 for senior military officers and their families. U.S. Coast Guard facilities occupy the eastern shoreline of the island south of the Bay Bridge/Interstate 80. The Torpedo Assembly Building, built in 1891, is at the easternmost point of Yerba Buena Island.

REGULATORY FRAMEWORK

San Francisco General Plan

As discussed in Chapter III, Plans and Policies, "San Francisco Plans and Policies," p. III.1, although Treasure Island and Yerba Buena Island are located within the jurisdictional boundaries of the City and County of San Francisco, they are not included in the *San Francisco General Plan* (*General Plan*) and its related planning and policy documents, or in the San Francisco Planning Code (Planning Code).

As discussed in Chapter II, Project Description, "Proposed General Plan and Planning Code Amendments," p. II.9, the *Redevelopment Plan* and *Design for Development* documents would establish the land use controls and design standards for the Proposed Project. The Proposed Project includes amendments to the text and maps of the *General Plan* and Planning Code that would identify the geographic and physical boundaries of Treasure Island and Yerba Buena Island, and incorporate the land use controls and design standards specified in the *Redevelopment Plan* and *Design for Development*.

San Francisco Bay Plan

The San Francisco Bay Conservation and Development Commission's *San Francisco Bay Plan* contains the following policies related to "Appearance, Design, and Scenic Views" that are applicable to the Proposed Project:

Policy 1: To enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines.

Policy 2: All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore. To this end, planning of waterfront development should include participation by professionals who are knowledgeable of the Commission's concerns, such as landscape architects, urban designers, or architects, working in conjunction with engineers and professionals in other fields.

Policy 3: In some areas, a small amount of fill may be allowed if the fill is necessary—and is the minimum absolutely required—to develop the project in accordance with the Commission's design recommendations.

Policy 4: Structures and facilities that do not take advantage of or visually complement the Bay should be located and designed so as not to impact visually on the Bay and shoreline. In particular, parking areas should be located away from the shoreline. However, some small parking areas for fishing access and Bay viewing may be allowed in exposed locations.

Policy 8: Shoreline developments should be built in clusters, leaving open area around them to permit more frequent views of the Bay. Developments along the shores of tributary waterways should be Bay-related and should be designed to preserve and enhance views along the waterway, so as to provide maximum visual contact with the Bay.

Policy 10: Towers, bridges, or other structures near or over the Bay should be designed as landmarks that suggest the location of the waterfront when it is not visible, especially in flat areas. But such landmarks should be low enough to assure the continued visual dominance of the hills around the Bay.

Policy 12: In order to achieve a high level of design quality, the Commission's Design Review Board, composed of design and planning professionals, should review, evaluate, and advise the Commission on the proposed design of developments that affect the appearance of the Bay in accordance with the Bay Plan findings and policies on Public Access; on Appearance, Design, and Scenic Views; and the Public Access Design Guidelines. City, county, regional, state, and federal agencies should be guided in their evaluation of bayfront projects by the above guidelines.

Policy 13: Local governments should be encouraged to eliminate inappropriate shoreline uses and poor quality shoreline conditions by regulation and by public actions (including development financed wholly or partly by public funds). The Commission should assist in this regard to the maximum feasible extent by providing advice on Bay-related appearance and design issues, and by coordinating the activities of the various agencies that may be involved with projects affecting the Bay and its appearance.

Policy 14: Views of the Bay from vista points and from roads should be maintained by appropriate arrangements and heights of all developments and landscaping between the view areas and the water. In this regard, particular attention should be given to all waterfront locations, areas below vista points, and areas along roads that provide good views of the Bay for travelers, particularly areas below roads coming over ridges and providing a "first view" of the Bay (shown in Bay Plan Map No. 8, Natural Resources of the Bay).

Policy 15: Vista points should be provided in the general locations indicated in the Plan maps. Access to vista points should be provided by walkways, trails, or other appropriate means and connect to the nearest public thoroughfare where parking or public transportation is available. In some cases, exhibits, museums, or markers would be desirable at vista points to explain the value or importance of the areas being viewed.

IMPACTS

SIGNIFICANCE CRITERIA

The City and County of San Francisco has not formally adopted significance standards for impacts related to visual quality. The Planning Department's Initial Study Checklist form provides a framework of topics to be considered in evaluating a project's impacts under CEQA. Implementation of a project could have a potentially significant impact related to aesthetics if it were to:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and other features of the built or natural environment that contribute to a scenic public setting;

- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or which would substantially impact other people or properties.

Design and aesthetics are, by definition, subjective and open to interpretation by decision-makers and members of the public. A proposed project would be considered to have a significant adverse effect on a scenic vista or on visual quality under CEQA only if it would cause a substantial and demonstrable negative change.

APPROACH TO ANALYSIS

Because of the island location of the Redevelopment Plan Project Area at the center of San Francisco Bay, construction-related impacts on scenic vistas and on visual quality would not be visually prominent from surrounding off-site vantage points around the Bay, if discernible at all. Buildout of the proposed project would occur incrementally over 15 to 20 years, so that construction and operational impacts on visual quality would occur simultaneously over this period. The impacts analyzed here are those at buildout of the proposed Redevelopment Plan.

An independent consultant has photographed the Redevelopment Plan Project Area from a range of publicly accessible vantage points. From these, the Planning Department has selected eight representative views. These views are presented and described above on pp. IV.B.2 – IV.B.15 (denoted on the figures as “Existing”). The existing view represents the existing baseline visual condition of the Redevelopment Plan Project Area, viewed from distant public vantage points along the shoreline of San Francisco Bay as well as from areas within the Redevelopment Plan Project Area from which views would be most affected by the construction of new buildings under the Proposed Project.

Below this image of existing conditions, a representative massing simulation of the Proposed Project is superimposed on the same view. This allows the reader to compare existing photographic views with massing-level visualizations of the Proposed Project. It should be noted that the representative massing simulations are simple diagrams illustrating the maximum overall height and volume of proposed new construction. The simulations depict the general location, height, and overall massing of future development under the Redevelopment Plan. They do not represent any specific design or exact location for individual buildings, which would be determined in the future, subject to the standards and guidelines in the Proposed Project’s *Design for Development*.

PROJECT IMPACTS

As described in Chapter II, Project Description, "Building Heights," p. II.24, the *Redevelopment Plan* envisions construction of a dense cluster of up to 19 high-rise towers on Treasure Island. The highest densities and tallest buildings are proposed for the Island Center at the southern portion of Treasure Island. Proposed new buildings within the Island Center would include a residential tower up to 650 feet tall adjacent to Building 1 to its north and east. Note that the construction program allows for some limited flexibility in the siting of tower volumes. See Figure IV.B.10: Proposed Representative Massing Diagram. In this figure, the "wire-frame" boxes above the representative building volumes do not represent maximum height and bulk. Rather, they represent the spatial limits within which the tower volumes may shift when the development program is implemented and specific building designs are proposed.

Buildings 1, 2, and 3 would be retained and reused, and would become part of the Island Center District, a dense mix of retail, restaurant, office, hotel, residential, transit, and community services uses located in the southern part of Treasure Island. New infill buildings would be constructed in the vicinity of Buildings 1, 2, and 3 south of California Avenue. The Island Center would include a Ferry Terminal east of Building 1 at the water's edge. A tall residential tower, up to 650 feet, is proposed north of Building 1. The Island Center would also permit high-rise towers up to 450 feet tall. Within two residential districts, the Cityside and Eastside Districts, individual blocks would consist primarily of a dense, low-rise podium (up to 70 feet) punctuated by mid-rise buildings (between 70 and 130 feet) and neighborhood high-rise towers (up to 240 feet) serving as neighborhood markers.

As described in Chapter II, Project Description, "Yerba Buena Island District," p. II.22, new construction on Yerba Buena Island would be placed primarily on the sites of existing buildings and would be predominantly low-rise, stepping down hillsides. A mid-rise building up to 80 feet in height would be permitted in zone Y3. Building height limitations would be established by the *Design for Development* to ensure that development would not substantially interfere with existing views from hilltop public park areas, as provided for in the Trust Exchange legislation. The historic Nimitz House and eight other Senior Officers' Quarters and the Torpedo Assembly Building would be rehabilitated and programmed for public uses.

Approximately 300 acres of proposed open space would be constructed within the Development Plan Area as part of the Proposed Project. The open space would include a variety of programmed and natural habitat elements, including public parks and recreation areas; shoreline trails and access improvements; a stormwater wetland; Urban Agricultural Park; Cultural Park, adjacent to Building 1; a plaza adjacent to the Ferry Terminal and Transit Hub; a pedestrian promenade along Clipper Cove; preserved and new wildlife habitat on Yerba Buena Island; and Hilltop Park, with vista points, overlooks, and trails, on Yerba Buena Island.

SOURCE: Perkins + Will

TREASURE ISLAND AND YERBA BUENA ISLAND REDEVELOPMENT PROJECT EIR

FIGURE IV.B.10: PROPOSED REPRESENTATIVE MASSING DIAGRAM

Impact AE-1: Development under the proposed Treasure Island and Yerba Buena Island Redevelopment Plan would adversely alter scenic vistas of San Francisco and San Francisco Bay from public vantage points along the eastern shoreline of San Francisco, Telegraph Hill, the East Bay shoreline, and from the Bay Bridge east span. ***(Significant and Unavoidable)***

As discussed above under "Setting," p. IV.B.1, views of San Francisco Bay are among the most scenic and recognizable in the world. The position of Treasure Island and Yerba Buena Island at the center of San Francisco Bay provides unobstructed views of the Redevelopment Plan Project Area from numerous public vantage points along the Bay shoreline, as well as upland areas around the Bay. Views of the Bay that include the Redevelopment Plan Project Area are highly coherent. Distinctive natural and built environment features combine to create a visual setting that is highly readable, geographically orienting the viewer.

Implementation of the proposed Redevelopment Plan would create a prominent new cluster of high-rise buildings on Treasure Island at the center of San Francisco Bay. The tallest of the proposed buildings (650 feet) would be comparable to the height of the suspension towers of the Bay Bridge west span. As discussed under Setting, p. IV.B.1, panoramic views of the Bay and familiar visual landmarks within and surrounding the Bay are available from various locations around the shoreline of the Bay and from elevated inland locations. The particularly scenic quality of Bay views relies on the arrangement of distinctive natural and built environment elements in readable and recognizable patterns, and on a clear visual hierarchy of built forms that conveys the regional importance of San Francisco.

Proposed new construction on Treasure Island would adversely alter scenic vistas of San Francisco Bay from the eastern waterfront of San Francisco (see Figure IV.B.2: View Point A – View from The Embarcadero at Rincon Park (Proposed)), and from Telegraph Hill (see Figure IV.B.3: View Point B – View from Telegraph Hill at Pioneer Park (Proposed)). From these vantage points new construction on Treasure Island would be a prominent new visual presence within scenic vistas of San Francisco Bay, occupying a wide expanse of an individual's field of view.

New construction on Treasure Island would not have a substantial adverse impact on scenic vistas from more distant off-site locations. From Twin Peaks, the proposed new construction on Treasure Island would not be prominent, if discernible at all. (See Figure IV.B.4: View Point C – View from Twin Peaks (Proposed).) It would be largely obscured beyond dense, high-rise development of Downtown San Francisco. From the hills of Marin, the proposed new construction on Treasure Island would not be a dominant visual presence in the context of panoramic scenic vistas of the Bay that include the San Francisco skyline, the Golden Gate Bridge, the Bay Bridge, Yerba Buena Island, and the East Bay Hills. (See Figure IV.B.5: View Point D – View from the Marin Headlands at Vista Point (Proposed).)

Views from the East Bay shoreline would be significantly altered. (See Figure IV.B.6: View Point E – View from the Berkeley Marina (Proposed).) Considerably nearer to the viewer than the San Francisco skyline, the proposed development on Treasure Island would appear as large or larger than the skyscrapers of Downtown San Francisco. To the extent that segments of the San Francisco skyline would continue to be visible in the background between and around proposed new buildings on Treasure Island, proposed new buildings would eclipse the San Francisco skyline in visual importance. The new cluster of high-rise buildings on Treasure Island would visually merge with the San Francisco skyline, creating visual ambiguity as to what the viewer is actually observing the San Francisco skyline or the Treasure Island skyline. The resulting view would thus be less readable and less coherent when viewed from the East Bay shoreline.

The Proposed Project would affect scenic vistas available to the public from the surface of the Bay (i.e., from ferries, cruise ships, tour boats, and private recreational craft). Viewed from some positions within the Bay, the impacts of the Proposed Project on scenic vistas would be similar in character to those described above for shoreline viewpoint locations on land, although the Yerba Buena Island landform and the proposed buildings on Treasure Island would be more prominent within such views, while distant features beyond would be comparatively less so. Unlike scenic vistas from fixed positions on land, views from boats are transitory, changing through time as the boat moves through space. Surrounded by flat, unobstructed expanses of water in all directions, persons on boats in the Bay would continue to have access to panoramic scenic vistas of the Bay that are unaffected by the Proposed Project and that are not available to viewers on land. For these reasons, the impact of the Proposed Project on scenic vistas from the surface of the Bay would be less than significant.

Viewed from the new Bay Bridge east span (currently under construction), new construction on Treasure Island would be prominent in west- and northwest-facing views of the Bay from the Bay Bridge. See Figure IV.B.7: Viewpoint F – View Looking West from the New Bay Bridge East Span (currently under construction) (Proposed). Much of the southern and western portion of the island would have buildings with a base height of 50 to 70 feet, punctuated by 125- to 450-foot-tall-towers and a 650-foot-tall signature tower near the southwest corner of the island. Heights of towers would follow a general pattern of stepping down gradually to the east and north from the 650-foot-tall signature tower. The 650-foot tower would be comparable in height to the cable stay tower of the new Bay Bridge east span. The Proposed Project would introduce new prominent large-scale development in the middle-ground of scenic vistas of the Bay when viewed from the Bay Bridge east span. Views of familiar visual features in and around Bay (the Golden Gate Bridge, Alcatraz Island, Angel Island, and the Marin Headlands) would be obstructed or partially obstructed by the proposed development. The obstruction of views from the Bay Bridge to these other familiar visual landmarks around the Bay would diminish the existing visual reciprocity that exists between these familiar visual landmarks that contributes to a clear sense of spatial orientation and coherence within the City.

Given the familiarity and exceptionally high quality of the existing San Francisco Bay scenic resource, the regional prominence of the Redevelopment Plan Project Area within views of the Bay, and the scale of proposed new development on Treasure Island, the effect of the Proposed Project on scenic vistas of the Bay when viewed from the eastern waterfront of San Francisco, Telegraph Hill, the East Bay shoreline, and from the Bay Bridge east span would be considered significant. This effect on a scenic resource is also considered unavoidable because no effective mitigation measure is available that would avoid or substantially reduce a significant impact on scenic Bay vistas resulting from construction of a new, high-density urban community on Treasure Island.

Impact AE-2: The Redevelopment Plan would affect existing features that are considered scenic resources on Treasure Island and Yerba Buena Island. *(Less than Significant)*

As described above under Setting, and for the purposes of this analysis, the following features within the Redevelopment Plan Project Area are considered scenic resources: Buildings 1, 2, and 3; historic buildings and associated landscape features of the Senior Officers' Quarters Historic District; the Torpedo Assembly Building; Avenue of the Palms; and the Yerba Buena Island landform.

Under the proposed Redevelopment Plan, Buildings 1, 2, and 3 on Treasure Island, buildings and landscape features within the Senior Officers' Quarters Historic District, and the Torpedo Assembly Building on Yerba Buena Island would be retained, rehabilitated, and reused in a manner that conforms to the Secretary of the Interior's Standards for Rehabilitation. (See Section IV.D, Cultural and Paleontological Resources, "D.2, Historic Architectural Resources," pp. IV.D.52 – p. IV.D.61). Conformity with the Secretary of the Interior's Standards would ensure that the essential historic and architectural character of these visual resources would be preserved.

New infill buildings would be constructed in the vicinity of Buildings 1, 2, and 3 south of California Avenue (see Figures IV.B.7 through IV.B.9). West of Building 1, a proposed new Ferry Terminal (up to 50 feet tall) at the water's edge and proposed retail pavilions (up to 20 feet tall) would be constructed. Between Building 1 and Building 2, new mixed-use buildings (various heights from 50 to 450 feet tall) would be constructed. South of Buildings 2 and 3 along Clipper Cove, new residential buildings (30, 50, and 125 feet tall) would be constructed.

New infill construction south of California Avenue in the vicinity of Buildings 1, 2, and 3 would not damage these visual resources of the built environment. Building 1 would continue to be a prominent visual presence, functioning as the visual centerpiece of Treasure Island. Buildings 2 and 3 would become less prominent when viewed from the causeway and from the Bay Bridge east span due to proposed new construction south of these buildings along Clipper Cove and proposed new infill construction west of Building 2. Buildings 2 and 3 would no longer occupy the water's edge at Clipper Cove. The basic form of Buildings 2 and 3, defined by the wide arched span of their roofs, and architectural features such as the distinctive corner pylons and upper fenestration would continue to be prominent, rising from beyond the proposed new buildings along Clipper Cove. As discussed under Impact AE-3 below, the *Design for Development* provides design standards for alterations and additions to historic buildings and for new construction in their vicinity. These standards are intended to preserve the historic character of these visual resources.

Although Avenue of the Palms is not considered a historical resource for the purposes of analysis in "D.2, Historic Architectural Resources" in Section IV.D, it is a familiar formal visual feature that now defines the western edge of Treasure Island. Under the proposed Development Plan, Avenue of the Palms would be removed and replaced by a proposed new palm-lined landscaped plaza (Waterfront Plaza) west of Building 1 at the proposed Ferry Terminal landing. Further north along the western edge of Treasure Island, a proposed new park ("Cityside Waterfront Park") would be constructed. The proposed Waterfront Plaza and Cityside Waterfront Park would replace the existing Avenue of the Palms to define the western edge of Treasure Island, to provide greenery and texture to visually soften this urban edge, to provide recreational opportunities, and to provide access to the shoreline and scenic vistas of the Bay toward the San Francisco peninsula and the hills of Marin County.

As described above and in Chapter II, Project Description, "Yerba Buena Island District," p. II.22, new construction on Yerba Buena Island would be placed primarily on the sites of existing buildings and would be predominantly low-rise, stepping down hillsides. A mid-rise building would be permitted in zone 4Y stepping down the north slope of the island facing Clipper Cove. Building height and placement limitations established by the *Design for Development* (see Figure II.5: Yerba Buena View Corridors, p. II.23, and Figure II.6b: Yerba Buena Island Maximum Height Limit Plan, p. II.27 in Chapter II, Project Description) would ensure that development would not rise above the ridgeline of Yerba Buena Island to substantially alter the existing visual character of the Yerba Buena Island landform as a scenic resource of San Francisco Bay. Proposed new development on Yerba Buena Island would not be substantially more prominent than existing development when viewed from locations around the Bay, if discernible at all.

For these reasons, although the Proposed Project would introduce new development in the vicinity of existing features that are considered scenic resources, the impact is considered less than significant. No mitigation measures are required.

Impact AE-3: New construction on Treasure Island would alter the existing visual character and visual quality of the Redevelopment Plan Project Area. *(Less than Significant)*

The proposed construction program would transform the existing visual character of Treasure Island. As described above under Setting, pp. IV.B.12 – IV.B.15, the existing visual character of Treasure Island is largely defined by Buildings 1, 2, and 3 (each individually listed on the National Register) at the southern end of the island, and by low-scale, widely spaced military support facilities of a utilitarian character. The island is not characterized by a strong sense of spatial or design cohesiveness.

New construction on Treasure Island would be considerably denser and more urban in visual character than existing conditions. New infill construction would be constructed in the vicinity of Buildings 1, 2, and 3 (see Figure IV.B.8 (Proposed)). From this viewpoint, Building 1 would continue to function as the prominent visual centerpiece at the entrance to Treasure Island. The tallest building, a 650-foot-tall residential tower in the Island Center, would rise from beyond Building 1, reinforcing the centrality of Building 1. The tall tower would be flanked on both sides by successively lower, rhythmically spaced towers in a pyramidal composition.

Figure IV.B.9 (Proposed) shows the view toward Building 1 from the open area west of Building 1. Low, 20-foot-tall retail pavilions in the foreground would symmetrically flank this view of Building 1. High-rise towers would rise from beyond Building 1. Its low horizontal form, curved façade, and distinctive architectural features would contrast with nearby new construction.

As part of the Proposed Project, a *Design for Development* would be adopted and implemented.[1] The *Design for Development* is a regulatory document that would establish design standards and guidelines that would direct future development of the Redevelopment Plan Project Area. The *Design for Development* articulates the vision for the future visual character of the Redevelopment Plan Project Area. It establishes specific requirements for buildings, streets, open spaces, and parking and loading to encourage high-quality design and materials, an inviting pedestrian orientation, and visual variety and interest while maintaining a cohesive visual identity for the Redevelopment Plan Project Area.

The *Design for Development* establishes a specific framework for the placement, layout, landscaping and visual character of public open spaces within the Redevelopment Plan Project Area (Public Open Space Chapters T2 and Y2) to promote public spaces that are visually

[1] Treasure Island Development Authority, Draft *Design for Development for Treasure and Yerba Buena Islands,* Public Review Draft, March 5, 2010.

appealing and inviting. Specific streetscape standards for each proposed street or street type (Streets Chapters T2 and Y2) specify street widths and configurations, the location, spacing, species of plantings, street furniture, and paving materials. Standards and guidelines governing the distribution of building heights, building massing, and building articulation (Building Envelope Chapters T4 and Y4) are provided to protect and enhance views, maintain appropriate pedestrian scale, and create a visually appealing skyline for Treasure Island, while minimizing visual impacts of new construction on Yerba Buena Island. Building design standards and guidelines (Chapters T5 and Y5) provide more specific direction for the design of façades, fenestration, commercial frontage, parking structures, signage, and building materials. Their objective is to promote buildings that contribute visual interest, texture, and variety to the public and pedestrian realm, while establishing a cohesive visual order and identity for the Proposed Project and its neighborhoods.

The *Design for Development*'s building design standards also provide design standards for alterations and additions to historic buildings and for nearby new construction (Chapters T5.10 and Y5.7). These standards require that alterations and additions conform to the Secretary of the Interior's Standards for Rehabilitation. The building design standards establish allowable building zones and height limits for additions to, and new construction in the vicinity of, historic resources. These standards are intended to preserve the historic visual character of historic resources on Treasure Island and Yerba Buena Island, while allowing for their reuse and the redevelopment of adjacent sites.

As a regulatory document, the *Design for Development* is intended to ensure the enhancement of visual quality within the Redevelopment Plan Project Area. It would inform the design and review of specific development projects within the Redevelopment Plan Project Area. If the proposed *Design for Development* is adopted by the decision-makers, it would reflect the City's long-term vision for the visual character and quality of the Redevelopment Plan Project Area. New construction within the Redevelopment Plan Project Area would be subject to design review by TIDA for conformity with the *Design for Development* as specific designs are proposed in the future.

Changes in visual character, even substantial and transformative changes such as those that would result from implementation of the *Redevelopment Plan*, do not in themselves constitute a significant adverse impact on visual character under CEQA unless they would substantially degrade the existing visual character or quality of the site and its surroundings. Implementation of the *Redevelopment Plan* would not cause a significant adverse change in the visual character and quality of the Redevelopment Plan Project Area. Implementation of approved design guidelines in the *Design for Development* would ensure that the Proposed Project would not cause a significant adverse impact on the visual quality of the Redevelopment Plan Project Area and its surroundings. Therefore, no mitigation measures are required.

Impact AE-4: Implementation of the Proposed Project would increase the nighttime lighting requirements within the Development Plan Area and would increase potential sources of glare. *(Less than Significant)*

Current levels of nighttime lighting within the Development Plan Area are relatively low, consistent with the relatively low intensity of existing land uses within the Development Plan Area. Current sources of nighttime light include exterior security lighting of buildings, yards, streets, parking lots, and light emitted from within occupied residential buildings. Given the distances to mainland locations around the Bay, the low-rise stature of buildings within the Development Plan Area, and a cover of vegetation, the Development Plan Area is not a prominent visual presence within nighttime views of the Bay from mainland locations around the Bay.

Implementation of the proposed Redevelopment Plan would increase the nighttime lighting requirements within the Development Plan Area. Lighting for the Proposed Project would include exterior lighting of streets, sidewalks, parking areas, public spaces, and building entrances. Light would also be emitted from the interiors of residential and non-residential buildings. The Proposed Project would also include a Sports Park located immediately north of the Eastside neighborhood. The Sports Park would include a range of sports facilities (e.g., for baseball, soccer, football, basketball, tennis, etc.). Nighttime use of the Sports Park would require elevated high-intensity outdoor lighting to illuminate the playing fields, creating the potential for spillover of intrusive amounts of light into nearby residential areas. The particular program and layout of the facility, the particular location and characteristics of Sports Park lighting, and of landscape screening around the facility have not been determined at this time.[2]

The potential for project impacts from nighttime lighting would be greatest for the existing residential uses that would remain (like the Job Corps site), and the new residential uses that would be constructed under the Proposed Project. However, project lighting would also be visible from distant mainland locations. Given the height and density of proposed new residential development on Treasure Island, a nighttime skyline of Treasure Island would become a prominent new visual presence within nighttime views of the Bay, as it would in daytime views of the Development Plan Area (see Impact AE-1 above). The intensity of project light when

---

[2] A typical soccer field would require four 40- to 70-foot-tall light poles. A typical softball field would require six 40- to 70-foot-tall light poles. A typical baseball field would require six 40- to 70-foot-tall light poles. A typical volleyball court would require four 40- to 70-foot-tall light poles. A typical batting cage would require four 40- to 70-foot-tall light poles. See TICD, *Memorandum re: Responses to Outstanding Information Request*, from Alex Galovich to YBI/TI RP EIR Team, December 1, 2009.

viewed from mainland locations around the Bay would be diffused by distance. In addition, the lighting standards and guidelines established by the *Design for Development* (discussed below) would ensure that project light would not adversely affect nighttime views from the mainland nor substantially affect persons or properties on the mainland.

The *Design for Development* includes lighting standards and guidelines which are intended to conserve energy and resources, minimize light trespass and obtrusive light, and preserve the nighttime environment by minimizing light pollution. The lighting standards require that all new outdoor lighting fixtures include cutoff control, which limits the intensity of horizontal light emitted by lighting fixtures.[3] The lighting standards also establish performance criteria which all new outdoor lighting must meet to minimize light trespass onto neighboring properties. These standards have been developed by the Illuminating Engineering Society of North America. The lighting standards identify four Lighting Zones: LZ1 - Dark (Park and Rural Settings); LZ2 - Low (Residential Areas); LZ3 – Medium (Commercial/Industrial, High Density Residential); and LZ4 – High (Major City Centers, Entertainment Districts). For each zone, the lighting standards establish the appropriate corresponding limits on the intensity of light (in foot-candles) as measured at the site boundary of the affected use. The *Design for Development* also includes lighting guidelines for the proposed Sports Park. Sports Park lighting guidelines call for lighting fixtures to adhere to the above standards.[4] Compliance with the standards required by the *Design for Development* as part of the Proposed Project would ensure that the potential impact of light trespass from new project lighting on existing residents, including those at the Job Corps campus, and on proposed new residential uses on Treasure Island and Yerba Buena Island would be less than significant.

Implementation of the Proposed Project could create excessive daytime glare if new buildings include highly reflective materials. The potential for excessive daytime glare would be greatest for receptors within the Development Plan Area and travelers on the Bay Bridge. The intensity of reflected daytime glare on mainland locations around the Bay would be diffused by distance. The *Design for Development* prohibits the use of reflective or mirrored glass in new construction.[5] New buildings within the Redevelopment Plan Project Area would thus include transparent or lightly tinted glass rather than reflective glass, to minimize reflection of sunlight. Conformity with the *Design for Development* would ensure that the potential for daytime glare from project buildings would be less than significant.

Light levels resulting from buildout of the Redevelopment Plan would be consistent with the urban character and associated ambient light levels of the City as a whole and would not exceed levels commonly accepted by residents in an urban setting. Implementation of the standards for

[3] Draft *Design for Development*, p. 197.
[4] Draft *Design for Development*, p. 89.
[5] Draft *Design for Development*, pp. 184, 186, and 268.

project lighting established in the *Design for Development,* and compliance with the *Design for Development*'s prohibition on reflective or mirrored glass in new construction would ensure that the effects related to light and glare would be less than significant.

CUMULATIVE IMPACTS

Impact AE-5: The Proposed Project would not contribute cumulatively to impacts related to aesthetics when considered with nearby projects. *(Less than Significant)*

Although the Proposed Project would have significant and unavoidable impacts on scenic vistas of the Bay, these impacts would not contribute to cumulative degradation of scenic vistas and visual quality when considered with anticipated projects on mainland locations around the perimeter of the Bay. There are no other development projects that are proposed nearby. The Redevelopment Plan Project Area is located at the center of San Francisco Bay, physically separated from the surrounding mainland around the perimeter of the Bay by wide expanses of open water (distance from the San Francisco Peninsula, about 1.6 miles; from the East Bay shoreline, about 3.5 miles; from Marin, about 6 miles). To the extent that anticipated future development around San Francisco Bay would be visible when viewing the Proposed Project, it would be seen in expansive long-range views. Future development within these mainland areas would not be prominent (if discernible at all) when viewed in the context of the Proposed Project from distant vantage points around the perimeter of the Bay.

The Proposed Project would not contribute to cumulative degradation of scenic vistas and visual quality when considered with the new Bay Bridge east span. The new bridge's simple single-level viaduct design and its single cable stay tower, together with the removal of the old Bay Bridge east span, would generally have a beneficial impact on scenic vistas and visual quality, improving scenic vistas and visual quality of the Bay when viewed from the new span itself.

The Proposed Project would not contribute to a cumulative degradation of scenic vistas or visual quality when considered with the Yerba Buena Island Ramps Improvement Project. Adverse impacts on the historic visual setting of historical resources on Yerba Buena Island are the result of the Ramps Project.[6] The Proposed Project would not contribute to this impact. Historic architectural resources on Yerba Buena Island would be retained, rehabilitated, and reused consistent with Secretary of the Interior Standards, to ensure that their visual and architectural character is preserved.

The Proposed Project would not contribute to a cumulative degradation of scenic vistas or visual quality when considered with the Clipper Cove Marina project. That project would construct improvements at Clipper Cove to increase the capacity of the marina from about 100 slips to 400

[6] San Francisco County Transportation Authority, *Finding of Effect, Yerba Buena Island Ramps Improvement Project, San Francisco, CA*, September 2009.

slips. The enlarged marina would occupy a larger portion of the foreground in Clipper Cove when viewed from the causeway. Implementation of the *Design for Development* as part of the Proposed Project would reduce the Proposed Project's potential contribution to cumulative impacts on visual quality to a less-than-significant level.

For these reasons, the proposed project would not have significant cumulative impacts related to Aesthetics.

C. POPULATION AND HOUSING

This section examines the effects of the Proposed Project related to population, housing, and employment. The Setting discussion describes existing regional and Citywide population, housing, and employment-related conditions and trends. The Impacts analysis describes anticipated changes to the population, employment, and housing characteristics of the Development Plan Area and greater San Francisco region. This analysis evaluates the potential for the Proposed Project to induce substantial unplanned population growth and to displace existing housing or residents for both project-level and cumulative population and housing as a result of implementation of the Proposed Project. Construction of the Proposed Project would be phased over an approximately 15- to 20-year period, with the completion of development expected to occur by 2030. Therefore, the time frame used in this analysis is the 20-year period from 2010 to 2030.

The information in this section is based on 2000 U.S. Census data, *American Community Survey 2006-2008* data, Association of Bay Area Governments ("ABAG") *Projections 2007* data,[1] ABAG's *San Francisco Bay Area Housing Needs Plan 2007-2014,* and the City's 2009 *Draft Housing Element Part 1: Data and Needs Analysis*. Estimates of existing housing units and characteristics are based on 2000 U.S. Census data and *Projections 2007* data.

SETTING

REGIONAL AND CITYWIDE POPULATION AND HOUSING TRENDS

Population

In 2000, the population of the City and County of San Francisco was recorded by the U.S. Census as 776,733, ranking San Francisco as the second most populous city, behind San Jose, in the nine-county Bay Area, and the fourth most populous county, behind Santa Clara, Alameda, and Contra Costa.[2] San Francisco is the most urbanized county, with the highest population and residential densities of the nine Bay Area counties. At that time, San Francisco comprised approximately 11.4 percent of the Bay Area's total population (6,783,760 persons).[3]

As shown in Table IV.C.1, the population of the Bay Area grew by approximately 4.6 percent (a total population of 7,096,100 persons), an increase of approximately 312,340 persons, over the

---

[1] ABAG is the regional agency responsible for preparing forecasts of population, housing, and job growth in the nine Bay Area counties and their cities. Though ABAG's 2009 edition (*Projections 2009*) of its biennial forecast of population, housing, jobs, and income for the nine-county San Francisco Bay region is available, this EIR analysis uses ABAG's 2007 edition (*Projections 2007*).

[2] U.S. Census 2000 Data ABAG website, http://www.bayareacensus.ca.gov/counties/SanFranciscoCounty.pdf, accessed April 6, 2010.

[3] U.S. Census 2000 Data; ABAG website: http://www.bayareacensus.ca.gov/bayarea.htm, accessed April 6, 2010.

five-year period between 2000 and 2005.[4] Between 2000 and 2005, the regional population of the Bay Area grew by about 1 percent per year, and it is expected to grow at about this same rate through 2030. During that same period of 2000-2005, the population of San Francisco grew by approximately 2.4 percent (a total population of 795,800 persons) an increase of approximately 19,070 people.

Table IV.C.1: San Francisco and Bay Area Population Growth Trends

Population	2000	2005	Percentage Increase (2000–2005)	2010	Percentage Increase (2005–2010)	2030	Percentage Increase (2010–2030)
City and County of San Francisco	776,733	795,800	+2.4 %	808,700	+1.6 %	922,600	+14.1%
San Francisco Bay Area	6,783,762	7,096,100	+4.6 %	7,412,500	+4.5 %	8,712,800	+17.5 %

Source: U.S. Census 2000 Data; ABAG, *Projections 2007*

By 2010, the population of the Bay Area is expected to grow by approximately 4.5 percent (a total population of 7,412,500 persons), an increase of about 316,400 persons between 2005 and 2010. During that same 2005–2010 period, the population of San Francisco is expected to grow by approximately 1.6 percent (total population of 808,700 persons), an increase of about 12,900 persons. For the 20-year period between 2010 and 2030, around the time period of the Proposed Project’s buildout, ABAG projects an overall Bay Area population growth increase of 17.5 percent (a total population of 8,712,800 persons), an increase of approximately 1,300,300 persons. Over 70 percent of that growth would be accommodated in Alameda, Contra Costa, and Santa Clara Counties. ABAG projects that the population of San Francisco will increase by about 14.1 percent (approximately 113,900 additional people) during that same time period, for a projected total population of 922,600. In 2030, the population of San Francisco is expected to be approximately 10.6 percent of the Bay Area’s total population.

As shown in Table IV.C.1, San Francisco’s total population has grown at a slightly slower rate than the region as a whole since 2000, a trend that is expected to continue through 2030. This slower rate of population growth in the City is due, in part, to housing prices in San Francisco, increased housing opportunities in the Sacramento and Central Valley areas, and a cyclical decline in the City’s role as a regional employment center.

Housing

The U.S. Census 2000 data show that the average household size for the San Francisco Bay Area is 2.69 persons per unit.[5] ABAG *Projections 2007* reports that the average household size for the nine-county Bay Area continued to be 2.69 persons per unit in 2005, and it is expected to remain

[4] ABAG, *Projections 2007*, December 2006, pp. 35-36.
[5] U.S. Census 2000 Data ABAG website, http://www.bayareacensus.ca.gov/bayarea.htm, accessed April 6, 2010.

at that level through 2030.[6] The U.S. Census for 2000 reported an average household size in the City and County of San Francisco of 2.3 persons per unit.[7] San Francisco has a comparatively small number of family households in comparison to the Bay Area as a whole, and this proportion is continuing to shrink. ABAG *Projections 2007* estimated a slight dip in the number of persons per household in 2005 (2.29 persons per household), and estimated further decreases in the estimated number of persons per household in the City by 2010 (2.26 persons per household). By 2030, however, the household size is anticipated to slightly increase to 2.33 persons per household.[8] ABAG projected that the total number of households in San Francisco (which roughly equates to the number of housing units) would be 338,920 in 2005, and it projects 348,330 total households for 2010.[9] Household growth, an approximation of the demand for housing, is expected to grow approximately 11 percent, from 348,330 in 2010 to 386,680 by 2030. This would be an increase of 38,350 households.[10]

Residential densities within San Francisco vary by neighborhood, from an average of 25 dwelling units per acre in the Richmond and Sunset districts to 40 dwelling units per acre in the Mission district, and 86 dwelling units per acre in the Chinatown and North Beach districts. Existing residential density within the Development Plan Area currently averages about 13.5 dwelling units per acre.[11]

Employment

According to *Projections 2007*, the total number of jobs anticipated in the City in 2005 was 553,090 and is estimated to reach approximately 593,370 in 2010. By 2030, the City is projected to have a total of approximately 782,560 jobs, an increase of 189,190 jobs.[12] In 2005, ABAG estimated 3,449,460 total jobs in the Bay Area, and estimates a 7.1 percent increase in the number of jobs by 2010 (3,693,920). From 2010 through 2030, the total number of jobs in the nine-county Bay Area is expected to increase by almost 1,227,760 jobs. In this context, the City's share of regional employment is expected to remain about the same, with a slight decline from

---

[6] ABAG, *Projections 2007*, p. 35.
[7] U.S. Census 2000 Data, ABAG website http://www.bayareacensus.ca.gov/counties/SanFranciscoCounty.htm, accessed April 6, 2010.
[8] ABAG, *Projections 2007*, p. 139.
[9] Households are based on the number of units divided by the number of persons per household. This total does not account for units that are vacant and, therefore, may slightly overstate the total number of households.
[10] ABAG, *Projections 2007*, p. 139.
[11] Existing residential density is based on 908 total dwelling units (du), including occupiable and non-occupiable units, in the existing residential area on Treasure Island (67.5 acres divided by 908 units on Treasure Island = 13.5 du/acre rounded). Due to the steep topography, and configuration of Yerba Buena Island, estimates of residential land area on Yerba Buena Island are not available.
[12] ABAG, *Projections 2007*, p. 139.

16 to 15.9 percent.[13] Maintaining this job share ensures San Francisco's continuing role as an employment hub, making full use of existing transportation and urban services infrastructure.

ABAG projected the City to have about 388,100 employed residents in 2005, and estimates roughly a 1.9 percent increase in the number of employed residents by 2010 (395,500). In 2010, about 76 percent (300,580) of these employed residents are anticipated to be employed in the City itself, while about 24 percent (94,920) of the employed residents would commute to jobs outside of the City.[14] The total number of the City's employed residents is projected to increase to approximately 481,800 by 2030. Assuming the same percentage (24 percent) of the City's employed residents would continue to commute to jobs elsewhere (or 115,630), about 76 percent (or 366,170) of these employed residents would live and work in the City in 2030.

Jobs and Housing Balance in San Francisco

The *San Francisco General Plan* Housing Element summarizes population, housing, and employment challenges facing the City in the future. Notable jobs-housing challenges include a lag in the number of new housing units compared to population and employment growth during the past ten years; the mismatch between income from available jobs and the cost of housing in the City, resulting in a large number of commuters, increased commute time, and adverse effects on traffic and air quality; and a lag in the construction of affordable housing compared to demand.

2010 Estimated Jobs-to-Household Ratio

According to ABAG *Projections 2007* there were an estimated total of 553,090 jobs and 338,920 households in the City in 2005. By 2010 these totals are anticipated to increase to about 593,370 total jobs and 348,330 total households or occupied housing units. Based on these numbers, the City is expected to have 1.7 jobs-to-household in 2010. There are expected to be approximately 395,500 employed residents in the City in 2010, averaging about 1.14 wage-earners per household.

2010–2030 Estimated Jobs-to-Household Ratio

As noted previously, between 2010 and 2030, the City's population is projected to grow from 808,700 to about 922,600 persons, and the City's households are projected to grow from 348,330

[13] ABAG, *Projections 2007*, p. 35.

[14] According to the U.S. Census Bureau's *American Community Survey 2006-2008*, about 75.8 percent of the City's employed residents work in the City itself. http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=05000US06075&-qr_name=ACS_2008_3YR_G00_DP3YR3&-context=adp&-ds_name=&-tree_id=3308&-_lang=en&-redoLog=false&-format=, accessed April 6, 2010. A copy of the *ACS 2006-2008* tables is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

to about 386,680. During this same time period, the number of jobs in the City is projected to increase from 593,370 to about 782,560.[15] As a result, the jobs-to-household ratio in the City is projected to be 2.02 by 2030, an increase from the 2010 jobs-to-household ratio of 1.7. Because the City is projected to experience a 31.9 percent increase in jobs and only a 14.1 percent increase in population, the City's jobs-to-household ratio is projected to become less balanced over the long term. However, a higher number of wage earners per household is anticipated in the City by 2030, with 481,800 employed residents, representing about 1.24 wage earners per household, which is higher than the 1.14 wage earners per household anticipated for 2010.

2010–2030 Estimated Jobs-to-Employed-Persons Ratio

To account for retired persons and other residents who are not employed, another useful relationship to consider is the ratio of jobs to the total number of employed persons. According to the 2000 U.S. Census, out of a total Citywide population of approximately 776,730, about 437,530 persons were employed either in the City or elsewhere, with the remainder unemployed or out of the labor force entirely. In 2000, the jobs (642,500) to employed residents (437,530) ratio was 1.47. In 2010, the ratio of jobs (593,370) to employed residents (395,500) is anticipated to be 1.5. And by 2030, the ratio of jobs (782,560) to employed residents (481,800) is expected to be about 1.62. Thus, the number of jobs provided in the City is projected to continue to outpace the number of employed City residents over the next 20 years.

Housing Needs

In order to respond to statewide population and household growth, and to ensure the availability of decent affordable housing for all income groups, in 1981 the state enacted Government Code Section 65584, which requires each Council of Governments ("COG") to periodically distribute state-identified housing needs to all jurisdictions within its region. ABAG serves as the COG for the Bay Area. Government Code Section 65584 requires that a city's share of regional housing needs include housing needs of persons at all income levels. The different income levels to be studied within the parameters of state-mandated local Housing Elements, which must be prepared by every city and county in California, are "Very Low Income," "Low Income," "Moderate Income," and "Above Moderate Income." Based on a Federal Housing and Urban Development formula, San Francisco's Area Median Income in 2008 was estimated to be approximately $75,450 for a two-person household and approximately $84,850 for a three-person household. Table IV.C.2, presents the City's distribution of income levels based on this formula.

[15] ABAG, *Projections 2007*, p. 139.

Table IV.C.2: Income Distribution of San Francisco Households

Income Group	Income Level	Income Range[b]	Percentage of SF Households
Very low	≤ 50% of AMI[a]	\$22,650 – \$42,450	27.1%
Low	50% – 80% of AMI	\$37,750 – \$67,900	14.4%
Moderate	80% – 120% of AMI	\$60,350 – \$84,850	15.7%
Above moderate	>120% of AMI	>\$90,550	42.8%

Notes:

[a] "AMI" – Area Median Income equals approximately \$75,450 for two-person and \$84,850 for three-person households.

[b] San Francisco Planning Department, *San Francisco General Plan, 2009 DRAFT Housing Element, Part I: Data and Needs Analysis,* April 2009, Table I-40: Household Income Standards by Household Size, 2008, and Table I-41: Income Distribution, San Francisco, 2007, p. 42. The "Income Range" shown above is the average income range for two- to three-person households in the City.

Source: U.S. Department of Housing and Urban Development, San Francisco Planning Department, and Turnstone Consulting

The ABAG Policy Board established housing needs for all jurisdictions within its boundaries for the 2007-2014 planning period by using a "fair share" approach, based on household and job growth of the region as well as regional income level percentages. Each jurisdiction is required by State law to incorporate its housing need numbers into an updated version of its general plan housing element. According to ABAG's *San Francisco Bay Area Housing Needs Plan 2007–2014,* the Bay Area's overall housing need would be for a total of about 214,500 new residential dwelling units,[16] of which San Francisco's share is a total of 31,193, or an average yearly need of 4,456 units. In terms of affordability, the distribution of those housing units is as follows:[17]

Very Low Income (≤50% of median income)	6,589 units
Low Income (50–80% of median income)	5,535 units
Moderate Income (80–120% of median income)	6,754 units
Above Moderate Income (>120% of median income)	12,315 units
Total Housing Need for San Francisco (2007–2014)	***31,193 units***

From 1989 to 1998, 10,696 net new housing units[18] were added Citywide, ranging from a low of about 288 units (1993) to a high of about 2,345 units (1989). The Citywide annual average during that period was about 1,069 net new units. From 1999 to 2008, 20,851 net new housing units were added Citywide, ranging from a low of about 1,619 units (2001) to a high of about 3,019 units (2008). The Citywide annual average during that period was about 2,085 net new units, slightly less than a doubling in production over the previous ten-year period.[19] At the end of the second quarter of 2009 (June 30, 2009) approximately 2,850 building permits had been

[16] ABAG, *San Francisco Bay Area Housing Needs Plan 2007–2014*, p. 46.
[17] *Ibid*.
[18] Net new units are equal to new units constructed minus units demolished plus units gained or (lost) from alterations.
[19] San Francisco Planning Department, *San Francisco Housing Inventory 2008*, April 2009, p. 6.

approved, issued, or reinstated.[20] In order to meet current regional housing need projections, the City would need to increase its share of housing unit production to an average 4,456 units per year. Thus, the City is currently not on track to meet its share of the regional housing needs allocation forecasted for the 2007-2014 planning period.

DEVELOPMENT PLAN AREA

Population

In 2000, there were approximately 1,450 residents within the Development Plan Area.[21] Based on ABAG's 2010 projection of 2.26 persons per household, the current population on Treasure Island and Yerba Buena Island is estimated to be about 1,820 persons (805 occupiable units multiplied by 2.26).

Housing

The Redevelopment Plan Project Area ("Project Area") includes about 805 occupiable dwelling units. There are about 725 occupiable dwelling units on Treasure Island and about 80 on Yerba Buena Island. This represents roughly 0.23 percent of the total number of households within San Francisco.

Of the 725 dwelling units on Treasure Island, about 250 are operated by the Treasure Island Homeless Development Initiative ("TIHDI"), which provides housing for formerly homeless (extremely low income) individuals and families.

Employment

In addition to the 805 occupiable dwelling units within the Development Plan Area, there are also about 100 buildings with existing and former non-residential uses on Treasure Island. These uses include space for retail, office, schools, public services (police and fire), recreational uses (sailing center), and maintenance. Existing uses within the Development Plan Area employ about 320 persons (see Table IV.C.4, p. IV.C.12). Employment associated with the existing Job Corps Campus, and temporary construction employees associated with construction of the east span of the Bay Bridge are not included in the total number of existing employees within the Development Plan Area.

Refer to Section IV.A, Land Use and Land Use Planning, for additional summaries of existing land use conditions within the Redevelopment Plan Project Area.

---

[20] San Francisco Planning Department, *San Francisco Pipeline Report 2009 Quarter 2*, July 2009, p. 3.
[21] Based on Census 2000 data for Census Tract 179.02 (the tract in which the Development Plan Area is located).

REGULATORY FRAMEWORK

State

Community Redevelopment Law

Treasure Island Development Authority ("TIDA") is the redevelopment agency responsible for implementing the proposed Treasure Island / Yerba Buena Redevelopment Plan. California Health and Safety Code Section 33334.6 states that the provision of housing is a fundamental purpose of redevelopment. Under the California Redevelopment Law[22] ("CRL") Section F, California Health and Safety Code, Section 33680-33692, redevelopment agencies must annually deposit at least 20 percent of the gross tax increment received into a low- and moderate-income housing fund. In addition to the requirement to create funding for affordable housing, the CRL requires a redevelopment agency to produce affordable housing totaling at least 15 percent of all new units within the redevelopment plan project area. Not less than 6 percent of all new units must be affordable to very low-income households, with the remaining 9 percent affordable to very low-, low-, and moderate-income households. The housing production requirement must be met every ten years during the life of the redevelopment plan. Redevelopment agencies may meet the housing production obligation by producing units outside the project area on a two for one basis. Redevelopment agencies may also meet their housing production requirements by acquiring long-term affordability covenants on existing housing.

Regional

Bay Area Regional Housing Needs Plan

The California Department of Housing and Community Development ("HCD") is responsible for determining the overall regional housing need and for initiating the process by which each COG then distributes its share of regional need to all jurisdictions within its region. Government Code Section 65584 requires development of a new Regional Housing Needs Assessment ("RHNA") every five years. In June 2008, ABAG released its *San Francisco Bay Area Housing Needs Plan*, which identifies the San Francisco Bay Area's housing needs determination for the 2007–2014 planning period.

Local

San Francisco Housing Element

The *2004 Housing Element* update was adopted by the San Francisco Planning Commission on May 13, 2004 and was found in compliance with state housing element requirements by HCD in October of 2004. Subsequent to adoption of the *2004 Housing Element*, the California Courts of Appeal found that the Negative Declaration prepared in support of the *2004 Housing Element* was

[22] California Health and Safety code, Sections 33680-33692.

inadequate and required the preparation of an environmental impact report. Under the terms of the Writ of Mandate issued by the San Francisco Superior Court, the City may rely on the *2004 Housing Element*, minus policies, objectives, and implementation measures that were stricken as a result of the lawsuit. Such policies cannot be adopted until completion of an EIR. As required by State law, San Francisco is due to complete its next five-year Housing Element Update, and the Planning Department has prepared a 2009 *Draft Housing Element* for environmental review. In an effort to comply with the court order requiring an EIR for the *2004 Housing Element* and to review the updated 2009 *Draft Housing Element* pursuant to CEQA, the City is preparing an EIR to identify the environmental impacts resulting from the proposed objectives, policies, and implementation measures identified as part of the *2004 Housing Element Update* and the 2009 *Draft Housing Element* at an equal level of detail.

At the time the *2004 Housing Element* was prepared, the proposed Redevelopment Plan Project Area remained in U.S. Navy ownership, although there were ongoing discussions between the City and the Navy at the time to transfer ownership in the future. Consequently, Treasure Island and Yerba Buena Island were not explicitly included in the housing policies or background housing supply and needs assessments of the *2004 Housing Element* update. However, Policy 12.2 of the *2004 Housing Element* supports well-planned housing regionwide to address regional housing needs and to support improved overall quality of life in the Bay Area. Treasure Island is identified as a large surplus public land/redevelopment area where the City plans to continue to support efforts to develop high-density housing and new jobs and services.

The 2009 *Draft Housing Element* identifies Treasure Island as one of three areas of public land within San Francisco that are identified as opportunity sites expected to accommodate additional housing units.[23]

IMPACTS

SIGNIFICANCE CRITERIA

The City and County of San Francisco has not formally adopted significance thresholds for impacts related to population and housing. The Planning Department's Initial Study Checklist form provides a framework of topics to be considered in evaluating potential impacts under CEQA. Implementation of a project could have a potentially significant impact related to population and housing if it were to:

- Induce substantial growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (for instance, through extension of roads or other infrastructure).

[23] San Francisco Planning Department, *Draft Housing Element 2009,* April 2009, p. 63.

- Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing.
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

APPROACH TO ANALYSIS

CEQA Guidelines Section 15064(e) notes that an economic or social change by itself would not be considered a significant effect on the environment. Population growth is considered in the context of local and regional plans and population, housing, and employment projections. Generally, a project that induces population growth is not viewed as having a significant impact on the environment unless this growth is unplanned or results in significant physical impacts on the environment. Thus, the growth and changes in employment and population that would occur with implementation of the Proposed Project would not be adverse physical impacts in and of themselves. However, the physical changes needed to accommodate project-related growth may have physical impacts on the environment. Project-related growth and the increase in population on the Islands would primarily result in physical changes in transportation, noise, air emissions, increased demand for public services, increased demand for utility capacity, and increased demand for recreational facilities. These physical impacts are evaluated under other environmental topics in this chapter such as Section IV.E, Transportation; Section IV.F, Noise; Section IV.G, Air Quality; Section IV.H, Greenhouse Gas Emissions; Section IV.J, Recreation; Section IV.K, Utilities; Section IV.L, Public Services; and Section IV.Q, Minerals and Energy Resources.

The Proposed Project would replace the existing occupiable 805 units on Treasure Island (about 725 units) and Yerba Buena Island (about 80 units) with up to approximately 8,000 new residential units; about 140,000 square feet ("sq. ft.") of new commercial and retail space; approximately 100,000 sq. ft. of new office space; adaptive reuse of historic Buildings 1, 2, and 3 with up to approximately 311,000 sq. ft. of commercial space, which includes about 67,000 sq. ft. of adaptively reused retail space; approximately 500 hotel rooms; 300 acres of parks and open space; bicycle, transit, and pedestrian facilities; a Ferry Terminal and intermodal Transit Hub; and new and/or upgraded public services and utilities, including a new or upgraded wastewater treatment plant, public school, and a new combined police and fire station. Initial buildout under the Proposed Project would be implemented in four phases, anticipated to occur over a 15- to 20-year period from approximately 2011 through 2030. For purposes of population impact analysis in this EIR, project buildout is assumed to be the year 2030.

The Development Program would increase the average overall residential density within the Development Plan Area from about 13.5 housing units per acre to about 100–110 housing units per acre.

The analysis compares the population, housing, and employment characteristics that would result from implementation of the Proposed Project to existing conditions, defined as 2010 in ABAG's *2007 Projections*. The 2010 ABAG data are used because they are the most current data consistently available for the Development Plan Area across all population, employment, and housing indices. Table IV.C.3 shows the number of housing units and the population within the Development Plan Area for 2010 and 2030. Table IV.C.4 shows existing and projected (2030) employment within the Development Plan Area.

Table IV.C.3: Existing (2010) and Future (2030) Number of Housing Units and Total Population within the Development Plan Area

Housing Units	Year 2010	Year 2030	*Net New Totals*
Existing Units within Development Plan Area	805 units[a]	-	-
Replaced Units[b]		805 units	-
Total Housing Units	**805 units**	**8,000 units**	***7,195 net new units***
Total Population	**1,820 persons**	**18,640 persons**	***16,820 net new persons***

Notes:
Total population is calculated using ABAG's projected 2.26 persons per household for 2010 and 2.33 persons per household for 2030 from *Projections 2007*, and it is assumed that all units are fully occupied. This calculation does not include population or housing on the Job Corps or Coast Guard sites that would remain within the Redevelopment Plan Project Area.
[a] Total number of occupiable units.
[b] Existing units that would be replaced as new units with the Proposed Project.

Source: ABAG *Projections 2007*, Turnstone Consulting

The analysis considers whether the Proposed Project would contribute to substantial[24] residential population growth. Direct population growth in the Development Plan Area would include the residents and employees who would occupy the newly developed housing units and businesses, as well as temporary construction employment. Indirect growth is often defined as development that occurs as infrastructure is expanded to previously un-served or under-served areas. These types of development patterns typically occur in suburban areas adjacent to or near undeveloped lands. The analysis also considers whether substantial numbers of residents or housing units would be displaced.

[24] Substantial growth is defined as increases in population that are unplanned, without consideration of or planning for infrastructure, services, and housing needed to support proposed residents, employees, and visitors.

Table IV.C.4: Employment Projections for the Development Plan Area[a]

Land Use	Existing Employment	Proposed Treasure Island / Yerba Buena Island Development Project	Proposed Employment (2030)	Net New Employment (2030)
Residential[b]	50	8,000 units	530	480
Retail (new)		140,000 sq ft.	465[c]	465
Buildings 1, 2, and 3 (includes retail entertainment, community services, food production uses)	110[d]	311,000 sq ft.[e]	680[e]	570
Office (new)		100,000 sq ft.	360[f]	360
Hotel		500 rooms	400[g]	400
Wellness Center			10	10
Schools	95[h]	105,000 sq ft.	75[i]	-20
Community Center		48,500 sq ft.	10[j]	10
Cultural/Museum		75,000 sq ft.	120[k]	120
Police-Fire Station		30,000 sq ft.	110[l]	50
Sailing Center/Ferry Terminal/Marina	5	15,000 sq ft.	5[m]	0
Athletic Fields/Open Space		300 acres	100[n]	100
On-site Miscellaneous[p]			55	55
Employment Total	***320***	—	***2,920***	***2,600***

Notes:

[a] Due to the range of proposed uses, and the adaptive reuse of existing buildings that were formerly used as naval facilities, estimation of existing and projected employment was developed using a number of sources. Unless otherwise noted, existing and proposed employment data is provided by Economic Planning Systems: Table 1b, Employment Projections (2007–2020) Treasure Island Redevelopment, EPS #12100, Economic & Planning Systems, Inc. March 31, 2008, and April 13, 2010; TIDA written communication on April 12–13, 2010; the San Francisco Transportation Impact Analysis Guidelines (2002); and employment projections from recent San Francisco EIRs (such as the Exploratorium Relocation EIR, and Candlestick Point – Hunters Point Shipyard EIR).

[b] Residential employment factors: Existing (48) and Proposed 8,000 units x 15 units/employee (533). (Figures are rounded.)

[c] Assumes 300 sq. ft./employee.

[d] There are currently about 10 existing employees in the TIDA office. Assumes an average of 26 employees (Hangar 2) and an average of 76 employees (Hangar 3) for Island Creative commercial.

[e] Square footage totals in Buildings 1, 2, and 3 include 150,000 sq ft. in entertainment space; 67,000 sq ft. in retail space; 30,000 sq ft. in community services space; 22,000 sq ft. in food production; and 42,000 sq ft. in excess building circulation space. Projected employment for the historic buildings after reuse is: Building 1, 363 gross square feet ("gsf") per employee; Building 2, 500 gsf/employee; and Building 3, 500 gsf/employee.

[f] Assumes 276 gsf/employee pursuant to the Transportation Impact Analysis Guidelines, October 2002.

[g] Assumes 0.8 employees/room.

[h] Based on the employment factor of 675 sq. ft./employee. Assumes about 65,000 sq. ft. of existing school buildings on Treasure Island.

[i] Assumes 75 proposed employees for school and daycare- type uses.

[j] Assumes 11 proposed employees for community center-type uses.

[k] Based on the employment factor of 606 sq. ft./employee. (Exploratorium Relocation Project Initial Study, November 2007.)

[l] Assumes 110 proposed police and fire employees.

[m] Assumes 3 proposed sailing center and 4 total Ferry Terminal and Marina (landside) employees.

[n] Assumes 0.3 employees per acre of open space, 4 employees for cultural park, and 6 employees for urban farm.

[p] Assumes proposed employees for paid parking spaces (5), recycling center (4), energy generation (12), wastewater treatment (6), and on-island shuttles (28).

Source: Economic Planning Systems 2008 and April 13, 2010,Turnstone Consulting 2010

PROJECT IMPACTS

Construction Impacts

Impact PH-1: The Proposed Project would induce substantial direct temporary population growth during project construction. (*Less than Significant*)

The Proposed Project would be phased over a 15- to 20-year construction period. Direct, but temporary, construction job growth within the Development Plan Area would occur as a result of the Proposed Project. Daily average construction employment is estimated for the various construction phases of the Proposed Project. During Phase 1, an average of 930 and a maximum of 1,250 construction employees are anticipated. During Phase 2, an average of 1,200 and a maximum of 1,350 construction employees are anticipated. During Phase 3, an average of 1,200 and a maximum of 1,500 construction employees are anticipated. During Phase 4, an average of 1,150 and a maximum of 1,300 construction employees are anticipated. Lastly, during Phase 5, an average of 800 and a maximum of 950 construction employees are anticipated.

The Bay Area has an adequate pool of skilled construction workers from which the Proposed Project would be able to draw. It is anticipated that construction employees would commute from elsewhere in the Bay Area rather than relocate to the Project Area for a temporary construction assignment. Construction programs associated with the Proposed Project would aim to maximize hiring among locally disadvantaged City residents, as stated in the Project Objectives (see Chapter II, Project Description, pp. II.4–II.6). Thus, development of the Proposed Project would not generate a substantial, unplanned population increase. Impacts associated with construction employment would be less than significant, and therefore no mitigation is required.

Operations Impacts

Impact PH-2: The Proposed Project would not displace substantial numbers of people and/or existing housing units or create demand for additional housing, necessitating the construction of replacement housing. (*Less than Significant*)

There are approximately 805 households currently residing within the Development Plan Area. To ensure that the households occupying these units have the opportunity to continue living within the Project Area if they choose, the Proposed Project would include a transitional housing program detailed in the Disposition and Development Agreement ("DDA"). The DDA would require that all existing residents of the Islands who reside on the Islands as of the date of the DDA approval and who continuously remain residents in good standing during project construction and development be given an opportunity to move into new housing built during phased construction of the Proposed Project. The express intent of the transitional housing program is to avoid displacement of existing residents. The new housing would be leased to the existing residents eligible for transitional housing at a price no greater than their rent at the time of DDA approval, plus annual adjustments for inflation. Depending upon the income of the household, the housing may be leased at rents lower than the household's rent at the time of DDA approval, plus annual adjustments for inflation. Transitioning households would also receive moving assistance to cover the costs associated with their move to the new units. Finally, the transitional housing program would include down payment assistance for eligible transitioning households who wish to purchase a home on the island, as long as they can qualify to do so.

Thus, the transitional housing program included in the Proposed Project would ensure that the Project would not result in the displacement of existing residents, which would necessitate the construction of new housing elsewhere or generate demand for new housing, beyond the number of units already provided as part of the Proposed Project. Although the existing 805 units would be demolished, the Proposed Project would construct 7,195 net new units (for a total of 8,000 units) resulting in a net increase in the total number of residential units. Therefore, even if a substantial portion of the existing residents were to choose to move from the Islands to other locations, the Proposed Project would result in a net increase in housing supply and thus would not create demand for additional housing that would require construction of housing elsewhere. Overall, the Proposed Project would result in a net new increase in housing supply that would help meet the region's unmet demand for housing.

For these reasons, displacement impacts as a result of construction of the Proposed Project would have less-than-significant impacts on Treasure Island and Yerba Buena Island, and mitigation is not necessary.

Impact PH-3: The Proposed Project would not induce substantial growth in an area either directly or indirectly. (*Less than Significant*)

The Proposed Project would concentrate population growth on Treasure Island and Yerba Buena Island.[25] As shown in Table IV.C.2, on p. IV.C.6, full occupancy of the 7,195 net additional residential units within the Development Plan Area would increase the existing on-site residential population from about 1,820 people to about 18,640 people in 2030.[26] The net increase of about 16,820 residents would increase population to approximately ten times that of the existing population in the Project Area. ABAG's *Projections 2007* estimates that the City will gain about 113,900 persons between 2010 and 2030. Though population increase on the Islands would be

[25] The Job Corps campus is located within the Redevelopment Plan Project Area, but is not included as part of the Proposed Project. Therefore, this facility is not included in any population, housing, or employment factors.
[26] ABAG *Projections 2007* uses 2.26 persons per household for 2010 and 2.33 persons per household for 2030 forecasts. Existing population was calculated by multiplying the number of existing housing units on the Islands by this number (805 x 2.26 = 1,819 (rounded to 1,820). Projected population for 2030 was calculated by multiplying the total number of proposed housing units in the Development Plan Area by projected persons per household.

considerable from a localized perspective, the total projected population would represent about 14.8 percent of the Citywide population growth expected by 2030.

The Proposed Project would increase residential units per acre from approximately 13.5 dwelling units per acre to about 100 to 110 dwelling units per acre and would establish design guidelines to enhance the residential neighborhood character of the area while accommodating the increase in population growth on site. If the Proposed Project is implemented, at buildout the Development Plan Area would have a total population of about 18,640 residents. The increase in residential population would conform with ABAG's designation of Treasure Island as one of ten urban areas with the potential to accommodate substantial population growth in the City and Bay Area region.[27]

The Proposed Project would increase the City's housing stock and would therefore contribute to the City's ability to meet its need for housing options of varying sizes, types, and levels of affordability. The Proposed Project would be subject to the affordable housing production of the California Community Redevelopment Law requirement for all new units developed in the Redevelopment Plan Project Area. TIDA has agreed to provide up to 2,400 units that would be affordably priced at a range of below-market rates. At least 20 percent of the affordable units would be affordable to very low-income residents. The project would exceed the California Community Redevelopment Law requirement that 15 percent of all new housing units be affordable to low- and moderate-income households. The Proposed Project is expected to include approximately 5 percent of the units (up to about 280) in market-rate buildings, which would be sold or leased as inclusionary housing. The Proposed Project would also include land and funding to replace 250 units in the existing TIHDI housing, as well as land for an additional 185 residential units, expanding the program to a total of 435 units subject to conveyance of the Property to TIDA and implementation of the Proposed Project. These TIHDI housing units would generally be for formerly homeless (extremely low-income) families. Up to around 1,685 units (a mix of rental and for-sale units) would be in stand-alone, completely affordable buildings. A minimum of 20 percent of the proposed residences would be sized for families.[28]

Below-market-rate units included in the Proposed Project would be affordable to very low-, low-, or moderate-income levels. The proposed number of market-rate (5,600) and below-market-rate (2,400) units would be expected to support the City's efforts to meet its regional housing needs allocation (31,190 units) and the total Bay Area housing need of 214,500 units projected by

---

[27] San Francisco County Priority Development Area Projects include the Bayview/Hunters Point Shipyard/Candlestick Point project; Balboa Park and Market Octavia Neighborhoods; Downtown Neighborhoods and Transit Infill Areas; Eastern Neighborhoods; Mission Bay; Port of San Francisco; Transbay Terminal; Treasure Island; San Francisco/San Mateo Bi-County Area; and the 19th Avenue Corridor (County Line to Eucalyptus Drive).

[28] For analysis purpose, it is assumed that the proposed 8,000 residences would include about 2,005 studio and one-bedroom units, and about 5,995 units with two or more bedrooms.

ABAG through 2014.[29] The proposed units would increase the City's supply of affordable housing units available for "very low" income levels.

Overall, the Proposed Project would be expected to increase the average residential density in the Development Plan Area and concentrate growth in one of the City's Priority Development Areas: Treasure Island. The net increase in residential population is conservatively estimated to be up to 16,820 persons. This would substantially increase the existing total population on the Islands, but not beyond that which has been expected and incorporated into local and regional planning efforts. Portions of the Development Plan Area are underdeveloped and have the potential to absorb substantially more residential population growth if adequate infrastructure and transportation services are provided as with the Proposed Project. The resulting residential densities in the Development Plan Area would not exceed levels that are permitted, common, and accepted in urban areas such as San Francisco. The number of residential units would increase from 13.5 housing unit per acre of land area to 100–110 units for every acre of land area.

The Development Plan Area is geographically isolated from other development areas. Proposed infrastructure to serve the Proposed Project is planned to connect to the existing facilities and capacity of the City water and wastewater facilities. There would no expansion or increase in facilities beyond what is required to provide service to the proposed Development Plan Area. The on-site infrastructure needed to support the level of growth anticipated under the Proposed Project was based on projections that included the residential component of the Proposed Project.

The need for infrastructure, public services, and housing associated with direct population growth proposed for the Redevelopment Plan Project Area has been anticipated in the proposed Development Program, Infrastructure Plan, and *Design for Development* that would be adopted as part of the Project approval process. Infrastructure and services would be expanded to serve the Proposed Project, without significant excess capacity that would encourage additional local growth beyond that already planned for in this Priority Development Area.

The Proposed Project would provide on-site infrastructure, public service facilities, and utilities, including on-site treatment of wastewater. Expansion to infrastructure and facilities (i.e., road and transit expansions and new utilities), would be necessary to provide adequate services, to the Proposed Project. However, given the geographic isolation of Treasure Island and Yerba Buena Island from other areas in and around San Francisco, there would be no significant excess capacity associated with infrastructure improvements that might encourage additional local growth. As a result, impacts associated with direct and indirect population growth are considered less than significant, and mitigation is not necessary.

---

[29] ABAG, *San Francisco Bay Area Housing Needs Plan 2007–2014*, p. 43.

Therefore, the Proposed Project would increase residential population in an established urban area with a high level of planned local and regional transit access. It would not expand or build new infrastructure that would support growth beyond what is planned by Proposed Project. Thus, impacts associated with direct population growth would be less than significant and mitigation is not necessary. As stated earlier, the physical impacts of the increased population on the Redevelopment Plan Project Area are addressed within other relevant sections of this EIR.

Employment Impacts

Construction

There would be direct, but temporary, construction job growth within the Development Plan Area as a result of the Proposed Project. It is anticipated that construction employees not already living on the Islands would commute from elsewhere in the City or the Bay Area rather than relocate from more distant cities or towns. The Bay Area has an adequate pool of skilled construction workers from which the Proposed Project would be able to draw. Thus, construction of the Proposed Project would not generate a substantial, unplanned population increase. Impacts associated with construction employment would be less than significant, and mitigation is not necessary.

Operations

The increase in the residential population of the Development Plan Area would generate new demand for local goods and services. New uses include about 140,000 sq. ft. of new commercial and retail space; approximately 100,000 sq. ft. of new office space; adaptive reuse of historic Buildings 1, 2, and 3 with up to approximately 311,000 sq. ft. of commercial space, which includes about 67,000 sq. ft. of adaptively reused retail space; approximately 500 hotel rooms; 300 acres of parks and open space; bicycle, transit, and pedestrian facilities; a Ferry Terminal and intermodal Transit Hub; and new and/or upgraded public services and utilities, including a new or upgraded wastewater treatment plant, public school, and combined police and fire station. Table IV.C.4, p. IV.C.12, shows the existing and future employment characteristics of the Development Plan Area. There are currently about 320 employees on the Islands. The Proposed Project would result in changes in business activity throughout the Islands, resulting in an increase in on-site employment. Employment growth would be considered substantial if it resulted in housing demand that would exceed planned regional housing development.

Employment generated by the Proposed Project is expected to total about 2,920 employees, with net new employment totaling about 2,600 jobs in the Development Plan Area. Table IV.C.5 presents the number of housing units that would be needed in San Francisco and other Bay Area communities to provide housing for the net new project-generated employees. Based on assumptions about commute patterns, household size, and employment, employment under the Proposed Project could generate a demand for up to 2,095 new dwelling units in the

San Francisco Bay Area (assuming that the employees do not already live in the San Francisco Bay Area).[30]

Table IV.C.5: Project Housing Demand (2010 to 2030)

Net New Employment[a]	2030 Demand, San Francisco[b]	2030 Demand, Other Bay Area Communities[c]	Total Demand	Proposed Net New Housing Units
2,600 employees	1,595 units	500 units	2,095 units	7,195 units

Notes:
[a] It is assumed that all leasable space is fully occupied.
[b] Net new project employment divided by 1.24 wage-earners per household (Year 2030) and multiplied by 76 percent.
[c] Net new project employment divided by 1.24 wage-earners per household (Year 2030) and multiplied by 24 percent.

Source: Turnstone Consulting

The total project-related demand for housing resulting from the increase in on-site employment would represent about 5.4 percent of the City's demand for housing and about 0.43 percent of the demand for housing in the Bay Area region in the period between 2010 and 2030.[31] The 7,195 net new housing units that would be developed in the Development Plan Area would exceed the demand for new units in the City (1,595) generated by employment by the Proposed Project as well as the total demand generated by the Proposed Project for new units in the Bay Area (2,095). There would be a range of housing options provided in the Development Plan Area of varying sizes, types, and levels of affordability. These options would be developed in close proximity to the jobs provided by the Proposed Project, and therefore would provide opportunities for future employees on the Islands to seek housing in the Development Plan Area prior to searching for housing on the San Francisco mainland or the greater Bay Area region. However, if future employees did seek housing elsewhere in the area, the effects would not be significant in relation to the overall housing supply.

While the population increase associated with Proposed Project's employment could be entirely accommodated within the Development Plan Area, it is likely that some employees would elect to live elsewhere in the City or within surrounding Bay Area communities. A percentage of the persons employed in the Development Plan Area would be expected to commute from other communities outside of the City. As noted in Table IV.C.5, based on existing commuting patterns, demand for about 500 units would be generated in surrounding Bay Area communities by the Proposed Project. This housing demand would be dispersed throughout the nine-county Bay Area, which would result in negligible potential increases in housing demand within the Bay Area.

[30] This method divides the estimated project-generated employment (approximately 2,600 net new employees) by the projected number of workers per household in San Francisco in 2030 (1.24). This result, approximate housing demand of project-related employees (2,095), is multiplied by 76 percent, the proportion of jobs in San Francisco held by people who live in the City.
[31] Percentages are calculated as a proportion of the anticipated growth in City and Bay Area households between 2010 and 2030 (38,350 new City households and 480,960 new Bay Area households.) Households are equivalent to housing units.

Employment on the Islands would not create a substantial demand for housing within the Development Plan Area, mainland San Francisco, or in the region that would be in excess of the housing provided as part of the Proposed Project or housing otherwise available in the Bay Area. The number of net new housing units provided by the Project would exceed demand generated by project-generated employees by about 5,100 units. Therefore, project-related demand for housing resulting from the increase in on-site employment would be less than significant, and no mitigation is required.

CUMULATIVE IMPACTS

Impact PH-4: The Proposed Project would not induce substantial cumulative growth in an area either directly or indirectly. (*Less than Significant*)

The Proposed Project would potentially contribute to cumulative population and housing in the context of existing, proposed, and reasonably foreseeable future development expected in the City and County of San Francisco. The geographic context for this analysis of cumulative impacts to population and housing is the City. The existing level of development in the City, described in the Setting on pp. IV.C.1–IV.C.3, represents the baseline conditions for the evaluation of cumulative impacts. Reasonably foreseeable future development forecasts are based on projections of future growth and take into account projects currently going through the entitlement process.

The geographic context for an analysis of cumulative impacts to employment includes the entire Bay Area (as represented by the ABAG Planning Area[32]), since a percentage of the City population commutes to jobs outside City limits, and significant numbers of residents of other cities in the Bay Area commute to jobs within the City. The existing employment conditions, representing past and present trends in this geographic area, are presented in Setting, on pp. IV.C.3–IV.C.4.

Population

ABAG recently developed projections for citywide growth in *Projections 2009.* These projections took into account San Francisco County Priority Development Area projects[33] currently in various stages of the entitlement process, including the Treasure Island and Yerba Buena Island Redevelopment Plan Project. *ABAG 2009 Projections* estimate an increase in San Francisco of 54,020 households (400,700 total households), 124,800 persons (934,800 total

---

[32] The ABAG Planning Area encompasses the nine Bay Area counties: Sonoma, Napa, Solano, Marin, Contra Costa, San Francisco, Alameda, San Mateo, and Santa Clara.

[33] San Francisco County Priority Development Area Projects include the Bayview/Hunters Point Shipyard/Candlestick Point project; Balboa Park and Market Octavia Neighborhoods; Downtown Neighborhoods and Transit Infill Areas; Eastern Neighborhoods; Mission Bay; Port of San Francisco; Transbay Terminal; Treasure Island; San Francisco/San Mateo Bi-County Area; and the 19th Avenue Corridor (County Line to Eucalyptus Drive).

population), and 179,370 jobs (748,100 total jobs) from 2010 to 2030.[34] By 2035 San Francisco is expected to have 415,000 households, 969,000 persons, and 806,830 jobs. In 2035, the projected Citywide growth from these Priority Development Area projects is expected to account for about 56 percent of the anticipated number of households, 56 percent of the anticipated population growth, and about 81 percent of the anticipated number of jobs.[35]

The population increase associated with the Proposed Project has been included in ABAG's overall population projections. Cumulative projects (i.e., the Proposed Project plus other anticipated development) fall within ABAG's population projections for the City. The City and County of San Francisco actively engages in long-range, Citywide planning efforts. These planning efforts consider anticipated population growth, as well as demand on infrastructure, public services, and housing. Consequently, there is no anticipated significant cumulative impact associated with population and housing growth.

The Proposed Project would directly increase the on-site population within the context of an established urban area with high levels of local and regional transit services and facilities and would include other neighborhood amenities and services that could accommodate this increase. This direct population growth is considered planned growth since the Proposed Project has been considered in the City's population planning projects. By 2035, approximately 56 percent of project population growth is expected to occur within the City's Priority Development Areas, which includes the Proposed Project.[36] Indirect growth (or unplanned growth) includes residential and employment growth in surrounding neighborhoods resulting from an expansion of local infrastructure and public services. The Proposed Project would improve the on-site infrastructure and transit services but would not build or expand infrastructure or public services that could encourage additional local growth beyond that already planned. The Redevelopment Plan Project Area is physically separated from the other development sites in the region by San Francisco Bay and is not situated next to land that could accommodate new large-scale or infill development. Within the City and County of San Francisco, there are two other large-scale development projects being proposed, Candlestick Point/Hunters Point Shipyard Phase II Development Plan Project ("Candlestick Point/Hunters Point Project") and the Parkmerced Project; these, when combined with the Proposed Project, would create substantial population increases on a regional level. The Candlestick Point-Hunters Point Project includes about 10,500 dwelling units, and Parkmerced includes about 5,680 new dwelling units. However, because this population growth has been accounted for in ABAG's population projections for the City, it would not be considered substantial, since the increase in population is forecasted, with consideration of planning for infrastructure, services, and housing needed to support proposed

---

[34] These calculations are based on ABAG *Projections* 2009, p. 92. ABAG *Projections 2007* did not specifically account for proposed developments at the Treasure Island and Yerba Buena Island, Parkmerced, or Candlestick Point/Hunters Point sites.
[35] ABAG *Projections* 2009, pp. 93-94.
[36] *Ibid.*

residents, employees, and visitors. Therefore, the Proposed Project would not have a cumulatively considerable contribution to any potential cumulative impact related to substantial increases in population, and its cumulative impact would be less than significant.

Housing

As identified in ABAG's *San Francisco Bay Area Housing Needs Plan 2007–2014*, the regional housing needs allocation for the nine-county Bay Area is 214,500 dwelling units, with San Francisco's share at 31,193 units. The Proposed Project would provide approximately 7,195 net new dwelling units, or over 23 percent of the City's regional housing needs allocation and 3.3 percent of the total regional housing need. As noted on pp. IV.C.5–IV.C.7, over the course of the past several decades construction of housing in the region has failed to keep pace with population growth in the Bay Area. Although population growth has slowed and is predicted to continue at a relatively moderate rate through 2030, the region is still attempting to make up for housing shortages from previous growth periods. The demand for 2,095 housing units that would be generated by employment in the Proposed Project would be considerably less than the total number of units provided by the Proposed Project. Thus, the Proposed Project would provide a benefit to the region by constructing more housing than the demand it would generate, helping to improve the jobs-housing balance in the Bay Area. As a result, the Proposed Project's contribution to the substantial cumulative housing shortage in the Bay Area would not be cumulatively considerable because it would provide more housing than is required by project-related demand, and the Proposed Project's cumulative impact would be less than significant.

<u>Housing Demand</u>

The demand for housing units outside of the City generated by the Proposed Project, conservatively assuming that 24 percent of those employed within the Development Plan Area would commute from outside of San Francisco, would be dispersed throughout the nine-county Bay Area. The Proposed Project would not create a substantial demand for housing in San Francisco or the region in excess of the total number of housing units provided as part of the Proposed Project. Therefore, the population growth associated with increased project-related employment would not result in a housing demand that would exceed planned regional housing development, and would not be substantial. Because the employment increase associated with the Proposed Project would not be individually substantial or contribute to an exceedance of the City's employment projections, the Project would not result in a cumulatively considerable contribution to a potentially significant cumulative impact related to employment. Cumulative impacts related to physical environmental topics (like transportation, noise, and air quality) are discussed in other sections of this EIR.

Employment

Development at the Development Plan Area would provide about 2,600 net new permanent jobs by 2030 (in addition to temporary construction-related jobs generated by the Proposed Project). Regional projections indicate that by 2030 the San Francisco Bay Area will have about 4,738,730 jobs (up from 3,693,920 in 2010). Citywide projections indicate that by 2030 San Francisco will have about 782,560 jobs (up from 593,370 in 2010).[37] San Francisco has traditionally experienced, and will continue to experience, employment opportunities that are not met by an equal supply of housing within the City, or even the Bay Area. The Proposed Project's contribution of about 2,600 net new permanent jobs would represent about 0.05 percent of the anticipated increase in regional employment and 0.3 percent of the anticipated employment in San Francisco through 2030. The project-related employment would result in a related increase in housing demand for 2,095 units, as shown in Table IV.C.5, p. IV.C.18, which would represent about 26 percent of the total number of units provided by the Proposed Project.

Therefore, the population growth associated with increased project-related employment would not result in housing demand that would exceed planned regional housing development, and would not be substantial. Because the employment increase associated with the Proposed Project would not be individually substantial or contribute to an exceedance of ABAG's employment projections for the City, the Proposed Project would not result in a cumulatively considerable contribution to a potentially significant cumulative impact related to employment.

[37] ABAG *Projections 2007*, p. 139.

D. CULTURAL AND PALEONTOLOGICAL RESOURCES

D.1 ARCHAEOLOGICAL AND PALEONTOLOGICAL RESOURCES

This section assesses the potential for the presence of archaeological and paleontological resources in the Redevelopment Plan Project Area, provides a context for evaluating the significance of archaeological resources that may be encountered, evaluates the potential impacts on archaeological resources, and provides mitigation measures that would avoid or minimize potential impacts on archaeological and paleontological resources.

An independent consultant has prepared an Archaeological Research Design and Treatment Plan ("ARDTP") for the Treasure Island / Yerba Buena Island Redevelopment Plan Project Area.[1] The research and recommendations of the ARDTP are the basis for the information and conclusions of this EIR section with respect to archaeological resources.

SETTING

Context

In order to predict the archaeological property types that may exist within the Redevelopment Plan Project Area and provide a context for evaluating the significance of archaeological resources that may be encountered, the ARDTP provides a historic context for prehistoric era and historic era settlement in the vicinity of the Redevelopment Plan Project Area.

Geologic Setting

Yerba Buena Island and Treasure Island are part of a highly dynamic geologic landscape. About 200 million years ago, the Pacific Plate was subducted under the North American Plate, producing what is known as the Franciscan Complex of rocks. These constitute the basement rock for the Coast Ranges east of the modern San Andreas Fault, including the San Francisco Peninsula and the islands of the San Francisco Bay. The islands in the Bay (with the exception of the man-made Treasure Island) were formed generally from faulting, downwarping, and flooding. Fossils have been reported in Franciscan rocks, including planktonic marine organisms, mollusks, and plant microfossils (pollen and spores).

The Franciscan Complex on Yerba Buena Island is overlain in some areas by thin sand deposits of the sedimentary Colma Formation. The Colma Formation within San Francisco has the potential to contain paleontological resources. Fossilized remains of mammoth and bison were recovered from an excavation in the gravelly, sandy clay of the Colma Formation at the southeast

[1] Archeo-Tec, Archaeological Research Design and Treatment Plan, Treasure Island Redevelopment Plan Project, City and County of San Francisco, CA, March 2010.

base of Telegraph Hill. This find is the most abundant collection of Pleistocene vertebrates reported in San Francisco.[2]

Paleosols (buried soil that is relatively stable sediment that is more likely to contain cultural remains) usually overlay the Colma Formation. Several prehistoric sites attest to humans occupying the surface of the Colma Formation during the Middle Holocene (8,000 to 4,000 years before present [B.P.]). These remains were sometimes subsequently buried by erosion and deposition of sediments. Yerba Buena Island's history of deforestation and construction may have caused erosion and redeposition of soils. This process may have contributed to burial of prehistoric sites on the island, and prehistoric remains may still be present.

Treasure Island is composed entirely of fill placed over the Yerba Buena shoals, a submerged area in the middle of the Bay. The shoals varied in elevation from 2 feet to 26 feet below mean lower low water. The fill was derived from dredging in the Presidio, Alcatraz, and Knox shoals,[3] and from other nearby dredging grounds. Today, the majority of Treasure Island is capped by asphalt, concrete, and landscaping.

Natural Setting

About 15,000 years B.P., the coastline was approximately 15 miles west of the current San Francisco coastline. At that time, the San Francisco Bay was a low-lying plain cut by the now-vanished California River. The valley supported riparian forests and oak savannahs and was home to tule elk, deer, and antelope, as well as megafauna before their extinction. A warming climate caused glacial melting, which in turn caused sea levels to rise. By 8,000 years B.P., rising sea levels caused inundation of the San Francisco Bay, burying the old shore under deep sediments. The flooding of the Franciscan Valley to form San Francisco Bay also led to the formation of Yerba Buena Shoals, immediately to the north of Yerba Buena Island and underlying Treasure Island.

Around 3,200 B.P., glacial advance caused cooler temperatures and increased precipitation in central California. Rainfall decreased after 1,375 B.P. and a warmer climate ensued. A long period of cool climate conditions, which is thought to be a worldwide phenomenon known as the Little Ice Age, occurred from 575–150 B.P. Human settlement over time was influenced by alternating abundance and decline of flora and fauna. Fluctuations in the Bay shoreline over time meant that the amount of Bay shoreline inhabited or otherwise exploited by humans also varied. Periods of increased precipitation would have increased erosion along rivers and, in turn, the deposition of sediments at the mouths of rivers. In addition, changes in rivers and siltation could have buried many sites of human occupation.

2 Peter U. Rodda, "Late Pleistocene Vertebrates from Downtown San Francisco," *Journal of Paleontology* (Abstract), Volume 67, No. 6, November 1993.
3 Navy EIS, p. 3-126

Prehistoric Period

Current archaeological evidence suggests humans have occupied the San Francisco Bay Area for at least 11,000 years, although no sites older than 6,000 years B.P. have been recorded in the San Francisco Peninsula. The early human presence in California is described in three periods: the Early Holocene (11,000–8,000 years B.P.); the Middle Holocene (8,000–4,000 years B.P.); and the Late Holocene (4,000–230 years B.P.). These are characterized by major regional shifts in settlement patterns, technology, economy, and trade that are evident in the archaeological record.

Early Holocene (11,000–8,000 years B.P.)

Archaeological evidence gathered from Early Holocene sites indicates that a sparse population of semi-sedentary bands of hunter-gatherers arrived in the Northern and Central California region by 11,000 years B.P., or possibly even earlier. The earliest known prehistoric sites in Northern California (CA-LAK-36, CA-NAP-131, and CA-MER-215) date from before the Early Holocene period. These early Californians probably lived for the most part in open-air shelters, although they also built rock shelters in some areas. Deep refuse deposits dating to the Early Holocene are absent throughout California, suggesting that people used locations only temporarily before abandonment, or briefly for recurrent periods. Projectile points dating to this period are commonly found, indicating hunting and butchering subsistence activities, and were likely used for the taking of large mammals, although hunting of smaller mammals and waterfowl also took place. Shellfish were a staple, though their consumption was less predominant during the Early Holocene than it was in later times. Seeds were likely collected.

Although four Early Holocene sites have been documented in the San Francisco Bay Area (CA-CCO-637 and CCO-696, CA-SCL-178, and CA-SCR-177), no Early Holocene sites have been found in San Francisco. Early Holocene sites found in association with paleosols in the San Francisco Bay region contained handstones and milling slabs, minimally modified cutting and scraping tools, and other chipped stone tools, as well as marine shellfish and the remains of a variety of mammals.

Middle Holocene (8,000–4,000 years B.P.)

After about 8,000 B.P., a general shift in subsistence occurred with specialized technology and exploitation of new ecological niches. In the absence of big game food sources, people began to exploit more diversified animal species and shifted to an increased reliance on plants and seeds. This resource diversification required seasonal migrations in order to access different environments throughout the year. Consequently, the “tool kit” of prehistoric peoples became more specialized, growing to include varied methods of food processing. The diverse habitats and year-round availability of food in Central California also contributed to the shift to exploitation of resources other than big game. The increasingly prominent role of seed collecting is reflected in the archaeological record by large numbers of food grinding implements. As the use of acorns became more predominant, heavy, deep-basined mills and handstones came into use.

Judging from archaeological evidence, the earliest traces of human habitation on the San Francisco peninsula dated to around 6,000 B.P., and that human habitation has been continuous since that time. The earliest site found in San Francisco was a fragmentary human skeleton dated at 6,270 to 4,880 B.P., confirming that early, deeply buried prehistoric sites may be present in San Francisco.

Late Holocene (4,000–230 B.P)

Beginning around 5,000 B.P. the climate began to shift from warm and dry to cooler and wetter conditions, causing an adjustment to new environmental conditions. This period is characterized by further niche specialization, a refinement of various technologies, and specialized exploitation of plant and animal species. Many sites dating to the Late Holocene in the San Francisco Bay region are shellmounds, midden sites containing large quantities of mollusk shells. Sites dating to the Late Holocene have been found in San Francisco, primarily in the South of Market region. In the early 20th century, one investigator recorded over 400 shellmounds around the edge of San Francisco Bay.

A recorded site, CA-SFR-4/H, is located on the northeast side of Yerba Buena Island in a saddle at the northeastern corner of the island. Anecdotes from the mid-19th century report ruins of a native village that was visible on the surface. The site was studied as part of the 2002–2004 Bay Bridge East Span Project. Radiocarbon and obsidian hydration dates from CA-SFR-4/H have demonstrated occupation beginning around 3,400 B.P. and ending around 470 B.P. This site has yielded a wide array of worked bone and stone objects, tools, polished stone, and beads, indicating long and sustained occupation. The lowest stratum contains several burials from the early Late Holocene. The extent of the site, and the variety of resource exploitation and social development associated with the artifacts, suggests that other sites may be present on Yerba Buena Island.

Yerba Buena Island would have been attractive for permanent or semi-permanent settlement. It offered at least one freshwater spring, plentiful firewood, and access to fish and shellfish. Ethnohistorical inquiry suggests that Yerba Buena Island may have been used by the East Bay Ohlone *Huchiun* tribelet. At the time of the Spanish arrival in the 1700s, the Ohlone occupied the San Francisco peninsula, inland around the South and East Bay regions, the Alameda and western Contra Costa bay shores, and south San Pablo Bay. (Marin and southern Sonoma counties were populated by the Coast Miwok.) Ohlone people are known to have traveled throughout the Bay on boats made of tule reeds, and the island lies along one possible route between the San Francisco Peninsula and the East Bay.

Ohlone settlements were comprised of a series of bulrush- or grass-bundle-thatched structures that housed between 40 and 400 people. Women were responsible for processing acorns and plant items (important sources of carbohydrates), as well as basketry and multiple other tasks. Men gathered shellfish, fish, and game (especially sea mammals) using bows and arrows, weirs, nets, hooks and lines, and various other traps. Material culture featured twined basketry; tule boats; robes of rabbit, sea otter, or buckskin; obsidian (obtained through trade) and chert stone tools; greenstone or sandstone spools; and beads used as decoration or currency.

Historic Period

Spanish and Russian Period (1812–1835)

The first Spanish ship sailed through the Golden Gate in 1775. From that time until 1812, the Spanish were the only European presence in the Bay Area. The principal centers of Spanish activity were the Presidio and Mission Dolores until the beginnings of Yerba Buena village in 1835. Documentary evidence suggests that the Spanish made little effort to explore and exploit the economic potential of the region. For example, travel within the Bay Area was entirely by land; boats were rarely used to cross the Bay.

Colony Ross (Fort Ross), an outpost of the Russian-American Company in Sonoma County, was established in 1812. One purpose of the colony was to hunt for the valuable sea otters that inhabited the California coast. These hunters were sent as far south as San Francisco Bay and even the Channel Islands. Along with Colony Ross, the Russians kept a permanent camp on the Farallon Islands, 25 miles off shore from San Francisco. Hunting of otter in the Bay was restricted by the Spanish, and hunters were only allowed along the coast from Cape Mendocino to Drake's Bay, although clandestine hunting continued. After Mexican independence from Spain, the Russians entered into official contracts with the new government and were legally allowed to hunt for sea otters in waters previously off-limits.

Mexican and Early American Period (1835–1867)

The Mexican and Early American Period in San Francisco's history began in 1835 with the founding of Yerba Buena village, where today, San Francisco's Chinatown is constructed. On July 8, 1846, Yerba Buena (renamed San Francisco) passed from Mexican to American jurisdiction, when the sloop-of-war *Portsmouth* under Captain John B. Montgomery's command raised the Stars and Stripes and claimed California for the United States.

Several conflicting claims to ownership of Yerba Buena Island arose. In 1835, the Mexican government gave a certificate of ownership of Yerba Buena Island to Captain Gorham Nye, as a reward for transporting the body of Governor Jose Figueroa to Mexico. In 1842, John Fuller and Nathan Spear purchased some of the goats brought to San Francisco by Captain Nye and began grazing them on Yerba Buena Island, selling them for meat in San Francisco. In the late 1840s, Spear claimed ownership of the island, using the Mexican method of granting ownership to anyone who maintained long, honest, and uninterrupted possession of, or use of, property. In 1849, Spear sold his ownership to Edward King.

In 1850, Elbert Jones claimed that he held title to the island, based on a copy of a grant given to Juan Jose Castro in 1838. The document provided by Castro was in doubt and the claim was never filed with the government. Jones' title was therefore suspect and a lawsuit ensued. Castro claimed that he had built a house and installed servants and livestock on the island, but witnesses in the case stated that there were no buildings on the island. The judge rejected the Castro claim.

Between 1849 and 1867, several other parties claimed ownership. In 1849, John C. Jennings and Thomas Dowling arrived on the island and established residence. Jennings had a barn and stable, a windmill, a carpenter's shop, other buildings, and a wharf and shipyard. Dowling had a comfortable dwelling where he lived with his family. He also built another residence for tenants, opened a quarry, and built three ship repair facilities.

Army Period

In 1867, the United States military asserted a claim to the island, and sent a small garrison of soldiers to establish a post on the island. This group lived there with Dowling and others until 1868 or 1869 when representatives of the Army arrived on the island, destroyed Dowling's residence and ejected the settlers. Dowling's main house was reused as a hospital and Jennings' wharf was retained, but other buildings were apparently demolished to make room for the Army's facilities. The Army population on the island numbered roughly 100 to 120. In 1875, the Army constructed the lighthouse keeper's residence and support buildings; these are still present at the southern end of the island.

In 1879, the Army abandoned the island. A caretaker and his family remained. In 1891, a fire destroyed most of the Army post. Also in 1891, another military facility, the Torpedo Station, was built on the northeastern point of the island. The station consisted of a Torpedo Assembly Building, wharf, officer's quarters, and other buildings and structures; today, only the Torpedo Assembly Building remains.[4]

In 1895, in deference to common usage, the name of the island was officially changed from Yerba Buena Island to Goat Island, recognizing the still-thriving goat population introduced by John Fuller.

---

[4] Building 262 historically has been known as the Torpedo Storehouse, Torpedo (Mine) Assembly Building, and the Long Range Accuracy Storage Building. However, for this discussion it will be referred to as the Torpedo Assembly Building. The Draft *Design for Development* refers to this building as the Torpedo Storehouse.

Navy Period

In 1896, Congress called for the establishment of a United States Naval Training Station at Goat Island. The island was transferred to the Navy in 1898. The Army continued to operate the Torpedo Station, the Lighthouse Service operated the lighthouse, and the Navy assumed control over the rest of the island. In 1899, the Navy undertook major grading that flattened and enlarged the saddle of the island, the location of CA-SFR-4/H. The Navy also constructed a barracks for 500 men, which also included space for offices, library, schoolroom, dispensary, brig, mess hall, kitchen, pantry, storehouse, and petty officers' quarters. Subsequently, a Commandant's house and two officers' quarters were constructed. The station also maintained at least one training ship and a receiving ship (eventually replaced by an on-land facility) that served to house unassigned crews until they were assigned to a ship.

The outbreak of World War I led to a surge in construction and population at Goat Island. Dozens of structures ranging from communications towers to a receiving ship dispensary and yeoman school were constructed in 1917–1918. Recruits were crowded into enormous tent camps filling all usable space on the island. The result of this overcrowding was outbreaks of meningococcus and influenza in 1918 and 1919. By 1920, the Naval Training Station had been expanded and the population had grown to around 1,480 people. In 1922, the government decided to move all training activities to the much larger facility in San Diego, and in 1923 the training station was closed. The receiving ship function continued on Goat Island until World War II. In 1931, the name of the island was changed from Goat Island back to Yerba Buena Island.

Although all of the naval station functions had moved to other locations by 1946, many of the buildings on Yerba Buena Island saw periodic use for several decades. In particular, the officers' quarters continued to house officers from Treasure Island. In 1966, several residences were built on the north and west sides of the island for Coast Guard officers. In 1973, a large portion of the Training Station property was transferred to the Coast Guard. The Naval Station was officially closed in 1997.

Treasure Island

Golden Gate International Exposition. Treasure Island was constructed in the shallow shoals north of Yerba Buena Island beginning in 1936. It contains almost 30 million cubic yards of fill. The island has a perimeter seawall composed of rock. A mixture of sand, gravel, and Bay water was poured into the newly created cavity. The Bay water was separated from the sand and gravel and pumped from the developing island through several wells. Desalinization of the fill was accomplished by pumping millions of gallons of fresh water onto the surface of the island followed by the extraction of the saltwater, now diluted, from the land. At least a 6-foot layer of good topsoil, imported from the San Joaquin Valley, was used to surface the entire man-made island.

Upon the completion of the island, work began on buildings and grounds for the Golden Gate International Exposition. Construction began with the three permanent buildings that were intended to serve the municipal airport after the Exposition closed. The Administration Building was intended to be the terminal, traffic control, and ticket office. These three buildings still remain, identified as Building 1 (the Administration Building) and Buildings 2 and 3 (the hangars). The remainder of the island was filled with temporary buildings, exhibit halls, towers, art, and landscaping. The Golden Gate International Exposition closed on September 29, 1940.

Naval Station Treasure Island (1941–Present). Use of Treasure Island was granted to the Navy with the outset of World War II. A Naval Training and Distribution Center was established on Treasure Island to group servicemen into ship's crews, train them, and then assign the crew to a ship bound for war. Former exhibition palaces became barracks, offices, mess halls, classrooms, galleys, and athletic and entertainment facilities. A pre-embarkation camp was established on the northeast part of the island. Sailors who had been assigned to a ship were restricted to this camp until their ship departed. From June 1945 to March 1946, approximately 1,300 German POWs were held at Treasure Island. In the postwar years Treasure Island continued to operate as a training command. In 1993, Naval Station Treasure Island was selected for closure. The station was operationally closed in 1997.

Archaeological Property Types That May Be Present within the Redevelopment Plan Project Area

The ARDTP identifies archaeological property types that describe patterns of behavior that have taken place within the Redevelopment Plan Project Area. Property type predictions for the project site are based on a review of historic and archaeological research materials, including ethnographic research, research into historic land use patterns, and a review of archaeological property types encountered at nearby sites. While it is impossible to predict all cultural materials that may be present within the Redevelopment Plan Project Area, there is a substantial likelihood that these property types may be encountered during construction of the Proposed Project.

Prehistoric Property Types

Generally speaking, any intact prehistoric deposit found within the Redevelopment Plan Project Area is presumed to be of scientific significance and therefore eligible for the California Register of Historical Resources under Criterion 4 (Information Potential).

Multi-Activity, Year-Round Sites

A multi-activity year-round site is defined as containing more than one of these property types: midden, hearth and ash features, housepits, burials, village sites or shellmounds, as well as other types of habitation sites. Such sites are particularly significant for archaeological study as data derived from them may address a variety of research questions, notably those related to cultural patterns and social organization.

Seasonal Sites

Cultural materials typically present in a seasonal site include dense areas of shell midden containing mammal, bird, and fish bones, evidence of stone and bone tool making, and beads and other decorative objects. The analysis of such sites, if found, would contribute to the understanding of prehistoric land use in the area.

Lithic Scatters

Flaked stone tools and waste flakes from their manufacture are typically found in the form of a diffuse, scattered deposit. These sites are significant in that they can answer a variety of research questions about prehistoric technologies, as well as potentially supply temporal data for any deposits in which they are found. When lithic scatters are found on the ground surface they are generally assumed to have been subject to a greater degree of disturbance than those associated with buried deposits.

Isolated Artifacts

Isolated artifacts may be any of a wide range of materials not apparently associated with a discrete archaeological feature or site. When such items are found outside the context of a site or feature the ability of such artifacts to address research themes and yield important scientific and historical information is limited. However, an isolated artifact exhibiting unusual or formerly unknown characteristics may add new and significant data to our understanding of past lifeways, even in the absence of contextual details.

Isolated Burials and Features

Prehistoric human burials are presumed to be significant, due both to their importance to their descendants and because a great deal of information about past peoples' health and traditional culture can be gleaned from their analysis.

Historical Period Property Types

Refuse

Refuse features include hollow features and sheet refuse. Hollow features include pits, privies, and wells. During their use or upon abandonment, they become a receptacle for refuse. Sheet refuse accumulates in broad scatters on living surfaces over a period of time as people discard refuse in their yard, farms, and working areas, a common 19th-century practice. Refuse features provide evidence of the behaviors of the people who used the Redevelopment Plan Project Area. Refuse features can often be dated and connected to specific individuals who lived on the site.

Architecture

Architectural properties include structural remains such as foundations, wall footings, platforms, collapsed wood buildings, ovens, and stoves. In many cases, the remains correlate to structures depicted on historical maps and other documents. In these instances, the ability of those remains to contribute to important research domains may be limited unless accompanied by a diverse artifact assemblage. Many research questions are often better suited to other research methods such as analysis of primary documents.

Shipwrecks

This property type consists of submerged ships and ship fragments that may have become buried due to land filling for the construction of Treasure Island. At least three ships are recorded as having been lost in or near the Redevelopment Plan Project Area. The *Utica* was a three-masted square-rigged sailing ship measuring about 131 feet long. She was built by Christian Bergh & Co. of New York in 1833. While anchored at San Francisco in 1850, she caught fire and was set adrift to prevent the fire from spreading to other vessels. She drifted toward Yerba Buena Island and was scuttled. The *Crown Princess,* alternatively described as either "Hanoverian" or "Swedish," reportedly sank north of Goat Island in 1850. One historical account indicates that another unnamed ship ran aground in the shoals north of Goat Island, a loaded barge with rock aboard which was caught at low tide.

Research Themes

An archaeological resource may be eligible for listing in the California Register of Historical Resources ("CRHR") as a historical resource. As explained below, Public Resources Code Section 5024.1 contains criteria, any one of which, if present, may indicate a resource is historical. Criterion 4 (Information Potential) is the most relevant for archaeological resources and provides that the resource is an historical resource and eligible for listing in the CRHR if the resource shows the potential to yield important scientific or historical information. Integrity of an archaeological resource is the ability of the artifact assemblages, features, or stratigraphic relationships associated with a resource to address significant research questions. The ARDTP identifies research issues that could potentially be addressed by archaeological features that may be present within the Redevelopment Plan Project Area. Determinations of relevance to research themes provides a context by which to assess the significance and integrity of archaeological features that may be encountered in the field. Examples of research themes identified in the ARDTP include the following:

Prehistoric Period

- Chronology and Cultural History: Unlike historical archaeological sites, for which written records may exist to contextualize archaeological finds, archaeologists must formulate a timeline for prehistoric sites almost exclusively through their cultural assemblages. The study of prehistoric archaeological assemblages, if encountered within the Redevelopment Plan Project Area, would allow such features to be placed within the particular time periods and cultural contexts within which they were created.
- Subsistence and Settlement Patterns: Study of prehistoric artifactual assemblages could provide information about where people lived from season to season, how they structured their communities, what resources were used at various times of the year, and what types of items/materials were important at different times.
- Succession of Prehistoric Populations: Changes in cultural behaviors are often linked to changes in the environment, technological innovation or evolution, and the growth or intrusion/migration of cultural groups. Study of habitation sites could address research questions regarding whether the Redevelopment Plan Project Area was continuously occupied by a prehistoric population, or if there are measurable gaps in time of human presence within the region.
- Trade, Transport, and Inter-Regional Contact: Evidence of trade can typically be documented by the presence or absence of items whose origin or source is exotic (nonlocal). Objects of value have been exchanged for other significant objects throughout prehistory and historical times, and are often tied to available resources and political issues such as cultural boundaries and control over various resources.
- Shell Mounds: Prehistoric shellmounds may have been intentionally constructed landscape features associated with pre-exisitng cemetery sites, and even after residential abandonment, associated with funeral and memorial feasting. This hypothesis expands on the more widely held belief that shell middens form as a result of discard associated with shellfish consumption at residential sites.

Historical Period

- Russian/Native Alaskan Hunting Settlements: Given the apparent prevalence of clandestine otter hunting, remains of hunting camps may be present on Yerba Buena Island. Such features (if present) would more likely be located on the east side of the island, where they would have been less visible to any observers on the San Francisco peninsula.
- Island Settlement and Homesteading: Between 1835 and 1867, numerous individuals claimed ownership of Yerba Buena Island, resulting in conflicting land grants and legal disputes. Regardless of the legality of these claims, the purported owners of the island

contributed to the building and development on it, adding features such as wharves and docks, houses, stores, wells, and other features.

- Economic and Commercial Development of Yerba Buena Island: A series of entrepreneurs have developed the island's various resources for commercial purposes, (e.g., lumber, quarrying, grazing). Architectural and refuse remains can show evidence of adaptation, innovation, and intercultural exchange.
- Shipwrecks: The study of shipwrecks could reveal scientific and historical information about shipbuilding and shipping industries in the mid-19th century, and about the shipwreck, abandonment, and salvage events.
- Military Institutions: Historical archaeology of military institutions holds the potential for multiple areas of inquiry. The dictates of the national government and military influenced how the military institutions on Yerba Buena Island were structured and managed, what resources were available, and the way that life for personnel and associated civilians was organized. Despite the highly regulated nature of institutional life, individual expression was still possible and is archaeologically recoverable in the form of personal goods or various uses of space and architecture.
- Burials: From 1852 to 1938, a fenced cemetery existed on the west end of the island. It was removed during the Bay Bridge construction in 1938. However, the task of removing bodies from poorly marked or unmarked graves was often imprecise, and the possibility exists that human remains from the cemetery may still be buried on the island. The study of burials could reveal information regarding the identity, health, social status, and cause of death of the deceased and the nature of military burials.

Regulatory Framework

CEQA considers archaeological resources to be an intrinsic part of the physical environment and, thus, requires for any project that the potential of the project to adversely affect archaeological resources be analyzed *(*CEQA Section 21083.2). For a project that may have an adverse effect on a significant archeological resource, CEQA requires preparation of an environmental impact report (CEQA Section 21083.2 and *CEQA Guidelines* Section 15065). CEQA recognizes two different categories of significant archeological resources: "unique" archeological resources *(*CEQA Section 21083.2) and archeological resources that qualify as "historical resources" under CEQA (CEQA Section 21084.1; *CEQA Guidelines* Section 15064.5).

Significance of Archeological Resources

An archeological resource can be significant as either a "unique" archeological resource or an "historical resource" or both, but the process by which the resource is identified under CEQA as one or the other is distinct (CEQA Section 21083.2(g); *CEQA Guidelines* 15064.5(a)(2)).

An archeological resource is an historical resource under CEQA if the resource is:

- Listed on or determined eligible for listing on the CRHR; this includes archeological properties listed or eligible for the National Register;

- Listed in a "local register of historical resources";[5] or
- Listed in an "historical resource survey."

Generally, an archeological resource is determined to be an historical resource due to its eligibility for listing to the California Register of Historical Resources or the National Register of Historic Places because of the potential scientific value of the resource, that is, it "has yielded, or may be likely to yield, information important in prehistory or history" (*CEQA Guidelines* Section 15064.5(a)(3)). An archeological resource may be CRHR-eligible under other Evaluation Criteria, such as Criterion 1, association with events that have made a significant contribution to the broad patterns of history; Criterion 2, association with the lives of historically important persons; or Criterion 3, association with the distinctive characteristics of a type, period, region, or method of construction. Appropriate treatment for archeological properties that are CRHR-eligible under criteria other than Criterion 4 may be different than that for a resource that is significant exclusively for its scientific value.

Failure of an archeological resource to be listed in any of these historical inventories, is not sufficient to conclude that the archeological resource is not an historical resource. When the lead agency believes there may be grounds for a determination that an archeological resource is an historical resource, then the lead agency should evaluate the resource for eligibility for listing to the CRHR (*CEQA Guidelines* Section 15064.5(a)(4)).

"Unique archeological resource" is a category of archeological resources created by the CEQA statutes (CEQA Section 21083.2(g)). An archeological resource is a unique archeological resource if it meets any of one of three criteria:

- Contains information needed to answer important scientific research questions (and there is a demonstrable public interest in that information);
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Under CEQA, evaluation of an archeological resource as an historical resource is privileged over the evaluation of the resource as a unique archaeological resource in that CEQA requires that "when a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource" (*CEQA Guidelines* Section 15064.5(c)(l)).

---

[5] A local register of historical resources is a list of historical or archeological properties officially adopted by ordinance or resolution by a local government (Public Resources Code 5020.1(k)).

Evaluation of an Archaeological Resource as Scientifically Significant

In requiring that a potentially affected archeological resource be evaluated as an historical resource—that is, as an archeological site of sufficient scientific value to be CRHR-eligible—CEQA presupposes that the published guidance of the California Office of Historic Preservation ("OHP") for CEQA providers will serve as the methodological standard by which the scientific, and thus the CRHR-eligibility, of an archeological resource is to be evaluated. As guidance for the evaluation of the scientific value of an archeological resource, the OHP has issued two guidelines: *Archaeological Resource Management Reports* (1989) and the *Guidelines for Archaeological Research Designs (1991).*

Integrity of Archeological Resource

Integrity is an essential criterion in determining if a potential resource, including an archeological resource, is an historical resource. In terms of CEQA, "integrity" can, in part, be expressed in the requirement that an historical resource must retain "the physical characteristics that convey its historical significance" (*CEQA Guidelines* Section 15064.5(b)).

For an archeological resource that is evaluated for CRHR-eligibility under Evaluation Criterion 4, "has yielded or may be likely to yield information important to prehistory or history," the word "integrity" is has a different meaning from how it usually applies to the built environment. For an historic building, possessing integrity means that the building retains the defining characteristics from the period of significance of the building. In archeology, an archeological deposit or feature may have undergone substantial physical change from the time of its deposition, but it may yet have sufficient integrity to qualify as a historical resource. The integrity test for an archeological resource is whether the resource can yield sufficient data (in type, quantity, quality, diagnosticity) to address significant research questions. Thus, in archeology "integrity" is often closely associated with the development of a research design that identifies the types of physical characteristics ("data needs") that must be present in the archeological resource and its physical context to adequately address research questions appropriate to the archeological resource.

Significant Adverse Effect on an Archeological Resource

The determination of whether an effect on an archeological resource is significant depends on the effect of the project on those characteristics of the archeological resource that make the archeological resource significant. For an archeological resource that is an historical resource because of its prehistoric or historical information value, that is, its scientific data, a significant effect is impairment of the potential information value of the resource.

The depositional context of an archeological resource, especially soils stratigraphy, can be informationally important to the resource in terms of datation and reconstructing characteristics of the resource at time of deposition and to interpreting the impacts of later deposition events on the resource. Thus, for an archeological resource eligible to the CRHR under Criterion 4, a significant adverse effect to its significance may not be limited to impacts on the artifactual material but may include effects on the soils matrix in which the artifactual matrix is situated.

Mitigation of Adverse Effect to All Archeological Resources

Preservation in place is the preferred treatment of an archeological resource (CEQA Section 21083.2(b); *CEQA Guidelines* Section 15126.4(b)(3)(a)). When preservation in place of an archeological resource is not feasible, data recovery, in accord with a data recovery plan prepared and adopted by the lead agency prior to any soils disturbance, is the appropriate mitigation *(CEQA Guidelines* Section *15126.4*(b)(3)(C)). In addition to data recovery, under CEQA , the mitigation of effects to an archeological resource that is significant for its scientific value requires curation of the recovered scientifically significant data in an appropriate curation facility *(CEQA Guidelines* Section 15126.4(b)(3)(C)) that is compliant with the *Guidelines for the Curation of Archaeological Collections* (California Office of Historic Preservation, 1993). Final studies reporting the interpretation, results, and analysis of data recovered from the archeological site are to be deposited in the California Historical Resources Regional Information Center *(CEQA Guidelines* Section 15126.4(b)(3)(C)).

Effects on Human Remains

Under State law, human remains and associated burial items may be significant resources in two ways: They may be significant to descendent communities for patrimonial, cultural, lineage, and religious reasons. Human remains may also be important to the scientific community, such as prehistorians, epidemiologists, and physical anthropologists. The specific stake of some descendent groups in ancestral burials is a matter of law for some groups, such as Native Americans *(CEQA Guidelines* Section 15064.5(d); Public Resources Code Section 5097.98). In other cases, the concerns of the associated descendent group regarding appropriate treatment and disposition of discovered human burials may become known only through outreach. Beliefs concerning appropriate treatment study, and disposition of human remains and associated burial items may be inconsistent and even conflictual between descendent and scientific communities. CEQA and other State regulations concerning Native American human remains provide the following procedural requirements to assist in avoiding potential adverse effects to human remains within the contexts of their value to both descendent communities and the scientific community:

- When an initial study identifies the existence or probable likelihood that a project would impact Native American human remains, the lead agency is to contact and work with the appropriate Native American representatives identified through the Native American Heritage Commission ("NAHC") to develop an agreement for the treatment and disposal of the human remains and any associated burial items *(CEQA Guidelines* Section 15064.5(d); Public Resources Code Section 5097.98).

- If human remains are accidentally discovered, the county coroner must be contacted. If the county coroner determines that the human remains are Native American, the coroner must contact the NAHC within 24 hours. The NAHC must identify the most likely descendant (MLD) to provide for the opportunity to make recommendations for the treatment and disposal of the human remains and associated burial items. If the MLD fails to make recommendations within 24 hours of notification or the project applicant rejects the recommendations of the MLD, the Native American human remains and associated burial items must be reburied in a location not subject to future disturbance within the project site (Public Resources Code Section 5097.98).
- If potentially affected human remains or a burial site may have scientific significance, whether or not it has significance to Native Americans or other descendent communities, then under CEQA, the appropriate mitigation of effect may require the recovery of the scientific information of the remains/burial through identification, evaluation, data recovery, analysis, and interpretation (*CEQA Guidelines* Section 15064.5(c)(2)).

Paleontological Resources

Paleontological resources, typically vertebrate or invertebrate fossilized remains, are afforded federal protection under 40 CFR 15-8.27 as a subset of scientific resources. California Public Resources Code Section 5097.5 provides for protection of paleontological sites and features on public lands. Paleontologic resources may exist with the Redevelopment Plan Project Area in sediments underlying San Francisco Bay. California Public Resources Code Section 5097.5 mandates that:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface, any…vertebrate paleontological site, including fossilized footprints…or any other paleontological…feature, situated on public lands, except with the express permission of the public agency having jurisdiction over the lands.

IMPACTS

Significance Criteria

The City and County of San Francisco has not formally adopted significance thresholds for impacts related to cultural and paleontological resources. The Planning Department's Initial Study Checklist Form provides a framework of topics to be considered in evaluating a project's impacts under the California Environmental Quality Act. Implementation of a proposed project could have a potentially significant impact on cultural or paleontological resources if it were to:

- Cause a substantial adverse change in the significance of a historical resource as defined in 15064.5, including those resources listed in Article 10 or Article 11 of the San Francisco Planning Code;
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to [CEQA Guidelines Section] 15064.5;
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;
- Disturb any human remains, including those interred outside of formal cemeteries.

Project impacts on historic architectural resources are discussed in Section D.2, Historic Architectural Resources.

Project Impacts

Construction of the Proposed Project would involve a number of ground-disturbing activities.

On Treasure Island, the Project includes demolition of existing buildings and infrastructure features. Areas of Treasure Island proposed for development of buildings or roads would be densified by compaction and/or vibration, and new fill would be added to compensate for loss of ground surface elevation through that process, as well as an allowance to protect against future sea-level rise. Most low-rise and mid-rise buildings would be supported on shallow mat foundations. High-rise buildings would be pile-supported, deriving support from deeper competent soil or rock. Most buildings would also have one to two levels of basement below grade. Further infrastructure development on Treasure Island would include installation of new telecommunications systems and potable water, wastewater, and recycled water systems. Geotechnical work would stabilize and raise the island’s perimeter berm. Dredging would be required to provide adequate depth for boats at the Ferry Terminal.

The proposed structures to be built on Yerba Buena Island would generally use a shallow foundation. Residential development on Yerba Buena Island will generally be limited to existing developed areas. Historic structures and landscapes would be retained and remodeled for public use. While the general street plan will be retained, the addition of new roads would require construction of retaining walls and earthwork activities.

Impact CP-1: Project construction activities could disturb significant archaeological resources, if such resources are present within the Redevelopment Plan Project Area. ***(Less than Significant with Mitigation)***

There is a substantial probability that significant archaeological features are present on Yerba Buena Island. Although intact archaeological features are less likely to be encountered within the fill of Treasure Island, the remains of documented shipwrecks, as well as undocumented prehistoric sites, may be present beneath Treasure Island fill or submerged nearby.

Unless mitigated, ground-disturbing construction activity within the Redevelopment Plan Project Area could adversely affect the significance of archaeological resources under CRHR Criterion 4 (Information Potential) by impairing the ability of such resources to convey important scientific and historical information. This effect would be considered a substantial adverse change in the significance of an historical resource and would therefore be a potentially significant impact under CEQA.

Mitigation Measure M-CP-1, calls for a qualified archaeological consultant to prepare and submit a plan for pre-construction archaeological testing, construction monitoring, and data recovery, for approval by the San Francisco Environmental Review Officer (ERO). Implementation of the approved plan for testing, monitoring, and data recovery under Mitigation Measure M-CP-1 would ensure that the significance of any CRHR-eligible archaeological resource would be preserved and/or realized in place. With implementation of Mitigation Measure M-CP-1, implementation of the Redevelopment Plan would not cause a substantial adverse change to the significance of an archaeological resource.

Mitigation Measure M-CP-1: Archaeological Testing, Monitoring, Data Recovery and Reporting

Based on a reasonable presumption that archaeological resources may be present within the Redevelopment Plan Project Area, the following measures shall be undertaken to avoid any potentially significant adverse effect from the proposed project on buried or submerged historical resources. The project sponsor shall retain the services of a qualified archaeological consultant having expertise in California prehistoric and urban historical archaeology. The archaeological consultant shall undertake an archaeological testing program as specified herein. In addition, a professionally qualified geo-archaeologist shall undertake a geo-archaeological assessment of the project area. The archaeological consultant shall be available to conduct an archaeological monitoring and/or data recovery program if required pursuant to this measure. The archaeological consultant's work shall be conducted in accordance with this measure and the requirements of the ARDTP (Archeo-Tec, Archaeological Research Design and Treatment Plan, Treasure Island Redevelopment Plan Project, City and County of San Francisco, CA, October 2009) at the direction of the Environmental Review Officer ("ERO"). In instances of inconsistency between the requirements of the project ARDTP and the requirements of this mitigation measure, the requirements of this archaeological mitigation measure shall prevail. All plans and reports prepared by the consultant as specified herein shall be submitted first and directly to the ERO for review and comment, and shall be considered draft reports subject to revision until final approval by the ERO. Archaeological monitoring and/or data recovery programs required by this measure could suspend construction of the project for a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce to a less-than-significant level of potential effects on a significant archaeological resource as defined in *CEQA Guidelines* Section 15064.5 (a)(c).

Archaeological Testing Program

The archaeological consultant shall prepare and submit to the ERO for review and approval an archaeological testing plan ("ATP"). The archaeological testing program shall be conducted in accordance with the approved ATP. The ATP shall identify the property types of the expected archaeological resource(s) that potentially could be adversely affected by the proposed project, the testing method to be used, and the locations recommended for testing. The purpose of the archaeological testing program will be to determine, to the extent possible, the presence or absence of archaeological resources and to identify and to evaluate whether any archaeological resource encountered on the site constitutes an historical resource under CEQA.

At the completion of the archaeological testing program, the archaeological consultant shall submit a written report of the findings to the ERO. If based on the archaeological testing program the archaeological consultant finds that significant archaeological resources may be present, the ERO, in consultation with the archaeological consultant, shall determine if additional measures are warranted. Additional measures that may be undertaken include additional archaeological testing, archaeological monitoring, and/or an archaeological data recovery program. If the ERO determines that a significant archaeological resource is present and that the resource could be adversely affected by the proposed project, at the discretion of the project sponsor, either:

(A) The proposed project shall be re-designed so as to avoid any adverse effect on the significant archaeological resource; or

(B) A data recovery program shall be implemented, unless the ERO determines that the archaeological resource is of greater interpretive than research significance and that interpretive use of the resource is feasible.

Archaeological Monitoring Program (AMP)

If the ERO in consultation with the archaeological consultant determines that an archaeological monitoring program shall be implemented, the archaeological monitoring program shall minimally include the following provisions:

- The archaeological consultant, project sponsor, and ERO shall meet and consult on the scope of the AMP reasonably prior to any project-related soils-disturbing activities commencing. The ERO in consultation with the archaeological consultant shall determine what project activities shall be archaeologically monitored. In most cases, any soils-disturbing activities, such as demolition, foundation removal, excavation, grading, utilities installation, foundation work, driving of piles (foundation, shoring, etc.), site remediation, etc., shall require archaeological monitoring because of the risk these activities pose to potential archaeological resources and to their depositional context;

- The archaeological consultant shall advise all project contractors to be on the alert for evidence of the presence of the expected resource(s), of how to identify the evidence of the expected resource(s), and of the appropriate protocol in the event of apparent discovery of an archaeological resource;
- The archaeological monitor(s) shall be present on the project site according to a schedule agreed upon by the archaeological consultant and the ERO until the ERO has, in consultation with the project archaeological consultant, determined that project construction activities could have no effects on significant archaeological deposits;
- The archaeological monitor shall record and be authorized to collect soil samples and artifactual/ecofactual material as warranted for analysis;
- If an intact archaeological deposit is encountered, all soils-disturbing activities in the vicinity of the deposit shall cease. The archaeological monitor shall be empowered to temporarily redirect demolition/excavation/pile driving/construction activities and equipment until the deposit is evaluated. If in the case of pile-driving activity (foundation, shoring, etc.), the archaeological monitor has cause to believe that the pile-driving activity may affect an archaeological resource, the pile-driving activity shall be terminated until an appropriate evaluation of the resource has been made in consultation with the ERO. The archaeological consultant shall immediately notify the ERO of the encountered archaeological deposit. The archaeological consultant shall make a reasonable effort to assess the identity, integrity, and significance of the encountered archaeological deposit, and present the findings of this assessment to the ERO.

Whether or not significant archaeological resources are encountered, the archaeological consultant shall submit a written report of the findings of the monitoring program to the ERO.

Archaeological Data Recovery Program

The archaeological data recovery program shall be conducted in accord with an archaeological data recovery plan ("ADRP"). The archaeological consultant, project sponsor, and ERO shall meet and consult on the scope of the ADRP prior to preparation of a draft ADRP. The archaeological consultant shall submit a draft ADRP to the ERO. The ADRP shall identify how the proposed data recovery program will preserve the significant information the archaeological resource is expected to contain. That is, the ADRP will identify what scientific/historical research questions are applicable to the expected resource, what data classes the resource is expected to possess, and how the expected data classes would address the applicable research questions. Data recovery, in general, should be limited to the portions of the historical property that could be adversely affected by the proposed project. Destructive data recovery methods shall not be applied to portions of the archaeological resources if non-destructive methods are practical.

The scope of the ADRP shall include the following elements:

- Field Methods and Procedures. Descriptions of proposed field strategies, procedures, and operations.

- Cataloguing and Laboratory Analysis. Description of selected cataloguing system and artifact analysis procedures.
- Discard and De-accession Policy. Description of and rationale for field and post-field discard and de-accession policies.
- Interpretive Program. Consideration of an on-site/off-site public interpretive program during the course of the archaeological data recovery program.
- Security Measures. Recommended security measures to protect the archaeological resource from vandalism, looting, and non-intentionally damaging activities.
- Final Report. Description of proposed report format and distribution of results.
- Curation. Description of the procedures and recommendations for the curation of any recovered data having potential research value, identification of appropriate curation facilities, and a summary of the accession policies of the curation facilities.

Human Remains and Associated or Unassociated Funerary Objects

The treatment of human remains and of associated or unassociated funerary objects discovered during any soils-disturbing activity shall comply with applicable State and Federal laws. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner’s determination that the human remains are Native American remains, notification of the California State NAHC who shall appoint a MLD (Pub. Res. Code Sec. 5097.98). The archaeological consultant, project sponsor, and MLD shall make all reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (CEQA Guidelines Sec. 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.

Final Archaeological Resources Report

The archaeological consultant shall submit a Draft Final Archaeological Resources Report (FARR) to the ERO that evaluates the historical significance of any discovered archaeological resource and describes the archaeological and historical research methods employed in the archaeological testing/monitoring/data recovery program(s) undertaken. Information that may put at risk any archaeological resource shall be provided in a separate removable insert within the final report.

Once approved by the ERO, copies of the FARR shall be distributed as follows: California Archaeological Site Survey Northwest Information Center (NWIC) shall receive one (1) copy and the ERO shall receive a copy of the transmittal of the FARR to the NWIC. The Major Environmental Analysis division of the Planning Department shall receive two copies (bound and unbound) of the FARR, and one unlocked, searchable PDF copy on a compact disk. MEA shall receive a copy of any formal site recordation forms (CA DPR 523 series) and/or documentation for nomination to the National Register of Historic Places/California Register of Historical Resources. In instances of high public interest in or the high interpretive value of the resource, the ERO may require a different final report content, format, and distribution than that presented above.

Impact CP-2: Project construction activities could disturb human remains, if such resources are present within the Redevelopment Plan Project Area. *(Less than Significant with Mitigation)*

Mitigation Measure M-CP-1 calls for compliance with applicable state and federal laws regarding the treatment of human remains and of associated or unassociated funerary objects discovered during any soils-disturbing activity. This shall include immediate notification of the Coroner of the City and County of San Francisco and in the event of the Coroner's determination that the human remains are Native American remains, notification of the NAHC, who shall appoint a Most Likely Descendant (Public Resources Code Section 5097.98). The archaeological consultant, project sponsors, and MLD shall make reasonable efforts to develop an agreement for the treatment of, with appropriate dignity, human remains and associated or unassociated funerary objects (*CEQA Guidelines* Section 15064.5(d)). The agreement should take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects.

With implementation of Mitigation Measures M-CP-1, implementation of the Redevelopment Plan would not cause a substantial adverse change to the scientific significance of an archaeological resource.

Impact CP-3: Project construction activities could disturb paleontological resources. *(Less than Significant with Mitigation)*

Given that the Franciscan Formation and sedimentary Colma Formation have yielded significant vertebrate fossils within the San Francisco Bay Area, paleontological resources could exist in the Franciscan, and possibly the Colma, Formation that underlies the Project Area. Project construction activities under the Project Area could disturb significant paleontological resources, if such resources are present within the Project Area. Site disturbance could impair the ability of significant archaeological resources within the Project Area to yield important scientific information. Unless mitigated, implementation of the Redevelopment Plan could impair the significance of paleontological resources on the roject Area and would therefore be considered a potentially significant impact under CEQA.

Mitigation Measure M-CP-3 calls for a qualified paleontogist to implement an approved Paleontological Resources Monitoring and Mitigation Program ("PRMMP"). Implementation of the approved plan for monitoring, recovery, identification, and curation under Mitigation Measure

M-CP-3 would ensure that the scientific significance of the resource under CRHR Criterion 4 (Information Potential) would be preserved and/or realized. With implementation of Mitigation Measure M-CP-3, implementation of the Redevelopment Plan would not cause a substantial adverse change to the scientific significance of a paleontological resource.

Mitigation Measure M-CP-3: Paleontological Resources Monitoring and Mitigation Program

The project sponsor shall retain the services of a qualified paleontological consultant having expertise in California paleontology to design and implement a Paleontological Resources Monitoring and Mitigation Program. The PRMMP shall include a description of when and where construction monitoring would be required; emergency discovery procedures; sampling and data recovery procedures; procedure for the preparation, identification, analysis, and curation of fossil specimens and data recovered; preconstruction coordination procedures; and procedures for reporting the results of the monitoring program.

The PRMMP shall be consistent with the Society for Vertebrate Paleontology Standard Guidelines for the mitigation of construction-related adverse impacts to paleontological resources and the requirements of the designated repository for any fossils collected. During construction, earth-moving activities shall be monitored by a qualified paleontological consultant having expertise in California paleontology in the areas where these activities have the potential to disturb previously undisturbed native sediment or sedimentary rocks. Monitoring need not be conducted in areas where the ground has been previously disturbed, in areas of artificial fill, in areas underlain by nonsedimentary rocks, or in areas where exposed sediment would be buried, but otherwise undisturbed. This, by definition, would exclude all of Treasure Island; accordingly, this mitigation measure would apply only to work on Yerba Buena Island.

The consultant's work shall be conducted in accordance with this measure and at the direction of the City's ERO. Plans and reports prepared by the consultant shall be submitted first and directly to the ERO for review and comment, and shall be considered draft reports subject to revision until final approval by the ERO. Paleontological monitoring and/or data recovery programs required by this measure could suspend construction of the Proposed Project for as short a duration as reasonably possible and in no event for more than a maximum of four weeks. At the direction of the ERO, the suspension of construction can be extended beyond four weeks only if such a suspension is the only feasible means to reduce potential effects on a significant paleontological resource as previously defined to a less-than-significant level.

Cumulative Impacts

Impact CP-4: Disturbance of archaeological and paleontological resources, if encountered during construction of the Proposed Project, could contribute to a cumulative loss of significant historic and scientific information. (*Less than Significant with Mitigation)*

When considered with other past and proposed development projects along and near the San Francisco Bay shoreline, the disturbance of archaeological and paleontological resources within Redevelopment Plan Project Area could contribute to a cumulative loss of significant historic and scientific information about California and Bay Area regional history and prehistory. As discussed above, implementation of an approved plan for testing, monitoring, and data recovery would preserve and realize the information potential of archaeological and paleontological resources. The recovery, documentation, and interpretation of information about archaeological and paleontological resources that may be encountered within the Redevelopment Plan Project Area would enhance knowledge of prehistory and history. This information would be available to future archaeological and paleontological studies, contributing to the body of scientific and historic knowledge. With implementation of Mitigation Measure M-CP-1 and Mitigation Measure M-CP-3, the Proposed Project's contribution to cumulative impacts would be less than cumulatively considerable.

D.2 HISTORIC ARCHITECTURAL RESOURCES

This section describes historic architectural resources in the Development Plan Area and its vicinity, and evaluates potential direct and indirect impacts to those resources due to implementation of the Proposed Project. For the purposes of this EIR, the term "historic architectural resource"[6] is used to distinguish such resources from archaeological resources which may also be considered historical resources under CEQA. Archeological resources are studied separately in Section IV.D.1, Archaeological and Paleontological Resources, of this EIR.

The assessment of project impacts on "historical resources," as defined by *CEQA Guidelines* Section 15064.5, is a two-step analysis: first, an analysis of whether a project may impact a resource that falls within the definition of "historical resource(s)" as defined under CEQA; and second, if the project is found to impact historical resources, an analysis of whether the project would cause a substantial adverse change to the resource. A project that may cause a substantial adverse change in the significance of an historical resource is one that may have significant effect on the environment (CEQA Section 21084.1).

Thus, this section has two component subsections. The Setting discussion examines the potential for the presence of historical resources within the Development Plan Area. The Impacts discussion evaluates the impacts of the Proposed Project on the historical resources identified in the Setting subsection.

This historic architectural resources EIR section is based on two technical studies: the *Historic Resource Evaluation Report, Treasure Island* ("HRE") by an independent historic architectural resource consultant, Knapp Architects;[7] and the Historic Resource Evaluation Response ("HRER") by the San Francisco Planning Department.[8] The Planning Department has reviewed the HRE and generally concurs with the HRE's conclusions (except that, contrary to the HRE, the Planning Department finds that demolition of Building 111 would not result in a significant adverse impact on Building 3, as discussed under Impact CP-8 below).

---

6 The "historic architectural resources" evaluated in this EIR include not only buildings, but also structures, objects, landscapes, and historic districts.

7 Knapp Architects, *Historic Resource Evaluation Report, Treasure Island, San Francisco California: Buildings, Structures and Objects Built Between 1947 through 1959 and Landscape Features from 1939 Through 1940*, April 20, 2010. It is incorporated by reference and summarized in this section. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

8 San Francisco Planning Department, *Historic Resource Evaluation Response, Treasure Island*, May 28, 2010. It is incorporated by reference and summarized in this section. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

SETTING

Identifying Historical Resources under CEQA

<u>"Historical Resource" Defined</u>

CEQA Guidelines Section 15064.5(a) defines a "historical resource" as:

(1) A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in the California Register of Historical Resources.

(2) A resource included in a local register of historical resources, as defined in ... the Public Resources Code … or identified as significant in an historical resource survey meeting the requirements … of the Public Resources Code, shall be presumed to be historically or culturally significant.

(3) Any object, building, structure, ... site ... which a lead agency determines to be historically significant or significant in the ... annals of California ... provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources.

(4) The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources …, or identified in an historical resources survey… does not preclude a lead agency from determining that the resource may be an historical resource…

Thus, under the *CEQA Guidelines*, even if a resource is not included on any local, State, or Federal register, or identified in a qualifying historical resources survey, a lead agency may still determine that any resource is an historical resource for the purposes of CEQA if there is substantial evidence supporting such a determination. A lead agency must consider a resource to be historically significant if it finds that the resource meets the criteria for listing in the California Register of Historical Resources ("CRHR").

<u>California Register of Historical Resources Criteria</u>

A resource that meets at least one of the eligibility criteria for inclusion in the CRHR is considered an historical resource for the purposes of CEQA. A resource is eligible for listing in the CRHR if it:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (Events);

(2) Is associated with the lives of persons important in our past (Persons);

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values (Design/Construction); or

(4) Has yielded, or may be likely to yield, information important in prehistory or history (Information Potential).

Integrity

In addition to qualifying for listing under at least one of the CRHR criteria, a property must possess sufficient integrity to be considered eligible for the CRHR. National Park Service guidance on determining eligibility under the National Register of Historic Places informs the determination of eligibility for inclusion in the CRHR. According to the *National Register Bulletin: How to Apply the National Register Criteria for Evaluation*, integrity is defined as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance." The National Register Bulletin defines seven characteristics of integrity as follows:

> Location is the place where the historic property was constructed.
>
> Design is the combination of elements that create the form, plans, space, structure and style of the property.
>
> Setting addresses the physical environment of the historic property inclusive of the landscape and spatial relationships of the buildings.
>
> Materials refer to the physical elements that were combined or deposited during a particular period of time and in a particular pattern of configuration to form the historic property.
>
> Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history.
>
> Feeling is the property's expression of the aesthetic or historic sense of a particular period of time.
>
> Association is the direct link between an important historic event or person and an historic property.

Historic Background

Although the Navy has managed Yerba Buena Island and Treasure Island (collectively, Naval Station Treasure Island, or "NSTI") as a single facility since 1940, the two islands have different histories. Yerba Buena Island is a natural island that has been used by private parties and by the Army and Navy since the 1840s. Treasure Island is an artificial island, constructed in 1936-1937 in the rocky shoals north of Yerba Buena Island.

Yerba Buena Island

The context for historic architectural resources on Yerba Buena Island begins with the Army's occupation of the island in 1867, when the Army asserted a claim and took possession of the island. Troops were stationed on the southeastern part of the island, above a cove near the modern Coast Guard Station. In 1875 the Army constructed the lighthouse and lighthouse keeper's residence at the southern end of the island (these buildings still stand, but they are outside of the Development Plan Area). In 1879, the Army reassigned artillery units to the Presidio of San Francisco and abandoned the Yerba Buena Island garrison for a time. In 1891, the Army Coast Artillery Corps took control of the island and erected a torpedo (i.e., underwater mine) depot at the eastern tip of the island (the Torpedo Assembly Building, also known as Building 262). The Army retained control of the eastern tip of the island until 1960.

In 1898, the Navy established a Naval Training Station at the location of the Army base. The Navy undertook extensive grading on the east cove part of the island to create a level parade ground flanked by officers' quarters and other military facilities (including Senior Officers' Quarters, barracks, offices, a mess hall, and classrooms). Only the Senior Officers' Quarters (including the Nimitz house, other officers' quarters, associated garages and landscaping) remain from this era. The Naval Training Station was active until 1923 when, due to overcrowding at the facility, the Navy relocated it to the Naval Training Center in San Diego. The Navy facility on Yerba Buena Island became a receiving station, housing crews awaiting assignment. In the mid-1930s the San Francisco-Oakland Bay Bridge was constructed through the island. The officers' quarters continued to house officers from Treasure Island. In 1966, residences were built on the north and west sides of the islands for Coast Guard officers. In 1997, NSTI was closed under the Base Closure and Realignment Act. Since that time, the Treasure Island Development Authority ("TIDA") has served as caretaker of NSTI under the terms of a Cooperative Agreement with the Navy.

Treasure Island

Treasure Island has evolved through three distinct periods, described below.

Golden Gate International Exposition (1936-1940)

The U.S. Army Corps of Engineers constructed the 404-acre Treasure Island during 1936 - 1937 to provide a short-term site for the Golden Gate International Exposition of 1939 ("GGIE"). Treasure Island is an entirely man-made island constructed of rock and mud fill placed over shallow areas at the northern shore of Yerba Buena Island. After completion, the new island was connected to Yerba Buena Island by a narrow causeway at the island's southwest corner. The GGIE was conceived to celebrate construction of both the Golden Gate Bridge and the San Francisco-Oakland Bay Bridge. Many of the buildings constructed for the Exposition were monumental in scale. Most buildings were built to be temporary, with the intent to convert the site into a permanent airport for San Francisco when the exposition closed. Only three buildings from the GGIE were planned to be permanent, serving both GGIE and airport functions, and these buildings remain today: Building 1, the Terminal or Administration Building; Building 2, the Hall of Transportation; and Building 3, the Palace of Fine and Decorative Arts (Building 111 is an addition to Building 3). The idea of converting Treasure Island into an airport was abandoned with the advent of World War II.

The foundation of the GGIE plan was its formal and axial spatial organization. Two central axes intersected at the Court of Honor. The primary axis was oriented north-to-south and the secondary axis was oriented east-to-west. The arrangement of the Exposition's primary buildings along these axes were the basic components of this organization. The secondary buildings and the circulation arteries were arranged in a grid system in relation to these axes. The use and location of vegetation supported this organization (e.g., through the use of uniform street tree plantings, the use of trees around the edges of courtyards, and the use of plants to frame entries to buildings). The purpose of the planting design was to provide "decorative enhancement and to frame the buildings and sculptural features and to provide a counterpoint to the architectural framework of the site."[9]

World War II Period (1941-1946)

In February 1941, the Navy took possession of Treasure Island from San Francisco in exchange for land south of San Francisco on the Peninsula that would become the site of Mills Field, now San Francisco International Airport. This action combined the military holdings of Yerba Buena Island and Treasure Island into one. Following the bombing of Pearl Harbor in December 1941, the Navy built several hundred additional temporary buildings on Treasure Island during the period between 1942 and 1945. Many of the GGIE's temporary structures were used by the Navy during the war, and additional structures were constructed. The island was used as a combined Receiving Station/Distribution and Training Center.

Post World War II Period (1946-Present)

Following World War II, the Navy transformed Treasure Island into a training facility, where it unified various specialized technical schools from throughout the Bay Area into a consolidated facility. The Navy demolished dozens of GGIE and World War II-era temporary structures during the 1960s and 1970s to allow new construction, filling the need for modern residential and classroom buildings suited to training and instruction.

---

[9] HRE, quoting Eugen Neuhaus, p. 23.

As discussed above for Yerba Buena Island, the Navy closed NSTI in 1997, and Treasure Island Development Authority has served as the caretaker of NSTI. During this interim period, NSTI has served many purposes. Many of the buildings are vacant, but most of the former Navy family living quarters have been leased, and there is a program in place to house the City's homeless. The Casa de la Vista, on the Avenue of the Palms, serves as a rental venue for gatherings. The lobby of Building 1 is open to the public, and the building houses TIDA's offices. Building 2 is used by Island Creative, which builds sets for theater, film and corporate industrial shows. Building 3 is home to studios and is currently used as a TV film studio. The United States Department of Labor maintains ownership and jurisdiction over the site of the Job Corps campus, which consists of 37 acres near the center of Treasure Island. The Job Corps campus is not part of the Development Plan Area and will continue to occupy that site.

Historic Architectural Resources on Treasure Island and Yerba Buena Islands

No historic architectural resource on Yerba Buena Island or Treasure Island has been designated at the local level under Article 10 or Article 11 of the San Francisco Planning Code. No historic architectural resource has been included in any local survey of historic architectural resources.

Treasure Island was designated as State Historic Landmark No. 987 in 1989, and is therefore included in the California Register of Historical Resources. The basis for the island's designation as a State Historic Landmark is its association with GGIE, so only features associated with GGIE would be part of the State Historic Landmark designation.

Historic architectural resources on Yerba Buena Island and Treasure Island have been comprehensively studied as part of Section 106 compliance for Navy actions, including the transfer of Navy property out of Federal ownership. In 1992, Building 1 (the Administration Building), Building 2 (the Hall of Transportation), and Building 3 (the former Palace of Fine and Decorative Arts, including Building 111 as an addition to Building 3) were each found eligible for individual listing on the National Register of Historic Places. In 1997, the Department of the Navy undertook a comprehensive survey of all buildings and structures on Treasure Island and Yerba Buena Island (the "1997 Inventory and Evaluation").[10] The 1997 Inventory and Evaluation included preparation of an historic context as well as a survey of all buildings on both islands. The 1997 Inventory and Evaluation studied and evaluated each building that was 50 years or older at that time for its eligibility for listing in the National Register of Historic Places. The 1997 Inventory and Evaluation identified as eligible for listing a Senior Officers' Quarters Historic District (also known as the "Great Whites"), consisting of The Nimitz House (Quarters 1), six other senior officers' quarters (Quarters 2-7), associated garages (Building 205, Building 230), family quarters (Building 83), and certain associated formal landscaping elements within

[10] United States Department of the Navy, *Cultural Resources Inventory and Evaluation Investigations*, prepared by JRP Historical Consulting Services, January 1997.

the district boundaries. The study also identified two other individually eligible structures within the Development Plan Area that are not associated with the historic district: Quarters 10 and its contributing garage (Building 267) and the Torpedo Assembly Building (Building 262).

Pursuant to the Memorandum of Agreement for the transfer of Navy property out of Federal ownership, all buildings or contributing elements to districts on Yerba Buena Island and Treasure Island that have been determined eligible for listing in the National Register of Historic Places ("NRHP"), have been formally nominated to, and listed in, the NRHR. Table IV.D.1 lists these buildings.

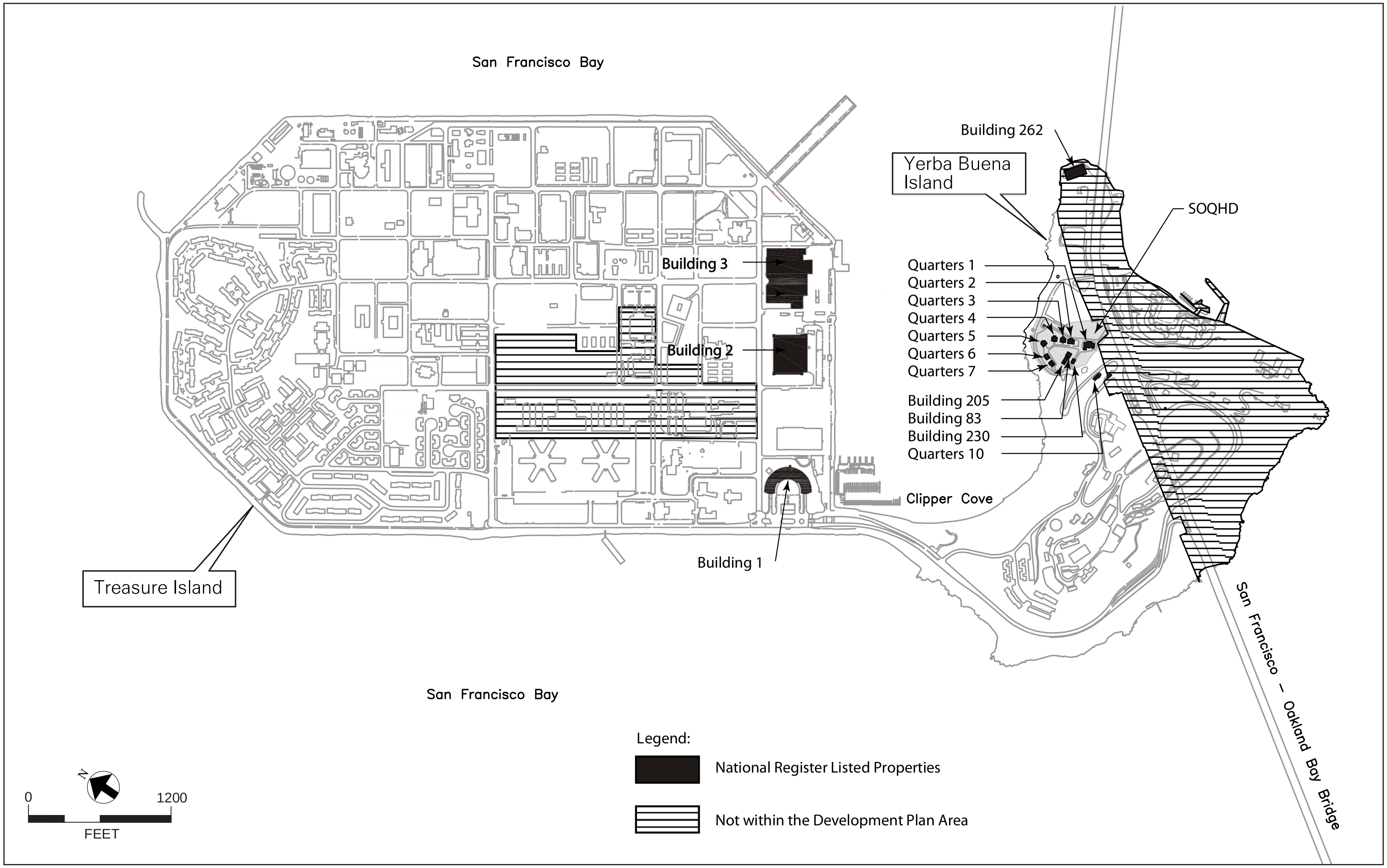
Table IV.D.1: NRHP Listed Properties in the Development Plan Area

Resource Number	**Resource Name**	**Year Constructed**
Yerba Buena Island		
1, 2-7, 83, 205, 230	Senior Officers' Quarters Historic District: The Nimitz House (Quarters 1); six other senior officers' quarters (Quarters 2-7), associated garages (Building 205, Building 230), family quarters (Building 83), and formal landscaping elements of the area.	1900 - 1905
1	Nimitz House (individually listed and a contributor to district)	1900
10/267	Quarters 10 and its contributing garage (individually listed)	1948
262	Torpedo Assembly Building (individually listed)	1891
<u>Treasure Island</u>		
1	Administration Building, Building 1 (individually listed)	1939
2	Hall of Transportation, Building 2 (individually listed)	1939
3	Palace of Fine and Decorative Arts, Building 3 (individually listed, Building 111 is identified as a component of Building 3)	1939

Note: This table excludes Yerba Buena Island buildings that are south of the Bay Bridge. They are currently located on the U.S. Coast Guard Station. They are not within the Development Plan Area and are not subject to study in this EIR Section.

Source: San Francisco Planning Department, 2005 EIR.

Figure IV.D.1: Location of NRHP Listed Properties, shows the location of resources listed on the NRHP in the Development Plan Area. As resources listed in the NRHP, they are considered to be included in the CRHR, and as such, are also considered historical resources for the purposes of CEQA.



SOURCE: U.S. Navy

TREASURE ISLAND AND YERBA BUENA ISLAND REDEVELOPMENT PROJECT EIR

FIGURE IV.D.1: LOCATION OF NRHP LISTED PROPERTIES

Supplemental Study of Historic Architectural Resources on Treasure Island

As part of the environmental review of the Proposed Project, the HRE includes supplemental study of potential historical resources that may be affected by the current Proposed Project. The HRE covers gaps in analysis due to the passage of time since the earlier studies of historic resources on Treasure Island and Yerba Buena Island were undertaken. The HRE evaluates the significance of those buildings and structures on Treasure Island, that have reached 50 years in age since the 1997 Inventory and Evaluation was completed (i.e., built between 1947 and 1959). In addition, the HRE evaluates the potential for a NSTI historic district, consisting of all buildings on the island dating from the Navy's tenure regardless of age.

The HRE did not evaluate any new resources on Yerba Buena Island because the nature and scope of alteration and demolition work on Yerba Buena Island under the Proposed Project would not affect any building that is now 50 years in age or older that was not already studied in the 1997 Inventory and Evaluation. No study of buildings on the Job Corps campus on Treasure Island was undertaken because these buildings are not within the proposed Development Plan Area and would not be directly affected by the Proposed Project.

The HRE also reflects an increased emphasis on cultural landscape, setting, and context within the discipline of Historic Preservation generally, since earlier studies that were undertaken did not place as much emphasis on these areas. The HRE studies and evaluates the individual significance of landscape features that survive from the GGIE. It also evaluates the collective significance of these remaining landscape features, together with Buildings 1, 2, and 3 (these buildings have already been studied and determined to be individual historic resources) as a potential historic district.

See Table IV.D.2 and Figure IV.D.2: Location of Treasure Island Resources Studied in the HRE.

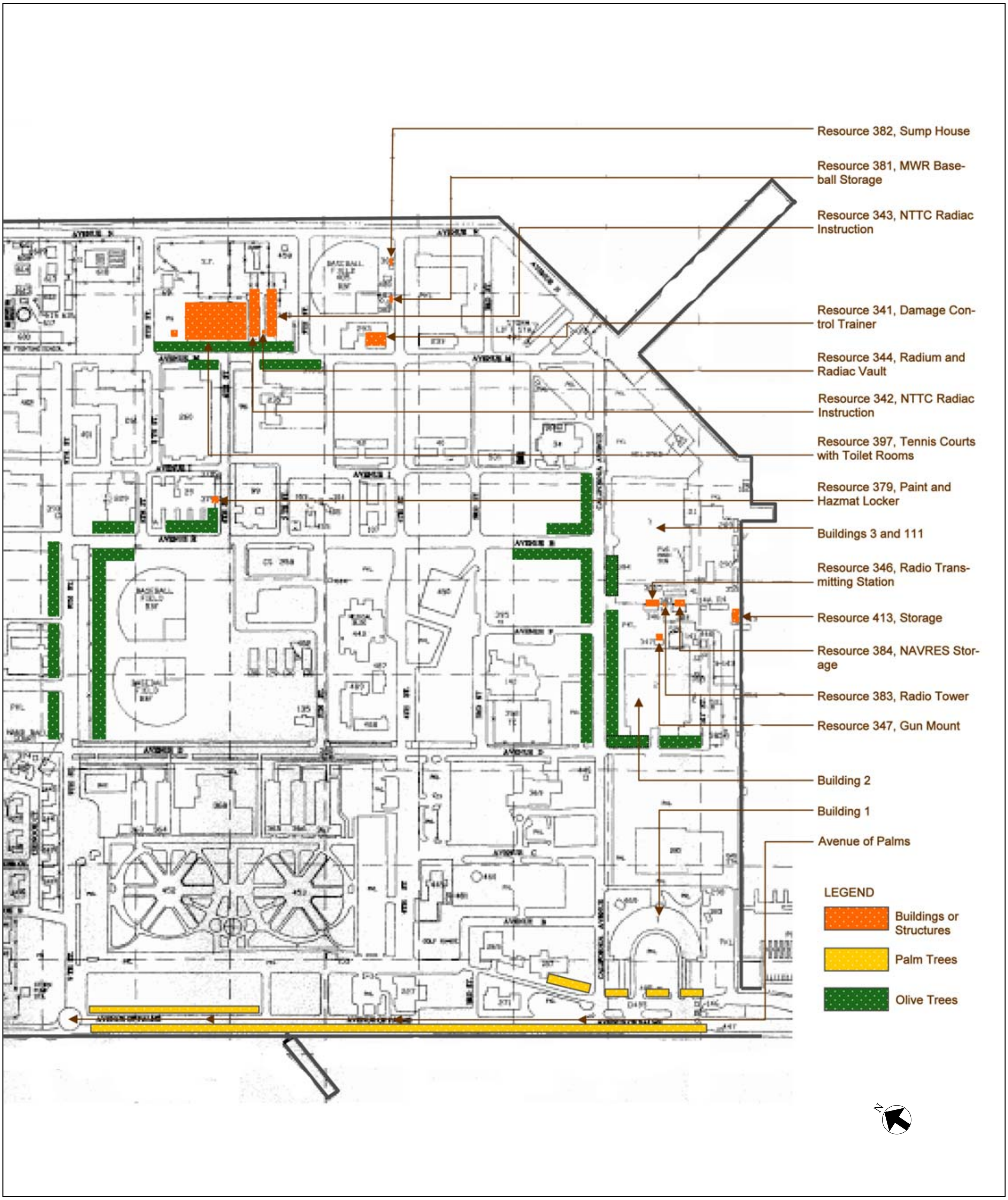
<u>NSTI Resources on Treasure Island (1947-1959)</u>

The HRE summarizes the historic context for Naval Station buildings on Treasure Island. It studies each of the 13 individual extant buildings and structures (including any objects located within those buildings and structures) that have reached 50 years in age since the 1997 Inventory and Evaluation was completed. The HRE also studies all remaining Naval Station buildings, structures, objects, and landscapes on Treasure Island for their potential collective eligibility for inclusion in the CRHR as an historic district.

Table IV.D.2: Treasure Island Resources Studied in the HRE

Resource Number	Resource Name	Year Constructed
NSTI Resources (1947-1959)		
341	Damage Control Trainer with *U.S.S. Buttercup*	1951
342	Naval Technical Training Center (NTTC) RADIAC Instruction	1951
343	Naval Technical Training Center (NTTC) RADIAC Instruction	1951
344	Radium and Radiac Vault	1951
346	Radio Transmitting Station	1950
347	Gun Mount	1951
379	Paint and Hazmat Locker	1956
381	MWR Baseball Storage	1957
382	Sump House	1959
383	Radio Tower	1948
384	NAVRES Storage	1958
397	Tennis Courts	1950
413	Storage	1950
NA	Potential Naval Station Historic District	1942-1959
GGIE Landscape Resources		
NA	Potential GGIE Landscape Historic District	1939
NA	Avenue of the Palms	1939
NA	Olive Trees (various locations)	1939
NA	Landscape as contributing feature to Building 1	1939
NA	Landscape as contributing feature to Building 2	1939
NA	Landscape as contributing feature to Building 3	1939
NA	Potential GGIE Historic District, consisting of remaining GGIE landscape features and remaining GGIE structures (Building 1, Building 2, and Building 3)	1939

Source: Knapp Architects



SOURCE: Knapp Architects

FIGURE IV.D.2: LOCATION OF TREASURE ISLAND RESOURCES STUDIED IN THE HRE

<u>Potential Individual NSTI Historical Resources</u>

For each of these individual resources, the HRE presents research into its history, provides a physical description of the resource, and describes its current condition. The HRE evaluates each resource's significance under the relevant CRHR eligibility criteria: Criterion 1 (Events); Criterion 2 (Persons); and Criterion 3 (Design/Construction).[11] Based on the research and analysis presented in the HRE for each individual resource, of the 13 individual resources studied, the HRE concludes that 12 of these do not meet the criteria for inclusion in the CRHR. These conclusions are based on a lack of substantial evidence that indicates that these resources possess sufficient association with important historical events or persons, or possess distinctive characteristics of design or construction, such that they would be eligible for inclusion in the CRHR. For these reasons, resources 342, 343, 344, 346, 347, 379, 381, 382, 383, 384, 397, and 413 are not considered Historical Resources for the purposes of CEQA.

The HRE concludes that one individual resource, the Damage Control Trainer (housed in Building 341) meets the criteria for inclusion in the CRHR, discussed in further detail below. (Building 341 itself was not considered to meet the criteria for inclusion, and is not considered an historical resource.)

Individual Historical Resource Identified by the HRE: The Damage Control Trainer

The Damage Control Trainer was constructed around 1951.[12] It consists of two distinct properties: the building that houses the Damage Control Trainer and the Damage Control Trainer object contained within the building. The Damage Control Trainer is a battleship simulator known as the *U.S.S. Buttercup*. The simulator duplicated a portion of a ship's exterior deck and below deck interior compartments and was capable of being flooded with water and blown with wind to simulate the effects of battle damage on the high seas. As part of their practical training, sailors were required to save the flooding ship by controlling all leaks. The students also learned the skills to repair structural damage to the ship's overhead piping and decks with the use of shoring, patching, and dewatering methods.

The building housing the Damage Control Trainer is likely a prefabricated building constructed by the Butler Manufacturing Company, as the construction is identical to other known Butler

[11] California Register of Historical Resources Criterion 4 (Information Potential) is commonly understood to apply primarily to archaeological resources. Such resources may lack sufficient historical documentation, physical integrity, or physical accessibility (they may be buried or submerged) to describe their character and evaluate their significance. Archaeological research and investigative methods are necessary to realize the information potential of such resources. The architectural resources date from the Navy's occupation of Treasure Island, a relatively recent historic era that is well documented in the historic record. These resources are therefore not likely to yield important scientific or historical information under CRHR Criterion 4 that is not already documented in the historic record.

[12] The construction dates were not established from permits but rather by the study of dated maps and/or photographs. Maps were not available for every year, so the dates are broad and to be considered as circa.

buildings cited in the HRE study. On its interior, a concrete floor has a narrow pathway of varying widths around the perimeter of the building. This surrounds a pool which contains a portion of a battleship hull. The hull pivots within the tank on axis points that simulate the action of an ocean-going ship. The hull has a flat deck surrounded by stanchions with chains between them. The deck is accessed by an angled ladder on the east. A small deck house sits on the south end of the deck. The area below deck is accessed by a hatch. An angled metal ladder goes below deck, where there is a single large room. Skylights illuminate the interior during daylight hours.

The HRE concludes that while the building housing the Damage Control Trainer does not meet the criteria for inclusion in the CRHR, the Damage Control Trainer itself does meet the criteria for inclusion in the CRHR under Criterion 3 (Design Construction). Although the building housing the Damage Control Trainer is not a unique or rare building type, the *U.S.S. Buttercup,* as an object, is a rare device. All damage control trainers used by the Navy have this affectionate name, and two others are known to still be functioning. One is located at Naval Station Norfolk in Virginia and the other at Naval Station Newport, in Rhode Island. A new facility was recently built for the Navy in Great Lakes, Illinois, which has a trainer. The *U.S.S. Buttercup* is a rare and distinctive object, exhibiting specialized design and construction for military training, which is an important aspect of military history. Because this object is one of a handful in the United States, and the only such object on the West Coast, it is significant at the State level under CRHR Criterion 3.

As a resource eligible under the CRHR, the Damage Control Trainer is considered an historical resource for the purposes of CEQA.

Potential NSTI Historic District

Although individual Navy resources (with the exception of the Damage Control Trainer) do not appear to be individually significant, the HRE considers whether the remaining NSTI resources on Treasure Island are collectively eligible for listing in the CRHR as a potential historic district. An historic district is defined in the *National Register Bulletin: How to Apply the National Register Criteria for Evaluation,* which states that the proposed district must contain "a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development."[13]

The HRE concludes that the remaining NSTI resources do not meet CRHR criteria for an historic district due to lack of integrity. The collection of buildings, structures, objects, and landscape features does not retain integrity because of the extent of demolition and new construction within the past 50 years. The remaining Navy resources lack sufficient spatial, historic, and aesthetic

[13] National Register Bulletin, *How to Apply the National Register Criteria for Evaluation*, U.S. Department of the Interior, National Park Service, 1995. http://www.nps.gov/history/nr/publications/bulletins/pdfs/nrb15.pdf.

cohesiveness within the collection of NSTI properties to classify them as an historic district. Research has not uncovered evidence that the Naval Station possesses a sufficiently close association with important historic events or persons to merit inclusion in the CRHR under Criterion 1 (Event) or Criterion 2 (Persons). The remaining NSTI resources on Treasure Island do not represent a significant example of military base design. As a group, these properties do not collectively exhibit important design principles, methods of construction, or urban design characteristics under CRHR Criterion 3 (Design/Construction).

For these reasons, the remaining buildings, structures, and objects of NSTI are not collectively considered an historical resource under CEQA

GGIE Landscape Resources

The HRE studies landscape features that remain from the GGIE as contributing features to individual resources Buildings 1, 2, and 3, and collectively as historic districts.[14] These resources are listed in Table IV.D.2, p.IV.D.34. For each of these landscape features, the HRE presents research on its history, provides a physical description of the resource, and describes its current condition. The HRE evaluates each landscape feature's significance under the relevant CRHR eligibility criteria: Criterion 1 (Events), Criterion 2 (Persons), and Criterion 3 (Design/Construction).

Potential GGIE Landscape Historic District

Based on the research and analysis presented in the HRE, a potential historic district consisting of the remaining landscape features from the GGIE does not meet the criteria for inclusion in the CRHR due to a lack of integrity. The designed landscape on Treasure Island was a component of the overall plan for the GGIE and its significance would be as a contributing component supporting the overall plan. The spatial organization that resulted from the formal arrangement of the GGIE's buildings, circulation system, and vegetation is no longer evident on the island. The overwhelming majority of the original buildings have been removed from the island, and the street system has been altered. The majority of the vegetation materials are no longer extant, and the feeling created through the use of plant materials, color, water, and lighting that characterized the landscape during the fair is missing. As a result of these losses, there is no integrity of design, materials, workmanship, setting, feeling, or association related to the GGIE landscape. The significance of this resource is derived from its contribution to the overall spatial organization of

[14] The evaluation of historic designed landscapes is slightly different than that of historic buildings. The National Register Bulletin, *How to Evaluate and Nominate Historic Designed Landscapes*, provides guidance regarding the evaluation of landscapes. The National Register guidelines suggest that evaluators consider aspects such as spatial relationships, vegetation, original property boundary, topography/grading, site furnishings, design intent, architectural features, and circulation system. National Register Bulletin, *How to Evaluate and Nominate Historic Designed Landscapes*, http://www.nps.gov/nr/publications/bulletins/nrb18/iNDEX.htm.

the GGIE. Because the spatial organization of the GGIE is no longer evident, the remaining landscape resources of the GGIE are unable to convey that significance.

For these reasons, a potential GGIE landscape historic district is not considered an historical resource for the purposes of CEQA.

Individual Landscape Features: Avenue of the Palms and Olive Trees

Based on the research and analysis presented in the HRE, the Avenue of the Palms and the remaining olive trees do not meet the criteria for inclusion in the CRHR due to a lack of integrity. Neither resource is considered individually eligible; rather, its significance, if any, would be as a contributor to an overall GGIE landscape district. However, the spatial organization that resulted from the formal arrangement of the GGIE's buildings, circulation system, and vegetation is no longer evident on the island. The overwhelming majority of the original buildings have been removed from the island, and the street system has been altered. The majority of the vegetation materials are no longer extant, and the feeling created through the use of plant materials, color, water, and lighting that characterized the landscape during the fair is missing. As a result of these losses, there is no integrity of design, materials, workmanship, setting, feeling, or association related to the GGIE landscape. The significance of each of these resources is derived from their contribution to the overall spatial organization of the GGIE. Because the spatial organization of the GGIE is no longer evident, these individual landscape features are unable to convey that significance.

For these reasons, the Avenue of the Palms and the remaining olive trees are not considered Historical Resources for the purposes of CEQA.

Potential Historic District Consisting of Remaining GGIE Landscape Features and Buildings

The National Park Service defines an historic district as "a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development."[15] An historic district derives its significance as a single unified entity. A surviving fragment of a much larger original collection of resources may continue to possess sufficient integrity as an historic district if those buildings and features that remain have sufficient spatial, functional, and aesthetic coherence among themselves to qualify as an historic district. For this reason, the HRE evaluates the potential collective CRHR eligibility of all remaining GGIE landscape features and buildings as a potential historic district.

The remaining GGIE buildings and landscapes do not constitute a coherent historic district under CRHR Criteria. Buildings 1, 2, and 3 and the remaining portions of their individual landscape settings are tangible reminders of the GGIE and are artifacts of this event. They are generally

[15] National Register Bulletin Number 15, p. 5.

compatible in style and scale, and are aligned from east to west along the southern edge of Treasure Island. However, they were not designed to relate to one another. Rather, they relate to the major north-south axis of the larger original GGIE plan. No ceremonial east-west progression or circulation axis connected these three buildings to each other within the original GGIE plan. Within the original GGIE plan, a building (the Yerba Buena Club) intervened between Buildings 1 and 2 at the eastern edge of the formal landscaped plaza that originally existed east of Building 1 (the Enchanted Garden). The main entrance to Building 3 is on the north side of that building. That entrance aligned with and served as the terminus for the Pacific Promenade, a major north-south axis under the original GGIE plan.

Any potential significance of Buildings 1, 2, and 3 and the remaining landscape features would be as contributing features within the overall GGIE plan. However, the remaining collection of buildings and landscape features from the original GGIE plan is not sufficient to convey the design, setting, feeling of, and association with the GGIE. Therefore, the HRE concludes that the remaining buildings and landscape features from the GGIE do not retain sufficient integrity to qualify as an historic district meeting CRHR criteria, and as such, are not collectively considered an historical resource under CEQA.

Landscapes as Contributing Features to Individual Buildings 1, 2, and 3

Building 1 is individually listed on the National Register of Historic Places under Criterion A (Events) in association with the GGIE and under Criterion C (Design/Construction) as an example of the Art Moderne style of commercial architecture from the late 1930s.[16] The boundary for this listing only included the "area immediately adjacent to the Administration Building." This is shown on the boundary map in the NRHP nomination form as including the landscape area in front of the building (to California Avenue, to the Avenue of Palms, and to the edge of a line extending from the south edge of the building). The boundary map in the NRHP nomination excluded the landscape area and hardscape on the building's east side (facing the now non-extant Enchanted Garden) and the landscape area on the building's south side that extended from the building to the Esplanade. The boundary justification in the NRHP nomination stated that these areas were excluded because they lacked integrity to the period of significance (1938-1940).

Building 2 is individually listed in the National Register of Historic Places under Criterion A in association with the GGIE and under Criterion C as an example of the Art Moderne style of commercial architecture from the late 1930s. The boundary for the NRHP listing only included the "area immediately adjacent to the Hall of Transportation." The boundary map in the NRHP nomination excluded the landscape area and hardscape adjacent to Building 2, and the boundary

[16] JRP Historical Consulting, *Administration Building (Building 1), Treasure Island National Register Nomination Form* (no date).

justification stated that these areas were excluded from the boundary because they lacked integrity to the period of significance.

Building 3 is individually listed in the National Register of Historic Places under Criterion A in association with the GGIE and under Criterion C as an example of the Art Moderne style of commercial architecture from the late 1930s. The boundary for the NRHP listing included only the "area immediately adjacent to the Palace of Fine and Decorative Arts." The boundary map in the NRHP nomination included the landscape area along the California Avenue side of the building but did not extend past the building on its east, south, and west sides. The boundary justification stated that the original landscape setting on these sides of the building was excluded from the boundary because it lacked integrity to the period of significance.

As part of, and for the purposes of, this EIR, the HRE studies each of the landscapes associated with Buildings 1, 2, and 3. Information on the landscapes associated with each building is based on a review of plans from the Exposition that show the landscape features at a schematic level, historical photographs, and historical aerial photographs. The HRE identifies, describes, and evaluates their significance and integrity. Based on closer study of these features than has been conducted in previous studies, the HRE identifies the particular landscape features that contribute, or do not contribute, to the significance of each building under CRHR criteria, and delineates a boundary for the contributing landscape features associated with each building. This boundary does not modify the existing NRHP site boundary for each building. Rather, it supplements those boundaries for the purposes of this EIR. Contributing landscape areas identified in the HRE for the purposes of this EIR are each discussed separately below for Buildings 1, 2, and 3.

Contributing Landscape Associated with Building 1

Building 1, the "Administration Building" during the GGIE, was located along the outer row of the Exposition's exhibits and features on the island's southern edge, between California Avenue and the Esplanade. The building was located immediately adjacent to the vehicular entrance to the Exposition, and its primary entrance faced the Avenue of Palms. There were distinctly delineated landscape areas around the building's west, north, east, and south sides that created a landscape setting for the building, defined the space associated with it, and provided a separation between the building and the adjacent circulation features (the Avenue of Palms, California Avenue, Marguerite Path, and the Esplanade). In general, the planting around the building was less elaborate than in the various Courtyards (which were key outdoor gathering spaces for the Exposition). However, due to its highly visible location at the vehicular entrance to the GGIE, the landscape treatment for the front of the building was an integral part of its design.

The original GGIE landscape setting for Building 1 did not include the Esplanade and the area along the waterfront south of the building, since these were related to the overall function of the island during the Exposition and not to that of Building 1. Neither the design of the building nor its associated landscape setting was oriented toward the waterside. The significance and integrity of Building 1 under CRHR Criterion 1 (its association with the GGIE) and Criterion 3 (as an example of the Art Moderne style of commercial architecture from the late 1930s) do not depend on this waterside setting.

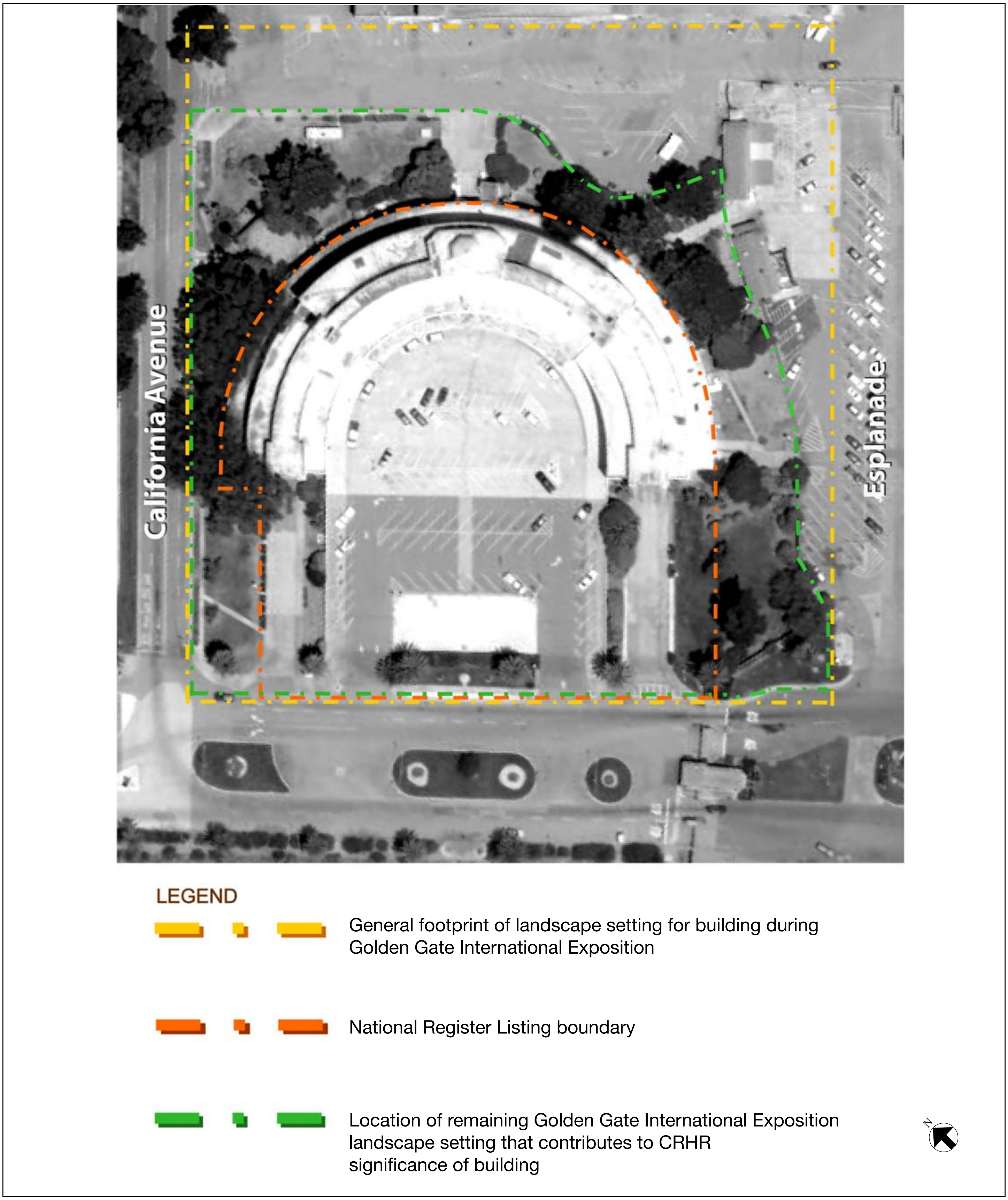
Today, the landscape zone for Building 1 remains largely intact. Remaining features associated with the GGIE landscape design to the west of the building include the entrance drive and walkways that follow the U-shape of the building plan, retaining walls flanking the building, and the location of a landscape bed across from the front entrance. To the north, east, and south of Building 1, landscape zones continue to contribute to the ability of Building 1 to convey its association with the GGIE and its original design intent. The HRE identifies contributing landscape areas associated with Building 1. See Figure IV.D.3: Building 1 Contributing Landscape Areas.

The landscape setting around the Building 1's east, north, west, and south sides retains sufficient integrity to contribute to the significance of the building under CRHR Criterion 1 (in association with the GGIE). These landscape areas still convey the general spatial organization of the building and the GGIE under CRHR Criterion 3 (Design/Construction). For these reasons, and for the purposes of this EIR, these landscape areas are considered contributing features to the significance of the Building 1 historical resource under CEQA. Note, however, that not all landscape features within these areas contribute to the significance of Building 1, and the HRE identifies only particular features as contributing, while other features are identified as noncontributing.[17]

Contributing Landscape Associated with Building 2

Building 2, the "Hall of Transportation" during the GGIE, was located along the outer row of the Exposition exhibits and features on the island's southern edge between California Avenue and the Esplanade. The primary entrance to Building 2 was on its west side, facing what is now Avenue D. There were distinctly delineated lawn areas on the building's west, north, and south sides that created a landscape setting for the building, defined the space associated with it, and provided a separation between the building and the adjacent circulation features (Avenue D, California Avenue, and the Esplanade). In general, the planting around the building was less elaborate than in the various Courtyards (which were the key outdoor gathering spaces for the Exposition) and the focus was on the exhibits within Building 2, not on the outdoor spaces that surrounded the building.

[17] HRE, pp. 83-84.



SOURCE: Knapp Architects

**FIGURE IV.D.3: BUILDING 1
CONTRIBUTING LANDSCAPE AREAS**

As with Building 1, the original GGIE landscape setting for Building 2 did not extend to include the Esplanade and the area along the waterfront south of the building, since these were related to the overall function of the island during the Exposition and not to that of Building 2. Neither the design of Building 2, which served as an exhibition hall during the Exposition, nor its associated landscape setting focused on the waterside, and the significance and integrity of Building 2 under the CRHR Criterion 1 (in association with the GGIE) and Criterion 3 (as an example of the Art Moderne style of commercial architecture from the late 1930s)[18] do not depend on this waterside setting.

Today, the landscape setting for Building 2 is still evident, but there have been a number of changes. Key components of the landscape setting along the west side of the building remain in place (the lawn, the paved connection to the building's primary entrance that divides the lawn area into two sections, and about 9 of the original 12 olive trees, enough to provide a sense of the original row). Key components of the landscape setting along the north side of the building also remain (lawn, sidewalk leading to the entry in the middle of the building, row of olives along California Avenue). The east side of the building remains paved. However, the GGIE design for this area has been altered with the repaving of the area and the addition of structures. The plant materials and original pavement from the Exposition have been removed along the south side. The HRE identifies contributing landscape areas associated with Building 2. See Figure IV.D.4: Building 2 Contributing Landscape Areas.

The landscape setting around Building 2's west and north sides retains sufficient integrity to contribute to the significance of the building under CRHR Criterion 1 (in association with the GGIE). These landscape areas still convey the spatial organization of the building and the GGIE under CRHR Criterion 3 (Design/Construction). For these reasons, and for the purposes of this EIR, these landscape areas are considered contributing features to the significance of the Building 2 historical resource under CEQA. Note, however, that not all landscape features within these areas contribute to the significance of Building 2, and the HRE identifies only particular features as contributing, while other features are identified as noncontributing.[19]

Contributing Landscape Associated with Building 3

Building 3, the "Palace of Fine and Decorative Arts" during the GGIE, was located along the outer row of the Exposition exhibits and features on the island's southern edge between California Avenue and the Esplanade. Its primary entrance was on California Avenue and aligned with

[18] JRP Historical Consulting, *Hall of Transportation (Building 2), Treasure Island National Register Nomination Form* (no date).
[19] HRE, pp. 91-92.

LEGEND

General footprint of landscape setting for building during Golden Gate International Exposition

National Register Listing boundary

Location of remaining Golden Gate International Exposition landscape setting that contributes to CRHR significance of building

SOURCE: Knapp Architects

FIGURE IV.D.4: BUILDING 2 CONTRIBUTING LANDSCAPE AREAS

Avenue H, one of the main north-to-south oriented circulation corridors for the Exposition. There were distinctly delineated landscape areas around Building 3 that created a landscape setting for the building, defined the space associated with it, and provided a separation between the building and the adjacent circulation features (the unnamed street between Buildings 2 and 3, California Avenue, Argonaut Place, and the Esplanade). In general, the planting around the building was less elaborate than in the various Courtyards (which were the key outdoor gathering spaces at the Exposition) because the focus was on the exhibits within Building 3 and not on the outdoor spaces that surrounded the building.

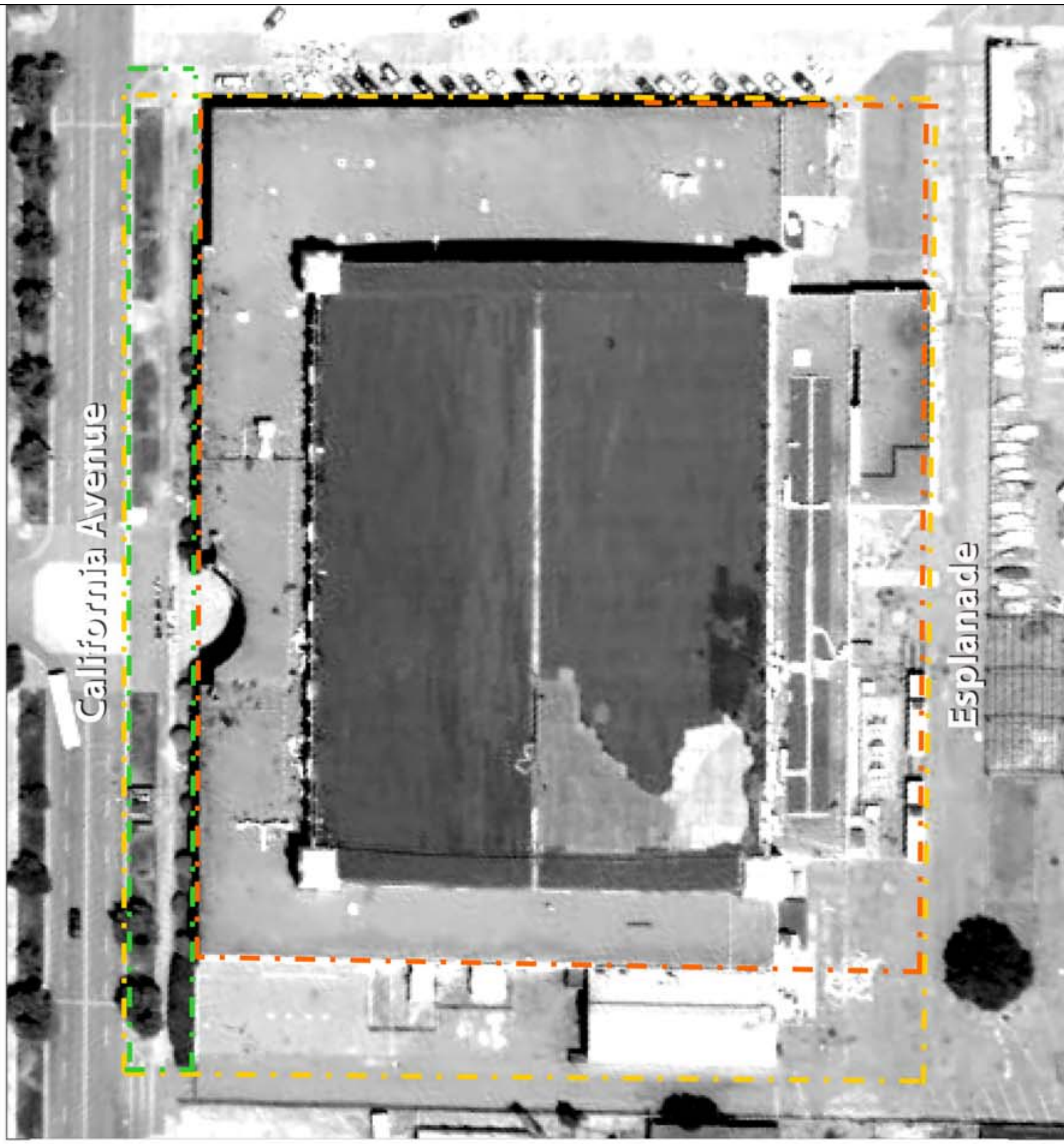
As with Buildings 1 and 2, the original GGIE landscape setting for Building 3 did not extend to include the Esplanade and the area along the waterfront south of the building, since these were related to the overall function of the island during the Exposition and not to that of Building 3. Neither the design of Building 3, which served as an exhibition hall during the Exposition, nor its associated landscape setting focused on the waterside, and the significance and integrity of Building 3 under the CRHR Criterion 1 (Events, in association with the GGIE) and Criterion 3 (Design/Construction) as an example of the Art Moderne style of commercial architecture from the late 1930s)[20] do not depend on this waterside setting.

Today, only the narrow strip of lawn north of Building 3, located between the building and California Avenue, remains. The two olive trees on the north side are the remains of a once longer row of about 12 trees immediately in front of Building 3 during the GGIE. These two remaining olive trees lack sufficient integrity to represent the original row of trees in front of Building 3. The landscape setting on the building’s east, south, and west sides no longer retains integrity due to the removal of the lawns and other vegetation and the loss of any distinction between these areas and the surrounding pavement. The HRE identifies contributing landscape areas associated with Building 3. See Figure IV.D.5: Building 3 Contributing Landscape Areas.

The area of lawn along Building 3’s north side retains sufficient integrity to contribute to the significance of the building under CRHR Criterion 1 (in association with the GGIE). This landscape area still conveys the general spatial organization of the building and the GGIE under CRHR Criterion 3 (Design/Construction). For these reasons, and for the purposes of this EIR, this landscape area is considered a contributing feature to the significance of the Building 3 historical resource under CEQA. Note however, that not all landscape features within these areas contribute to the significance of Building 3, and the HRE identifies only particular features as contributing, while other features are identified as noncontributing.[21]

---

[20] JRP Historical Consulting, *Palace of Fine and Decorative Arts (Building 3), Treasure Island National Register Nomination Form* (no date).
[21] HRE, p. 97.



LEGEND

General footprint of landscape setting for building during Golden Gate International Exposition

National Register Listing boundary

Location of remaining Golden Gate International Exposition landscape setting that contributes to CRHR significance of building

SOURCE: Knapp Architects

FIGURE IV.D.5: BUILDING 3 CONTRIBUTING LANDSCAPE AREAS

Regulatory Framework

Federal, state, and local government laws and regulations may apply to significant historical resources. As discussed below, the CEQA statute and *CEQA Guidelines* include procedures for identifying, analyzing, and addressing potential impacts on historic resources. CEQA takes into account federal laws and regulations that pertain to historic resources, as well as the laws and procedures of local California jurisdictions, such as the City and County of San Francisco, that pertain to historic resources.

<u>Federal</u>

<u>National Historic Preservation Act as Amended (1966)</u>

The National Historic Preservation Act ("NHPA") requires Federal agencies to consider the effects of their undertakings (such as issuing permits) on historic properties and to give the Advisory Council on Historic Preservation a reasonable opportunity to comment on those undertakings. Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties, afford the Advisory Council on Historic Preservation a reasonable opportunity to comment and consult with the applicable state historic preservation office (SHPO). If an adverse effect is identified, consultation with the SHPO usually results in a Memorandum of Agreement (MOA), which outlines agreed-upon measures that the agency will take to avoid, minimize, or mitigate the adverse effects. The permitting Federal agency is responsible for project compliance with Section 106 of the NHPA and its implementing regulations.

In accordance with the Section 106 process and the proposed federal conveyance action from the Navy to TIDA, the Navy notified the Advisory Council on Historic Preservation and received notification that the Council declined to participate in the consultation. The Navy also consulted with the California SHPO and as a result, entered into a MOA. Under the MOA, the Navy agreed to nominate to the NRHP a number of historic properties identified during the consultation process, as more particularly discussed above. The MOA also requires the Navy to submit a Research Design/Discovery Plan to the SHPO that delineates specific procedures to be taken under various scenarios to minimize impacts on potential archeological resources and to take certain precautions during interim leasing. The term of the MOA expires upon conveyance of NSTI to TIDA.

<u>National Register of Historic Places</u>

The National Register of Historic Places is the nation's master inventory of cultural resources worthy of preservation. It is administered by the National Park Service, which is represented at the state level by the State Historic Preservation Officer. The National Register includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the Federal, state, or local level. Resources that are listed on or have been found by State Historic Preservation Officer to be eligible to the National Register are called historic properties. The National Register includes four evaluative criteria to determine eligibility of a resource:

> The quality of significance in American history, architecture, archaeology and culture is present in districts, sites, buildings, structures, and objects of state and local importance that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:
>
> a. that are associated with events that have made a significant contribution to the broad patterns of history; or
>
> b. that are associated with the lives of persons significant in our past; or
>
> c. that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> d. that have yielded or may likely yield information important in prehistory or history.

Although there are exceptions, certain kinds of resources are not usually considered for listing in the National Register: religious properties, moved properties, birthplaces and graves, cemeteries, reconstructed properties, commemorative properties, and properties that have achieved significance within the past 50 years.

The eligibility criteria for inclusion in the California Register of Historical Resources are closely based on the NRHP eligibility criteria.

The Secretary of the Interior's Standards for Rehabilitation

The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (the "Secretary's Standards") were published in 1995 and codified as 36 CFR 67.[22] Neither technical nor prescriptive, these standards are intended to promote responsible preservation practices that help protect irreplaceable cultural resources. [23] The Secretary's Standards consist of ten basic

[22] Treatments are defined as follows:"Preservation" acknowledges a resource as a document of its history over time and emphasizes stabilization, maintenance, and repair of existing historic fabric. "Rehabilitation," while also incorporating the retention of features that convey historic character, also accommodates alterations and additions to facilitate continuing or new uses. "Restoration" involves the retention and replacement of features from a specific period of significance. "Reconstruction," the least-used treatment, provides a basis for recreating a missing resource.

[23] Weeks, Kay D. and Anne E. Grimmer. 1995. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstruction Historic Buildings*. Washington D.C.: U.S. Department of the Interior, National Park Service.

principles created to help preserve the distinctive character of an historic building and its site while allowing for reasonable changes to meet new needs. The preamble to the Secretary's Standards states that they "are to be applied to specific rehabilitation projects in a reasonable manner, taking into consideration economic and technical feasibility."

State

California Register of Historical Resources

The California Register of Historical Resources is the authoritative guide to historical and archaeological resources that are significant within the context of California's history. Criteria for eligibility for inclusion in the CRHR are based on, and therefore correspond to, National Register of Historic Places criteria for listing. The CRHR eligibility criteria are presented above, on pp. IV.D.26 – IV.D.27.

Local

Local Registers

The City and County of San Francisco reviews the historic resources described under Articles 10 and 11 of the San Francisco Planning Code when it evaluates impacts on historic resources (see "Significance Criteria" below). Article 10 describes procedures regarding the preservation of sites and areas of special character or special historical, architectural, or aesthetic interest or value, such as officially designated city landmarks and buildings included within locally designated historic districts. Article 11 of the Planning Code rates buildings in the downtown C-3 district in accordance with their historic significance, designates six downtown conservation districts, and further sets forth regulations governing permits pertaining to such structures or districts. Treasure Island and Yerba Buena Island are outside of the areas that have been surveyed by adopted San Francisco registers (Planning Code Article 10 and Planning Code Article 11 and *Here Today*) and other local surveys of historical resources (including the *1976 Architectural Survey* and the *Heritage Survey*).

San Francisco Planning Code Section 101.1: Master Plan Priority Policies

Planning Code Section 101.1 is generally applicable to the Proposed Project. It requires that the City find that the proposed project is consistent, on balance, with eight *Master Plan Priority Policies*. Priority Policy 7 is relevant to historic resources and establishes a priority policy "that landmarks and historic buildings be preserved."

San Francisco General Plan

The *San Francisco General Plan* currently does not contain a preservation element. In 2007, the Planning Department published a Draft Preservation Element. The Draft Preservation Element contains objectives and policies that promote the protection and preservation of historic architectural resources.

<u>*Planning Department, CEQA Review Procedures for Historic Resources*</u>

The San Francisco Planning Department prepared the *CEQA Review Procedures for Historic Resources* (Draft, March 31, 2008, subject to change, also referred to as San Francisco Preservation Bulletin No. 16) to determine whether a potential property or structure fits the definition of an historical resource as defined in the CEQA statute and *CEQA Guidelines*. Three categories of properties are defined.

- <u>*Category A*</u>. Category A has two subcategories:
  - *Category A.1*. Resources listed in or formally determined to be eligible for the CRHR.
  - *Category A.2*. Resources listed in adopted local registers, or properties that appear eligible, or may become eligible, for the CRHR.
- <u>*Category B*</u>. Properties requiring further consultation and review.
- <u>*Category C*</u>. Properties determined not to be historical resources, or properties for which the city has no information indicating that the property is an historical resource.

IMPACTS

Significance Criteria

The City and County of San Francisco has not formally adopted significance thresholds for impacts related to land use and land use planning. The Planning Department Initial Study Checklist form provides a framework of topics to be considered in evaluating potential impacts under CEQA. Implementation of a project could have a potentially significant impact related to land use and land use planning if it were to:

- Cause a substantial adverse change in the significance of an historical resource as defined in §15064.5, including those resources listed in Article 10 or Article 11 of the San *Francisco Planning Code*.

CEQA Guidelines (Section 15064.5(b)) establish the criteria for assessing a significant environmental impact on historical resources. They state, “[a] project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.” The *CEQA Guidelines* define “substantial adverse change in the significance of an historical resource” as a “physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired” (Section 15064.5(b)(1)). The significance of an historic architectural resource is considered to be “materially impaired” when a project demolishes or materially alters the physical characteristics that justify the inclusion of the resource in the CRHR, or that justify the inclusion of the resource in a local register, or that justify its eligibility for inclusion in the CRHR as determined by the lead agency for the purposes of CEQA (Section 15064.5(b)(2)).

CEQA Guidelines include a presumption that a project that conforms to the Secretary's Standards would generally have a less-than-significant impact on an historical resource. Section 15064.5(b)(3) of the *CEQA Guidelines* states, "Generally, a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings…shall be considered as mitigated to a level of less than a significant impact on the historic resource."[24]

Project Impacts

Impact CP-5: Reuse and rehabilitation of historical resources under the proposed *Redevelopment Plan* could impair the significance of those historical resources. *(Less than Significant)*

Buildings within the Senior Officers' Quarters Historic District and the Torpedo Assembly Building on Yerba Buena Island, and Buildings 1, 2, and 3 on Treasure Island would be retained, rehabilitated, and reused. It is anticipated that reuse of each of these district and individual historic resources would require interior and exterior alterations to adapt these resources to new uses and to modern standards for safety and energy efficiency. The specific nature and scope of such alterations have not been determined at this time but may include rehabilitation of the interior, rehabilitation of the exterior, and the addition of features (such as photovoltaic panels on Buildings 1, 2, and/or 3).

Rehabilitation of Buildings 1, 2, and 3 on Treasure Island may also include building additions. The draft *Design for Development* provides for the possibility of future additions to Buildings 1, 2, and 3. It establishes zones in which additions could occur and the maximum height for the potential additions.

As discussed above, Section 15065.5 of the *CEQA Guidelines* states that a project that conforms to the Secretary's Standards "shall be considered as mitigated to a level of less than a significant impact on the historical resource." The draft *Design for Development* requires that rehabilitation

---

[24] Note however, that Secretary's Standards are not to be construed as CEQA significance criteria. Although compliance with the Secretary's Standards may indicate that a project would have a less-than-significant impact on an historical resource, a project that does not comply with the Secretary's Standards does not, by definition, result in a significant impact under CEQA. Alterations that are not consistent with the Secretary's Standards may, or may not, result in a significant impact under the "material impairment" significance standard of *CEQA Guidelines* Section 15064.5(b)(1).

of all historic resources on Yerba Buena Island, including those within the Senior Officers' Quarters Historic District and the Torpedo Assembly Building (Standard Y5.7.15), and Buildings 1, 2, and 3 on Treasure Island (Standard T.5.10.1) comply with the Secretary's Standards. When specific proposals for rehabilitation of these historic buildings on Yerba Buena Island and Buildings 1, 2, and 3 are developed in the future, they will be subject to review by the Treasure Island Development Authority, the public body with jurisdiction over design review of proposed treatment of historic resources within the Development Plan Area. In order to approve an alteration or addition to buildings within the Senior Officers' Quarters Historic District, Torpedo Assembly Building, and Historic Buildings 1, 2, and 3, TIDA must find that the work conforms to Secretary's Standards. This requirement limits this potential impact to a less-than-significant level. No mitigation is required.

Impact CP-6: Alterations to the contributing landscape areas of Buildings 1, 2, and 3 could impair the significance of those historical resources. *(Less than Significant with Mitigation)*

The HRE identifies landscape areas associated with Buildings 1, 2, and 3 that were not included within the individual NRHR nominations for these buildings but contribute to the individual significance of each of those historical resources under CRHR criteria. For the purposes of environmental review under CEQA, these additional areas are each considered contributing features of Buildings 1, 2 and 3 when evaluating impacts of the Proposed Project on these individual historical resources. Alterations to and within the contributing landscapes of Buildings 1, 2, and 3 would take place either as a component of the larger scope of interior and exterior alterations for rehabilitation and reuse of these historical resources under the proposed *Redevelopment Plan,* or for portions of contributing landscapes that are adjacent to California Avenue, as part of proposed street network improvements.

The draft *Design for Development* includes planning-level land use and site design for Treasure Island as a whole and concept design for some landscapes, including that of Building 1. The draft *Design for Development* illustrates concepts for the landscapes around Building 1, including a new circulation pattern and palm grove on the west side of the building and a plaza east of the building that would include part of the contributing site of Building 1. Removal of the character-defining retaining walls and alteration of the driveways west of Building 1 could cause a substantial adverse change in the significance of an historic resource, although it is not possible to foresee the ultimate impact from the current concept-level design for the landscape. The landscape design has not reached the stage at which it can be determined whether there would be a significant impact on the landscape features that contribute to Building 1. Alterations to the contributing landscapes could result in a significant adverse impact on the individual historic significance of Building 1. Mitigation Measure M-CP-6 would reduce this impact to a less-than-significant level.

Based on a review of information provided by the project sponsors that is proposed to be included in the project's *Design for Development*, the proposed alterations to the contributing landscapes for Buildings 2 and 3 would not alter the contributing landscape areas of Buildings 2 and 3 in an adverse manner. They would preserve the essential spatial relationships of these spaces, allowing them to continue to contribute to the significance of the properties to which they are associated. For these reasons, the proposed alterations to the contributing landscapes of Buildings 2 and 3 would not result in a material impairment of the significance of the Buildings 2 and 3 historical resources under CEQA. No mitigation is required.

Mitigation Measure M-CP-6: Review of Alterations to the Contributing Landscape of Building 1

During the design review process, TIDA is required, according to draft *Design for Development* Standard T5.10.1, to find that Building 1's rehabilitation is consistent with the Secretary's Standards. In making that finding, TIDA shall also consider any proposed alterations to and within the contributing landscape areas identified by the HRE as contributing to the CRHR eligibility of Building 1. TIDA shall not approve a design proposal for Building 1 unless it makes a finding that any such alterations, when taken together with the alterations and additions to Building 1 itself, comply with the Secretary's Standards.

Impact CP-7: New construction within the contributing landscapes of Buildings 1, 2, and 3 could impair the significance of those historical resources. ***(Less than Significant with Mitigation)***

Implementation of the proposed *Redevelopment Plan* calls for new construction within the contributing landscapes of Buildings 1, 2, and 3. Removal of character-defining features and introduction of new incompatible features within these areas could materially impair the physical characteristics that convey the historical significance of Buildings 1, 2, and 3 and that justify their inclusion in the CRHR.

New free-standing construction that would be allowable within the contributing landscape of Building 1 to its east and within the contributing landscapes of Buildings 1 and 2 would not result in a material impairment in the significance of these individual resources. Proposed new construction within Block B1 would intrude only slightly on the northeast corner of the contributing landscape of Building 1, and would be 75 feet from that building. The contributing landscape setting of Building 1 would be altered to a small degree by this intrusion. Potential new free-standing construction that would be allowable within the contributing landscapes of Buildings 2 and 3 would be limited in height to 25 feet and are required to maintain a separation of at least 20 feet from these buildings (Standard T5.10.8). These limitations would result in new construction that is visually subordinate to, and differentiated from, the Building 2 and Building 3 resources. For these reasons new free-standing construction to the east of Building 1 and within the contributing landscapes of Buildings 2 and 3 would not result in a significant adverse impact on an historical resource. No mitigation is required for the impacts described above.

The draft *Design for Development* provides for construction of new free-standing buildings, up to 20 feet tall, within the contributing landscape site west of Building 1. The specific design of these proposed new features has not been developed enough at this time to assess their impact. Given the prominent location of these proposed free-standing buildings in relation to Building 1, they could potentially materially impair the integrity of Building 1, if not designed to be subsidiary to, and differentiated from, Building 1. Implementation of Mitigation Measure M-CP-7 would ensure that the potential impact of this new construction on Building 1 would be less than significant.

<u>Mitigation Measure M-CP-7: Review of New Construction within the Contributing Landscape West of Building 1</u>

During the design review process, TIDA is required, according to the draft *Design for Development* (Standard T5.10.1), to find that Building 1's rehabilitation is consistent with the Secretary's Standards. In making that finding, TIDA shall also consider proposed new construction west of Building 1 within its associated contributing landscape areas. TIDA shall not approve a design proposal for Building 1 unless it makes a finding that any such new construction, when taken together with the alterations and additions to Building 1 itself, comply with the Secretary's Standards.

Impact CP-8: Demolition of Building 111, a component of Building 3, would not impair the significance of the Building 3 historical resource. *(Less than Significant)*

As part of the rehabilitation and reuse of Building 3, Building 111, an addition to Building 3, would be demolished.

The HRE notes that Building 111 is included in the NRHP nomination for Building 3 as a part of Building 3. It was constructed to serve as a firehouse and was complete by the time the GGIE opened. The HRE reasons that that demolition of Building 111 would remove a characteristic of Building 3 that conveys the development of the site and its association with the GGIE and that justifies the eligibility of Building 3 for inclusion in the CRHR. On this basis, the HRE concludes that the demolition of Building 111 would result in a significant adverse impact on the significance of the Building 3 historical resource.[25]

The Planning Department has received additional information about Building 111 and its relationship to Building 3, provided in a memo to the project sponsors by historic architectural

---

[25] HRE, pp. 102-104.

resource consultants Page & Turnbull.[26] This additional information was not considered by the preparers of the NRHP nomination for Building 3. The Page & Turnbull memo presents supplemental evidence in support its conclusion that Building 111 does not significantly contribute to the historic character of Building 3, and may therefore be removed without affecting the historic significance of the Building 3 resource. Building 111 was included in the NRHP nomination because of its age, not because it was considered an integral feature of Building 3. Constructed with less-refined materials, this feature was an addition intended to serve a temporary function as a firehouse during the GGIE.

After a review of the information submitted in the HRE as well as the additional information provided by Page & Turnbull, the Planning Department has determined (contrary to the conclusion in the HRE for this impact) that substantial evidence in light of the whole record supports the conclusion that the removal of Building 111 in the manner proposed would be consistent with the Secretary's Standards, and would not result in a substantial adverse change in the historic significance of the Building 3 historical resource.[27] In view of this finding, this impact would be considered less than significant. No mitigation is required.

Impact CP-9: Demolition of the Damage Control Trainer would impair the significance of an historical resource. *(Significant and Unavoidable)*

The Damage Control Trainer (housed in Building 341) would be demolished as part of the Proposed Project. The HRE concludes that the object (but not the building housing it) meets the criteria for inclusion in the CRHR and is therefore an historical resource for the purposes of CEQA. Demolition of this historical resource would result in a significant adverse impact on an historical resource.

Mitigation Measure M-CP-9 calls for documentation and interpretation of the Damage Control Trainer. Implementation of this mitigation measure would lessen the impact of demolition of this historical resource, but would not reduce this impact to a less-than-significant level. Alternative mitigations, such as moving the object, are not feasible because the Damage Control Trainer includes a large concrete sump, much like a swimming pool, which is partially built into the grade. Avoiding removal of the object is not possible as part of the Proposed Project, since its location overlaps two development blocks and eliminating those development blocks would substantially change the Proposed Project.

---

[26] Page and Turnbull, "Information on the Landscape Treatment of Building 2; Description, Character-Defining Features and Proposed Design Criteria for Building 3," Memo to Alexandra Galovich, April 7, 2010. It is incorporated by reference and summarized in this section. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[27] HRER, pp. 7-9.

Chapter VII, Alternatives, presents an alternative (Alternative C, No Ferry Service Alternative) that would retain the Damage Control Trainer in place.

Mitigation Measure M-CP-9: Documentation and Interpretation

Documentation

The project sponsors shall retain a professional who meets the Secretary of the Interior's Professional Qualifications Standards for Architectural History to prepare written and photographic documentation of the historical resource.

The documentation for the property shall be prepared based on the National Park Service's Historic American Building Survey ("HABS") / Historic American Engineering Record ("HAER") Historical Report Guidelines. This type of documentation is based on a combination of both HABS/HAER standards (Levels II and III) and the National Park Service's policy for photographic documentation as outlined in the National Register of Historic Places and National Historic Landmarks ("NHL") Survey Photo Policy Expansion.

The written historical data for this documentation shall follow HABS/HAER Level I standards. The written data shall be accompanied by a sketch plan of the property. Efforts should also be made to locate original construction drawings or plans of the property during the period of significance. If located, these drawings should be photographed, reproduced, and included in the dataset. If construction drawings or plans cannot be located, as-built drawings shall be produced.

Either HABS/HAER standard large format or digital photography shall be used. If digital photography is used, the ink and paper combinations for printing photographs must be in compliance with NRHP-NHL Photo Policy Expansion and have a permanency rating of approximately 115 years. Digital photographs will be taken as uncompressed, TIF file format. The size of each image will be 1600x1200 pixels at 330 pixels per inch or larger, color format, and printed in black and white. The file name for each electronic image shall correspond with the index of photographs and photograph label.

Photograph views for the dataset shall include (1) contextual views; (2) views of each side of each building and interior views, where possible; (3) oblique views of buildings; and (4) detail views of character-defining features, including features of the interiors of some buildings. All views shall be referenced on a photographic key. This photographic key shall be on a map of the property and shall show the photograph number with an arrow to indicate the direction of the view. Historic photographs shall also be collected, reproduced, and included in the dataset.

All written and photographic documentation of the historical resource shall be approved by TIDA prior to any demolition and removal activities. The project sponsors shall transmit such documentation to the San Francisco History Center of the San Francisco Public Library, and to the Northwest Information Center of the California Historical Information Resource System.

Interpretation

The project sponsor shall provide a permanent display of interpretive materials concerning the history and architectural features of the historical resource within public spaces of Treasure Island. The specific location, media, and other characteristics of such interpretive display shall be approved by TIDA prior to any demolition or removal activities.

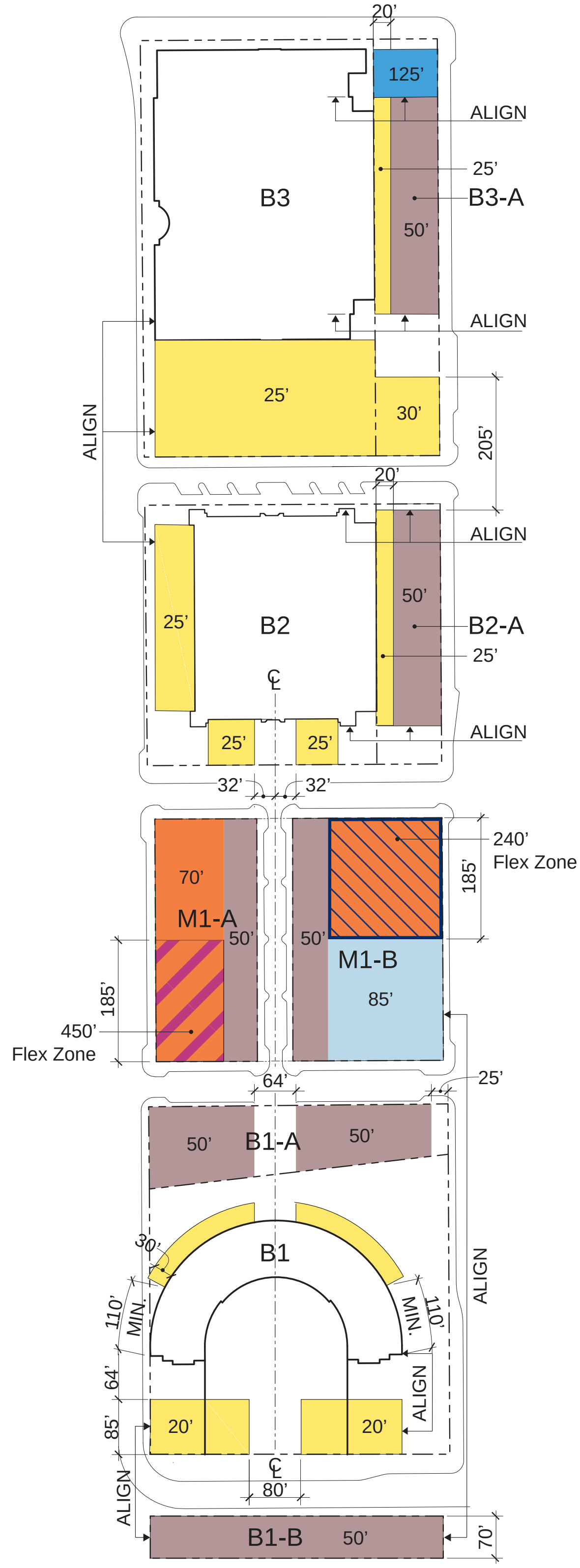
Impact CP-10: Demolition of NSTI resources on Treasure Island and Yerba Buena Island could impair the significance of historical resources. *(Less than Significant)*

All of the buildings and structures within the Development Plan Area on Treasure Island and Yerba Buena Island that are over 50 years in age have been comprehensively surveyed, studied, and evaluated. As discussed above, Buildings 1, 2, and 3 on Treasure Island; the Senior Officers' Quarters Historic District (and its contributing buildings and features) and the Torpedo Assembly Building on Yerba Buena Island would be retained and rehabilitated. The Damage Control Trainer would be demolished, resulting in a significant, unavoidable impact on an historical resource as discussed separately above under Impact CP-9.

All other NSTI buildings, structures, and objects within the Development Plan Area that would be demolished as part of the Proposed Project have been found by the comprehensive 1997 Inventory and Evaluation and by supplemental study in the HRE not to meet the criteria for inclusion in the CRHR. They are therefore not considered historical resources for the purposes of CEQA. For these reasons, demolition of these buildings and structures would have a less-than-significant impact historical resources. No mitigation is required.

Impact CP-11: Proposed new construction outside of the contributing sites of Buildings 1, 2, and 3 could impair the significance of those historical resources. *(Less than Significant)*

New buildings are proposed in the vicinity of, but outside of, the contributing landscape sites of Buildings 1, 2, and 3. The draft *Design for Development* specifies height limitations for the blocks in the vicinity of Buildings 1, 2, and 3 (see Figure IV.D.6: Height Plan Near Buildings 1, 2, and 3): on block B1: 20 feet (west of Building 1) and below the finish floor (east of Building 1); on block B1-A: 50 feet (east of Building 1); on block M1-A: 50, 70, and 450 feet (between Buildings 1 and 2); on block M1-B: 50, 85, and 240 feet (between Buildings 1 and 2); on block B2: 25 feet (north, west, and south of Building 2; on block B2-A: 25 and 50 feet (south of Building 2); on block B3: 25 feet (west of Building 3); and on block B3-A: 25, 30, 50, and 125 feet (south of Building 3). The draft *Design for Development* requires a minimum 20-foot separation between new buildings and the historic buildings. The draft *Design for Development*



SOURCE: TIDA

FIGURE IV.D.6: HEIGHT PLAN NEAR BUILDINGS 1, 2, AND 3

also allows new construction, including high-rise towers in the zones to the north of Buildings 1, 2, and 3 (north of California Avenue).

Buildings 1, 2, and 3 are individual resources, rather than part of an historic district. This proposed new construction would not be within the contributing sites of Buildings 1, 2, and 3, and would not have a physical effect on those historical resources. It would not alter, damage, or demolish them. The Secretary's Standards apply to work carried out on historic properties; they are not applicable to properties that are not historic and are not within the site of an historic resource or within a historic district. The new construction described in the draft *Design for Development* would have the potential to alter the integrity of setting, feeling, and association of Buildings 1, 2, and 3, but it would not change their integrity of design, materials, workmanship, or location. The proposed new buildings in the vicinity of Buildings 1, 2, and 3 would not impair the physical characteristics that justify their eligibility for inclusion in the California Register. Although new buildings would alter the existing visual, urban, and architectural context of Buildings 1, 2, and 3, the historic character of this surrounding context has already been altered, first with the Navy's occupation of the former GGIE site, and later with the Navy's own demolition and new construction.

For these reasons, new construction outside of the contributing sites of Buildings 1, 2, and 3 would not have a significant adverse impact on the historic and architectural significance of Buildings 1, 2, and 3. No mitigation is required.

Impact CP-12: Proposed new construction within and adjacent to the Senior Officers' Quarters Historic District could impair the significance of historical resources. *(Less than Significant)*

New construction is allowable within the Senior Officers' Quarters Historic District. As discussed above, Section 15065.5 of the *CEQA Guidelines* states that a project that conforms to the Secretary's Standards "shall be considered as mitigated to a level of less than a significant impact on the historical resource." The draft *Design for Development* requires that all new construction within the Senior Officers' Quarters Historic District (Standard Y5.7.15) comply with the Secretary's Standards. When specific proposals for new construction within the historic district are developed in the future, they would be subject to review by TIDA, the public body with jurisdiction over design review of proposed treatment of historic resources within the Development Plan Area. In order to approve any new construction within the Senior Officers' Quarters Historic District, TIDA must find that the work complies with the Secretary's Standards. This requirement limits this potential impact to a less-than-significant level. No mitigation is required.

The draft *Design for Development* also anticipates new construction outside of, and adjacent to, the Senior Officers' Quarters Historic District. The potential development is planned to serve as a parking lot and a potential fire station if needed (Guideline Y.5.7.20). It would continue to be separated from the buildings of the district by the greensward located within the district at its easternmost end. For these reasons, new construction outside of the Senior Officers' Quarters Historic District would not have a significant adverse impact on the historic and architectural significance of that district or its component resources. No mitigation is required.

Cumulative Impacts

Impact CP-13: The Proposed Project would not contribute cumulatively to impacts on historic architectural resources when considered with nearby projects. ***(Less than Significant)***

The Proposed Project would have a significant adverse impact on the Damage Control Trainer, diminishing the association of Treasure Island with the Navy. However, this project impact would not contribute to any cumulative impact on historical resources when considered with nearby projects such as the Bay Bridge East Span project and the Yerba Buena Island Ramps Improvement Project. Those projects would cause adverse effects on the Senior Officers' Quarters Historic District and Quarters 10. The proposed project would not cause any adverse impacts to these resources and therefore would not contribute to the adverse impacts caused by these projects. Under the Proposed Project, historic architectural resources on Yerba Buena Island would be retained, rehabilitated, and reused consistent with the Secretary's Standards to ensure that their historic and architectural character would be preserved. The Clipper Cove Marina Project would not result in any adverse impact on historic architectural resources that could compound, or be compounded by, any adverse impacts of the proposed project on historical resources.

For these reasons, the Proposed Project would not contribute to a significant cumulative impact related to historical resources.

E. TRANSPORTATION

This section analyzes the potential project-level and cumulative impacts on transportation and circulation resulting from implementation of the Proposed Project. Transportation-related issues of concern that are addressed include traffic on local and regional roadways, transit (including ferries), bicycles, pedestrians, freight loading, emergency vehicle access and construction-related activities. Additionally, a parking analysis is included for informational purposes. Transportation impacts are assessed for the land use development program for weekday AM and PM commute periods, and also for Saturday midday peak period conditions. This section also identifies mitigation measures that would reduce or avoid significant impacts.

This section is based on information contained in the *Treasure Island and Yerba Buena Island Redevelopment Plan Transportation Impact Study*. A copy of the *Transportation Impact Study* is included as Appendix C.

SETTING

The transportation study area includes all aspects of the transportation network that may be measurably affected by the Proposed Project. The transportation study area is defined by travel corridors and by facilities such as bus stops/transit stations. It includes the freeway segments, freeway ramps, and existing and proposed street intersections that residents and visitors would use in traveling to and from the Proposed Project. Since the San Francisco-Oakland Bay Bridge (“Bay Bridge”) provides the only vehicular access on and off the Islands, the transportation study area includes freeway approaches to the Bay Bridge in the East Bay and several intersections on freeway approaches within downtown San Francisco. Areas near the San Francisco Ferry Building are also studied for pedestrian impacts.

The existing conditions of the on-island roadway system were not analyzed because the Proposed Project would redesign the existing public roadway system on Treasure Island.

A total of 17 existing intersections (one on Treasure Island, and 16 in downtown San Francisco), and the six Bay Bridge on- and off-ramps connecting with Yerba Buena Island were identified as the key locations that would likely be affected by the Proposed Project, and were selected for detailed study of the Proposed Project’s impacts. The intersection analysis did not include intersections in the East Bay because, unlike downtown San Francisco, there is no central place or roadway where a majority of trips would converge. Studying individual intersections would not reflect the way that trips from the Proposed Project would disperse throughout the East Bay via the three major freeways (i.e., I-680, I-580, and I-880) and major cities, such as Oakland, Berkeley, Richmond, San Leandro, and Fremont. The 16 study intersections in downtown San Francisco include:

1. Fremont Street/Howard Street
2. Fremont Street/Folsom Street/I-80 Westbound Off-Ramp
3. Fremont Street/Harrison Street/I-80 Westbound Off-Ramp
4. First Street/Market Street
5. First Street/Mission Street
6. First Street/Howard Street
7. First Street/Folsom Street
8. First Street/Harrison Street/I-80 Eastbound On-Ramp
9. Essex Street/Folsom Street
10. Essex Street/Harrison Street/I-80 Eastbound On-Ramp
11. Second Street/Folsom Street
12. Second Street/Bryant Street
13. The Embarcadero/Harrison Street
14. Bryant Street/Sterling Street
15. Bryant Street/Fifth Street/I-80 Eastbound On-Ramp
16. Harrison Street/Fifth Street/I-80 Westbound Off-Ramp

The above intersections were selected for analysis because they are typically congested during peak periods due to traffic traveling to and from the Bay Bridge and downtown San Francisco and are therefore, most likely to experience increases in peak hour traffic associated with the Proposed Project. In addition to the 16 intersections within downtown San Francisco, the intersection of Avenue of the Palms/First Street on Treasure Island was analyzed (for conditions with the Proposed Project only) because it would serve as the gateway to the development on Treasure Island. Figure IV.E.1: Study Intersections, depicts the locations of the study intersections.

The transit analysis includes an assessment of the transit lines within the transportation study area that would serve the Proposed Project site and/or would be affected by vehicular traffic generated by the Proposed Project.

ROADWAY NETWORK

Regional Access

Three major freeways provide access to the Bay Bridge from the East Bay and vehicles on these facilities most frequently experience queues at the bridge's toll plaza during the weekday AM

SOURCE: Fehr & Peers, 2009

FIGURE IV.E.1: STUDY INTERSECTIONS

peak period (generally from 7:00 AM to 9:00 AM). Substantial queues associated with insufficient capacity on the Bay Bridge do not typically form at the toll plaza during the PM peak hour. On occasions when they do, they are typically associated with special events, incidents on the bridge, or other unique circumstances. The conditions on these three freeways — I-80, I-580, and I-880 — are described below.

Interstate 80 ("I-80") is a major multi-lane freeway that provides the only vehicular access to the Islands, via the Bay Bridge. I-80 extends to the East Bay and northeast towards Sacramento and the Sierra Nevada Mountains. To the west, I-80 terminates at the merge with U.S. 101 in San Francisco. Along the Bay Bridge, I-80 consists of two decks, each with five travel lanes. The upper deck is for westbound travel and the lower deck is for eastbound travel. The east span of the Bay Bridge, between Yerba Buena Island and Emeryville/Oakland is currently being reconstructed with a new structure scheduled to open in 2013. The new span will provide five lanes in each direction with wider shoulders than the existing structure to better accommodate breakdowns and emergencies as well as a mixed-use pedestrian and bicycle path. The travel lanes will all be on a single level of the new structure. The west span of the Bay Bridge has recently been seismically retrofitted and will remain in its current configuration (i.e., two decks with five lanes in each direction). There is a separate study underway by the Bay Area Toll Authority ("BATA") to evaluate potential alternative configurations for a proposed mixed-use pedestrian and bicycle path on the western portion of the Bay Bridge, but funding for its construction has not been identified and it is not assumed to be in place in this analysis.

The Bay Bridge travels through a short tunnel on Yerba Buena Island. On- and off-ramps are provided to Yerba Buena Island, linking to Treasure Island. In the westbound direction, one off-ramp is provided from the Bay Bridge to Yerba Buena Island on the east side of the tunnel. Two on-ramps are provided to westbound I-80 from Yerba Buena Island, one on each side of the tunnel. Similarly, there are two off-ramps from the eastbound Bay Bridge, one on each side of the tunnel. There is one eastbound on-ramp on the east side of the tunnel. Figure IV.E.2 illustrates the existing ramp configuration.

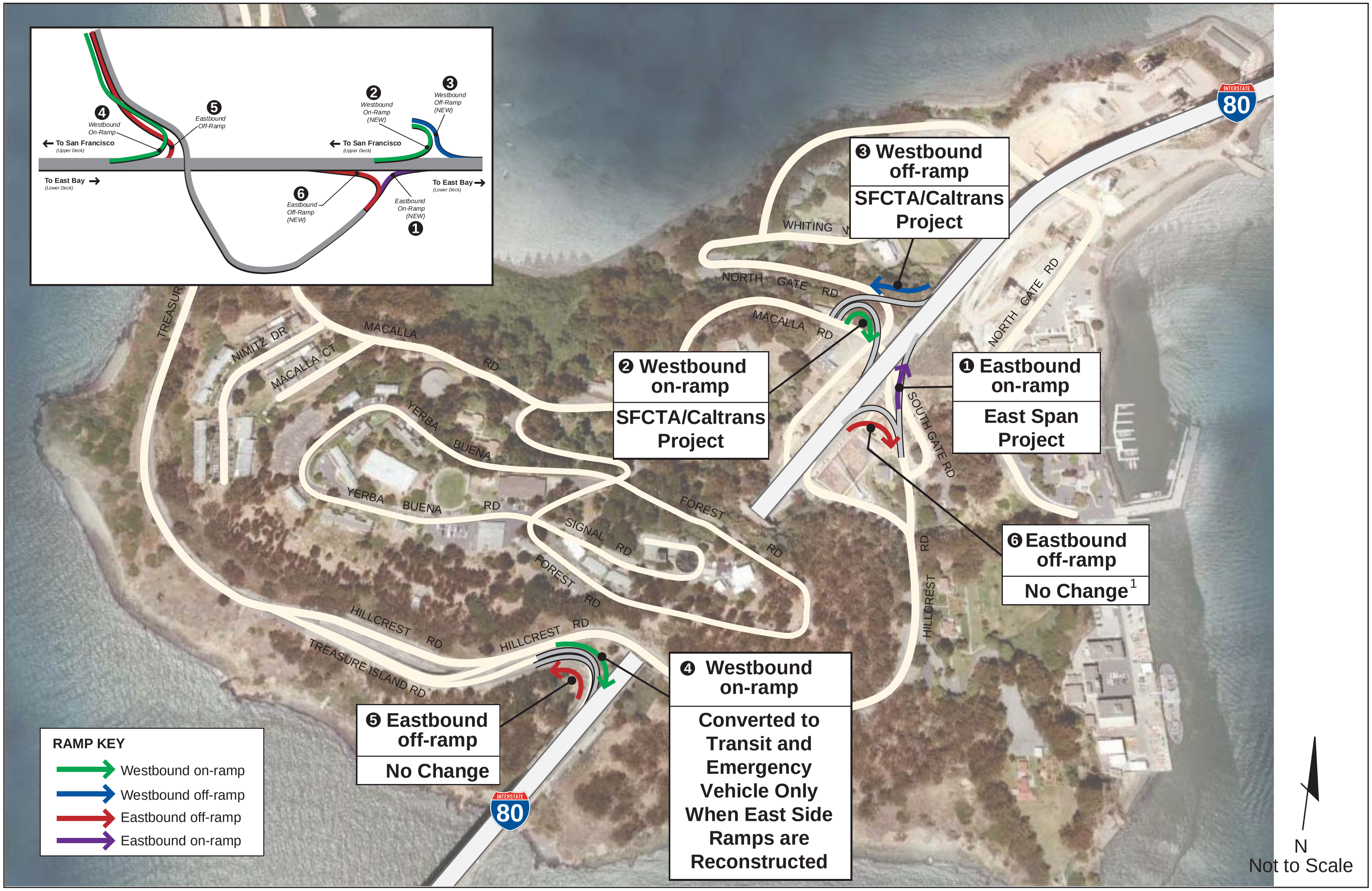
A number of ramps are being or are proposed to be reconfigured as part of two other projects. There would continue to be six ramps with the proposed configurations; however, the eastbound on-ramp on the east side of Yerba Buena Island will be modified as part of the Bay Bridge East Span project and some of the other ramps are proposed to be modified in the study underway by the SFCTA, as illustrated on Figure IV.E.3: Proposed Access Ramps with Existing Roadways, and described further below.[1]

---

[1] Impact analysis in this transportation study takes into account conditions resulting from both the existing ramps, including the replacement of the eastbound on-ramp that is currently being rebuilt as part of the Bay Bridge East Span Project, and the potential improved or replaced ramps as part of the Yerba Buena Island Ramps Improvement Project.

SOURCE: Yerba Buena Island Internal Road Network and Connection with Treasure Island Final Report, AECOM, 2009
Note: 1. Eastbound off-ramp reopened in Fall 2009.

FIGURE IV.E.2: EXISTING ACCESS RAMPS WITH EXISTING ROADWAYS



SOURCE: Yerba Buena Islad Internal Road Network and Connection with Treasure Island Final Report, AECOM, 2009
Note: 1. Eastbound off-ramp reopened in Fall 2009.

FIGURE IV.E.3: PROPOSED ACCESS RAMPS WITH EXISTING ROADWAYS

As part of the Bay Bridge East Span Project, the following ramp changes will occur (based on the numbering shown on Figure IV.E.2 and Figure IV.E.3):

1. The eastbound on-ramp on the east side of Yerba Buena Island will be reconstructed entirely as part of the replacement of the Bay Bridge east span. The new ramp will be in a similar location to the existing ramp, but will provide increased acceleration distance. This is the only ramp improvement that has been approved and funded to date and is scheduled to be completed by 2013.

The Yerba Buena Island Ramps Improvement Project (the "Ramps Project") is under a separate study underway by the San Francisco County Transportation Authority ("SFCTA") evaluating potential reconfiguration of some of the westbound on- and off-ramps on the east side to the Bay Bridge tunnel. Although those improvements are part of a separate effort and not part of the Proposed Project, they are described in this section since they would affect the vehicular access to the Islands. The Draft EIR/EIS for that project is anticipated to be published in the summer of 2010. Final design is estimated to be completed by early 2011, and construction to start in early 2012.

The SFCTA and Caltrans are currently evaluating alternatives for the following ramps:

2. The westbound on-ramp on the east side of Yerba Buena Island would remain open to all traffic, but would be completely reconstructed to provide greater acceleration distance. The ramp would also be outfitted with ramp metering traffic signals to meter the flow of traffic onto the westbound Bay Bridge from the Islands. A separate bypass lane would be provided for high-occupancy vehicles, which is assumed for purposes of this analysis to be vehicles with three or more passengers ("HOV 3+").
3. The westbound off-ramp on the east side of Yerba Buena Island, which is currently a left-hand exit, would be removed and replaced with a new right-hand exit that distributes exiting traffic onto Macalla Road, just west of the proposed reconstructed westbound on-ramp.
4. The westbound on-ramp on the west side of Yerba Buena Island would not be modified geometrically. However, it would be restricted to transit and emergency vehicle-use only, providing exclusive access for transit and emergency vehicles departing the Islands destined for the San Francisco mainland.

Improvement or replacement of the westbound on- and off-ramps, if undertaken, would be a separate project from both the Bay Bridge East Span project currently under construction and the Proposed Project. The improvement or replacement of the westbound on- and off-ramps are referred to as the "Ramps Project". Figure IV.E.3 illustrates the proposed ramp configuration.

No significant changes are expected for the remaining two ramps on Yerba Buena Island. Replacement of the eastbound off-ramps was studied by the SFCTA and Caltrans and determined to be infeasible:

5. The eastbound off-ramp on the west side of Yerba Buena Island would remain unchanged from its current configuration.[2]
6. The eastbound off-ramp on the east side of Yerba Buena Island, which was closed at the time that data was collected for this analysis, has recently been re-opened with no changes to its configuration. Following completion of bridge construction activities, the ramp will remain open and have signage and lighting improvements only that would be conducted as part of the Bay Bridge East Span project.

Impact analysis in this transportation study takes into account conditions resulting from both the existing ramps, including the replacement of the eastbound on-ramp that is currently being rebuilt as part of the Bay Bridge East Span project, and the potential improved or replaced ramps as part of SFCTA's and Caltrans' Yerba Buena Island Ramps Improvement Project.

At the time existing conditions data were collected for the impact analysis (in May 2008), both the westbound on-ramp and the eastbound off-ramp on the east side of the tunnel were closed due to construction of the east span of the Bay Bridge. Although the ramps have since re-opened, the impact analysis is based on conditions at the time data was collected (i.e., with the ramps closed).

In addition to ramp changes, the SFCTA and Caltrans are also evaluating retrofit of the nine viaduct structures on the west side of Yerba Buena Island. Retrofit of these structures is separate from the Proposed Project. As the retrofit would be a seismic safety project only and no changes to roadway alignment or capacity are proposed, the transportation impacts described in this Section would be the same whether the retrofit project was implemented or not.

The Bay Bridge currently operates at or near vehicular capacity in the peak direction most weekdays during the morning and evening peak periods. Queues are often observed on the approaches to the bridge from the East Bay during the AM peak period and from San Francisco in the weekday PM peak period. This occurs when the demand for travel onto the bridge in the peak direction (westbound in the morning and eastbound in the evening) is greater than the capacity of the bridge. Queues on the westbound approach are formed due to metering at the toll plaza. Queues on surface streets in San Francisco are formed due to limited capacity of on-ramps to the eastbound Bay Bridge. Although Saturday conditions can vary substantially depending on weather, season, and special events, this analysis is based on typical conditions in which bridge capacity is adequate to serve peak demands on Saturday.

Measurements of traffic flow on the Bay Bridge during the weekday peak period indicate a capacity of about 9,000 vehicles per hour per direction. This corresponds to around 1,800 vehicles per lane per hour, which is less than the ideal saturation flow rate of 2,200 vehicles per lane per hour defined by the *2000 Highway Capacity Manual* ("*2000 HCM*"). The average flow,

---

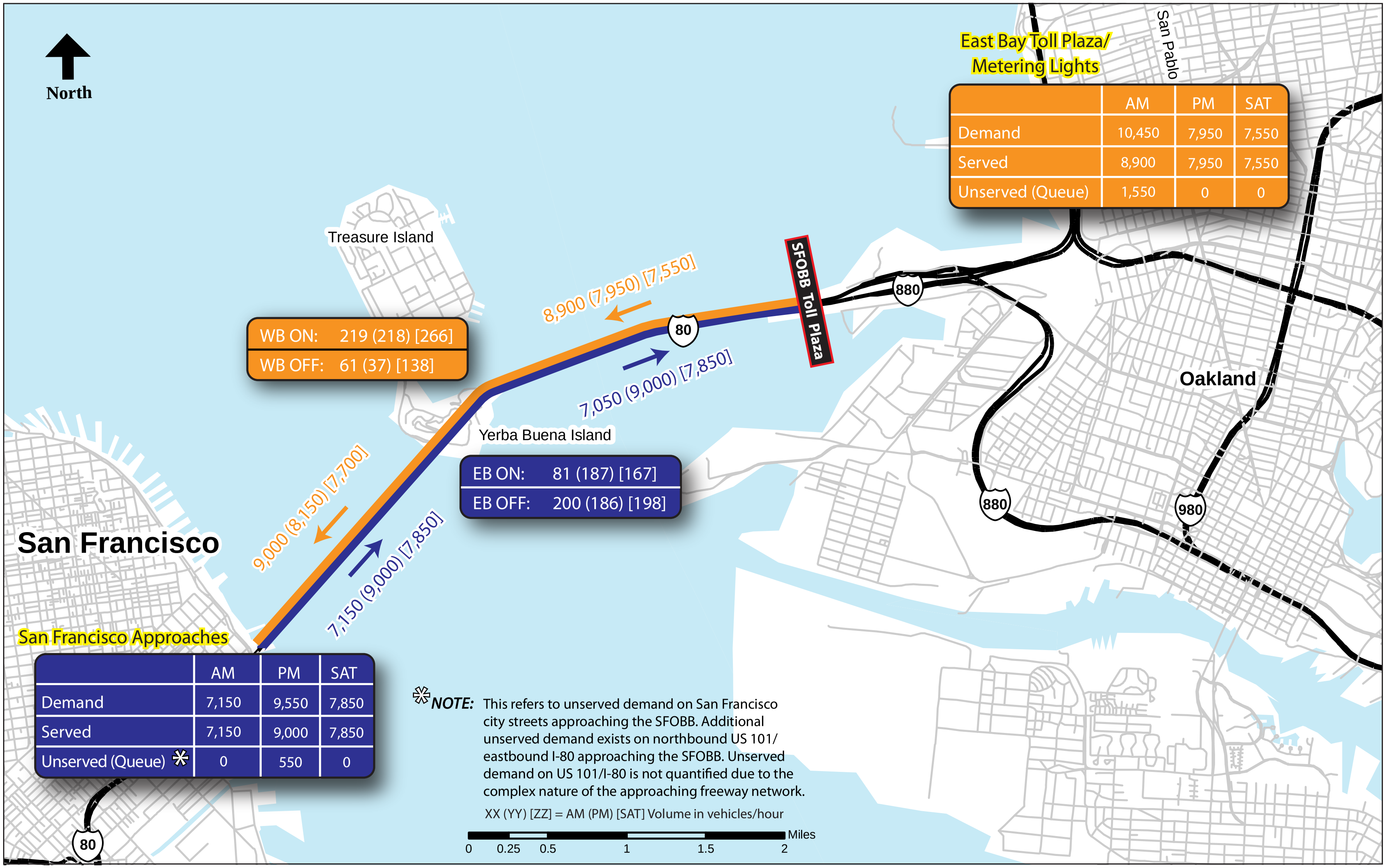
[2] Project Study Report on I-80 in the City and County of San Francisco at Yerba Buena Island from Post Mile 7.6 to Post Mile 8.1, Caltrans, December 2007.

however, is reasonable given minimal shoulder width, grades, and a mix of heavy vehicles, such as buses and trucks that reduce capacity from 2,200 vehicles per hour per lane that can be achieved on facilities under ideal conditions (wide shoulders, level grade, no trucks and buses, etc.).

The number of vehicles counted on the Bay Bridge does not necessarily represent all travel demand. The presence of queues approaching the Bay Bridge indicates that the demand exceeds the capacity of the Bay Bridge during certain times of day. The observed volume on the Bay Bridge represents the bridge's capacity and the number of vehicles in queues approaching the facility represents the excess demand (i.e., the amount of demand that exceeds the capacity of the facility). The full existing demand is estimated by adding unserved demand to the counted traffic volumes. In the AM peak hour, the existing travel demand is 10,450 vehicles per hour in the peak westbound direction. In the PM peak hour, the existing demand is slightly less, at approximately 9,550 vehicles per hour in the peak eastbound direction. Demand in the off-peak directions in the AM and PM peak hours is currently less than the Bay Bridge capacity, and therefore all demand is represented in counts on the Bay Bridge. Existing freeway mainline volumes, as well as the amount of unserved demand on all approaches to the Bay Bridge, are depicted on Figure IV.E.4: Existing Freeway Travel Demand.

Interstate 580 ("I-580") is a ten-lane, major freeway that travels southeast from the Bay Bridge through the City of Oakland towards the Tri-Valley area communities of Livermore, Dublin, and Pleasanton in southeastern Alameda County. I-580 merges with I-80 just east of the bridge toll plaza. I-580 shares the same route as I-80 between Emeryville and Albany. North of Albany, I-580 continues east towards the Richmond-San Rafael Bridge, where it merges with U.S. 101 and terminates in San Rafael.

Interstate 880 ("I-880") is a six- to eight-lane, major freeway that extends south through the City of Oakland towards the East Bay and South Bay communities of Hayward, San Leandro, and Fremont in Alameda County and Milpitas and San Jose in Santa Clara County. I-880 merges with I-80 and terminates just east of the bridge toll plaza. In the South Bay, I-880 terminates at the I-280/Highway 17 interchange in San Jose.



SOURCE: Fehr & Peers, 2009

TREASURE ISLAND AND YERBA BUENA ISLAND REDEVELOPMENT PROJECT EIR

FIGURE IV.E.4: EXISTING FREEWAY TRAVEL DEMAND

Existing Yerba Buena Ramp Operations

As noted above, at the time existing conditions data were collected for the impact analysis, both the westbound on-ramp and the eastbound off-ramp on the east side of the tunnel were closed.[3] Existing merge and diverge conditions were analyzed for the four open ramps (i.e., eastbound on-ramp (east side), eastbound off-ramp (west side), westbound on-ramp (west side), and westbound off-ramp (east side)). "Approach to Impacts Analysis" p. IV.E.47, presents the analysis methodology and the LOS definitions for ramp merge and diverge and stop-controlled intersection operations. During the AM and PM peak hour, the merge and diverge areas of the freeway generally operate at acceptable levels of service, except for the eastbound off-ramp on the west side of Yerba Buena Island during the PM peak hour. On the on-ramps themselves, however, vehicles experience substantial amounts of delay while waiting for gaps in traffic on the bridge. The ramps have very short acceleration lanes, poor sight distance, and tight curve radii, which, when combined with heavy mainline traffic volumes, result in a longer driver reaction time before entering the freeway.

Local Access

This section describes each of the streets that are within the transportation study area for the Proposed Project. These streets include twelve City streets on the San Francisco mainland and one street on Treasure Island, which is not currently a City street.

Howard Street is an east-west arterial in the study area. According to the San Francisco General Plan, Howard Street is a Major Arterial. Howard Street has been identified by the SFCTA, San Francisco's Congestion Management Agency, as part of the City's Congestion Management Plan ("CMP") network, a series of freeways and Major Arterials serving a citywide function. The street has also been designated by the Metropolitan Transportation Commission ("MTC") as part of the nine-county Bay Area's Metropolitan Transportation System ("MTS"), a network of streets and highways serving regionally-important transportation functions. Between Fremont Street and The Embarcadero, Howard Street has two travel lanes in each direction, twelve-foot wide sidewalks and on-street parking on both sides of the street. Howard Street, west of its intersection with Fremont Street to 11th Street, is one-way westbound, with four travel lanes, twelve-foot wide sidewalks and on-street parking. Between Beale Street and 11th Street, Howard Street has a Class II bicycle lane designated part of Bicycle Route #30. In the downtown area, Howard Street has extensive transit facilities, with nine bus lines (including Muni and Golden Gate Transit) running on at least one block of the roadway. The Muni 76-Marin Headlands and the 30X-Marina Express run on Howard Street.

---

[3] Closure of the westbound on-ramp and the eastbound off-ramp on the east side of Yerba Buena Island did not affect overall traffic volumes accessing Yerba Buena Island and Treasure Island, as alternate ramps were available in each direction.

Folsom Street is an east-west arterial in the study area. According to the San Francisco General Plan, Folsom Street is a Major Arterial Street. Folsom is also a CMP and MTS facility. Between 11th Street and The Embarcadero, this roadway is one-way eastbound, with four travel lanes, twelve-foot wide sidewalks and on-street parking on both sides of the street for most of its length. There are four bus lines (including Muni 12-Folsom and Golden Gate Transit) operating on the street. The street also has a Class II bicycle lane between The Embarcadero and 14th Street, designated part of Bicycle Route #30.

Harrison Street is an east-west arterial in the study area. According to the San Francisco General Plan, Harrison Street is a Major Arterial. Harrison Street is also designated as a CMP and MTS facility. Between Third Street and The Embarcadero, this roadway has two eastbound travel lanes, three westbound travel lanes, twelve-foot wide sidewalks and on-street parking on both sides of the street for most of its length. West of its intersection with Third Street, the roadway is one-way westbound, with four travel lanes, twelve-foot wide sidewalks and on-street parking. At Fourth Street, Harrison Street has access to the westbound on-ramps to I-80. The off-ramps at Fifth Street release westbound I-80 traffic onto Harrison Street. In the study area, Harrison Street has six Muni bus routes lines (12-Folsom-Pacific, 9X-Bayshore Express, 9AX Bayshore 'A' Express, 9BX Bayshore 'B' Express, 27-Bryant, and 47-Van Ness) running on portions of the street.[4]

Bryant Street is an east-west arterial in the study area. According to the San Francisco General Plan, Bryant Street is a Major Arterial. Bryant Street is also designated as a CMP and MTS facility. Between 11th Street and Second Street, this roadway is one-way eastbound, providing four travel lanes, twelve-foot wide sidewalks and on-street parking on both sides of the street for most of its length. At Fourth Street, there is an off-ramp from eastbound I-80, and at Fifth Street there is an on-ramp onto eastbound I-80. East of Second Street, Bryant Street provides access to HOV on-ramps onto the eastbound Bay Bridge. There are four Muni bus routes lines (9X-Bayshore Express, 9AX-Bayshore 'A' Express, 9BX-Bayshore 'B' Express, 27-Bryant, and 47-Van Ness) operating on the street.

Fremont Street is a north-south arterial that runs between I-80/Bay Bridge and Market Street. North of Market Street, Fremont Street becomes Front Street. According to the San Francisco General Plan, Fremont Street is a Major Arterial. Fremont is also designated as a CMP and MTS facility. Fremont Street is two-way between Harrison Street and Folsom Street, and one-way northbound north of Folsom Street. North of Mission Street, Fremont Street also has a bus-only lane for Muni buses exiting the Transbay Terminal. A second off-ramp from the westbound Bay Bridge terminates on Fremont Street between Folsom Street and Howard Street. Sidewalks on

[4] As part of the December 2009 SFMTA changes to service, the 9-Bayshore routes were renumbered as 8-Bayshore routes.

both sides of the street average twelve feet in width, and are generally separated from traffic by on-street parking.

First Street is a north-south arterial that runs between Market Street and I-80 in the study area. According to the San Francisco General Plan, First Street is a Major Arterial, and is also designated as a CMP and MTS facility. First Street is one-way southbound between Market Street and Howard Street, where it provides three southbound lanes for mixed-traffic and one southbound transit-only lane. (One of the mixed-flow traffic lanes is only available during peak commute periods. During off-peak periods, parking is allowed and the lane is not used for traffic). South of Howard Street, First Street provides four southbound travel lanes for mixed traffic. Sidewalks on both sides of the street average twelve feet in width, and are separated from traffic by on-street parking and street trees. First Street connects with the Bay Bridge eastbound on-ramp at Harrison Street and therefore serves as major link between the Financial District of San Francisco and I-80. Muni 2-Clement, 3-Jackson, and the 76-Marin Headlands run on First Street in the study area.

Second Street is a north-south street extending between Market Street and King Street. According to the San Francisco General Plan, Second Street is designated a Secondary Arterial roadway. Second Street has two lanes in each direction south of Mission Street. Between Market Street and Mission Street there are one northbound and two southbound travel lanes. On-street parking is provided on both sides of the street. Second Street is part of Bicycle Route #11 (Class III bicycle route) and is used by three Muni lines (9-San Bruno, 10-Townsend and 12-Folsom-Pacific).

Fifth Street is a north-south arterial that runs between Market Street and I-80 in the study area. According to the San Francisco General Plan, Fifth Street is a Major Arterial, and is part of the CMP network between Market Street and Brannan Street and is part of the MTS network between Howard Street and Brannan Street. This roadway generally has two travel lanes in both directions. At its intersections with Bryant Street and Harrison Street, Fifth Street has on- and off-ramp access to and from I-80 and the Bay Bridge. Sidewalks on both sides of the street average six feet in width, and are separated from traffic by on-street parking. The Muni 27-Bryant line runs on Fifth Street. Fifth Street is part of Bicycle Route #19 (Class III facility).

The Embarcadero is a north-south route that is located along the northeastern waterfront of San Francisco. According to the San Francisco General Plan, The Embarcadero is a Primary Transit Street, Major Arterial, and is designated as part of the CMP and MTS network. The Embarcadero has two lanes of traffic in each direction; however, three lanes are provided in each direction between the Ferry Building and Broadway. One of the three southbound lanes is a peak period tow-away parking lane during the evening commute. The Embarcadero has Class II bicycle lanes in both directions, as part of Bicycle Route #5. Muni operates light rail and streetcar lines within the median of The Embarcadero and two bus lines (the 80X-Gateway Express and 82X-Levi Plaza Express) along mixed-flow segments. Sidewalks and on-street parking are provided on both sides of the street. The pedestrian path along the east side of The Embarcadero, Herb Caen Way, is designated as part of the San Francisco Bay Trail.

Market Street is a major east-west street that runs from just east of Clipper Street to Steuart Street (east of Clipper Street, Market Street becomes Portola Avenue). According to the San Francisco General Plan, Market Street is part of the Citywide Pedestrian Network, and is a Primary Transit Street and Transit Conflict Street. Market Street is also part of the CMP and MTS networks between Franklin Street and Clipper Street. No on-street parking is provided on Market Street east of Van Ness Avenue; however, several areas have loading zones that permit temporary parking for service vehicles and taxis. Within downtown San Francisco, Market Street is part of Bicycle Route #50 (Class III bicycle route). Muni buses (including 2-Clement, 21-Hayes, 6-Parnasus, 9-San Bruno, 9L-San Bruno Limited, 31-Balboa, 71/71L-Haight/Noriega), Muni Metro, the Muni F-Market & Wharves historic streetcar line, and BART also operate along or below Market Street.

Essex Street is a north-south street extending for only one-block between Folsom Street and Harrison Street/I-80. Although it has historically provided two travel lanes in each direction, the northbound lanes have been closed for several years to serve as a construction staging area. Generally, the southbound lanes provide peak period storage for queues of vehicles accessing the on-ramp to the Bay Bridge eastbound located at the intersection of Harrison Street/Essex Street.

Mission Street is an east-west street in the study area, extending from The Embarcadero to Van Ness Avenue. At Van Ness Avenue, Mission Street turns to run north-south to the southern City limits and into Daly City. Within the study area, Mission Street is designated as a Transit Conflict Street, and generally has one mixed-flow travel lane and one peak period transit-only lane in each direction, with on-street parking and sidewalks on both sides of the street. Parking is prohibited during peak periods. Muni (including 14-Mission, 14L-Mission Limited, and 14X-Mission Express), SamTrans, and Golden Gate Transit operate bus service on Mission Street.

Treasure Island Road is a two-lane street extending between Treasure Island and the I-80/Bay Bridge on- and off-ramps on Yerba Buena Island. Treasure Island Road becomes Avenue of the Palms on Treasure Island and Hillcrest Road on southern parts of Yerba Buena Island. There are no existing pedestrian or bicycle facilities on the roadway. Treasure Island Road connects to the Bay Bridge westbound on-ramp and the eastbound off-ramp on the west side of Yerba Buena Island. Treasure Island Road also extends south of the Bay Bridge, where it becomes Hillcrest Road near the U.S. Coast Guard property on Yerba Buena Island. The Muni line 108-Treasure Island runs on Treasure Island Road.

Intersection Operations

Existing conditions at the study intersections were analyzed for the peak hour of the typical weekday morning (7 to 9 AM) and evening (4 to 6 PM) peak periods, as well as the peak hour of the Saturday midday peak period (1 to 3 PM). The peak periods are consistent with most transportation analyses conducted in San Francisco and were selected because they represent the times during typical days that routinely experience the highest traffic volumes and greatest congestion. Figure IV.E.1: Study Intersections, depicts the study intersections.

Traffic conditions at the study intersections were evaluated using the Level of Service ("LOS") methodology. Level of Service is a qualitative description of operating conditions ranging from LOS A, or free-flow conditions with little or no delay, to LOS F, or jammed conditions with excessive delays. "Approach to Impacts Analysis," p. IV.E.47, presents the analysis methodology and the LOS definitions for signalized and unsignalized intersections. Table IV.E.2 on p. IV.E.52, defines each of the levels of service and shows the average control delay associated with each level of service.

Existing operating conditions for the study intersections are presented in Table IV.E.15, p. IV.E.86– IV.E.87. During the weekday AM and PM, and Saturday peak hours, most study intersections currently operate within acceptable service conditions, at LOS D or better, with the following exceptions:

- First Street/Mission Street operates at LOS E in the PM peak hour;
- First Street/Howard Street operates at LOS E in the PM peak hour;
- First Street/Folsom Street operates at LOS E in the PM peak hour;
- First Street/Harrison Street/I-80 Eastbound On-Ramp operates at LOS E in the PM peak hour;
- Essex Street/Harrison Street/I-80 Eastbound On-Ramp operates at LOS F in the PM peak hour;
- Second Street/Folsom Street operates at LOS E in the PM peak hour;
- The Embarcadero/Harrison Street operates at LOS E in the AM peak hour and LOS F in the PM peak hour; and
- Bryant Street/Fifth Street/I-80 Eastbound On-Ramp operates at LOS F in the PM peak hour.

During the Saturday midday peak hour, none of the 16 study intersections currently operate at unacceptable LOS E or LOS F conditions.

Generally, conditions in downtown San Francisco are more congested in the PM peak hour than the AM peak hour. In the mornings, access to downtown San Francisco is constrained by the limited capacity of the Bay Bridge to deliver traffic into the City. In the evening, the opposite occurs, when traffic attempting to leave downtown San Francisco is constrained by the limited capacity of the Bay Bridge ramps onto the bridge, causing queues to form on surface streets leading to the bridge. Congestion in downtown San Francisco can vary depending on a number of other factors, including incidents on the bridge, special events, and seasonal variations in traffic and therefore, LOS may sometimes differ from what is presented in Table IV.E.15 due to variations in travel conditions. It should also be noted that traffic operations at a number of intersections in the South of Market area are affected by traffic associated with special events and during baseball season when the San Francisco Giants have home games at AT&T Park (on King Street, between Second and Third Streets). Transportation impacts associated with game day conditions are most severe prior to games and after the conclusion of games. The greatest impact occurs after weekday afternoon sellout events, during the 3:30 to 4:40 PM period when traffic, transit and pedestrian flows exiting the ballpark (and game-day street closures near the park) coincide with the evening commute traffic already on the transportation network. As a result, on days when San Francisco Giants play home games at AT&T Park, existing service levels at study intersections and the Bay Bridge, particularly those between the ballpark and the Bay Bridge, would generally be worse than those presented in Table IV.E.15.

Two of the study intersections included in the analysis (Folsom/Essex and Bryant/Sterling) are uncontrolled (i.e., no traffic signal or stop sign). At Folsom/Essex, traffic on eastbound Folsom Street destined for the eastbound Bay Bridge on-ramps at Harrison Street turns right from eastbound Folsom to southbound Essex Street. Similarly, Bryant Street/Sterling Street is uncontrolled and allows eastbound left turns and westbound right-turns to access the HOV-only on-ramp to the eastbound Bay Bridge at Sterling Street. Since approaches to these intersections are not controlled, delay cannot be calculated, and instead a qualitative discussion of the intersection operations was conducted. Observations indicate that these two intersections operate relatively well during the AM and Saturday peak periods. During the PM peak period on days when congestion leading onto the Bay Bridge is severe, queues from bridge on-ramps spill back into these intersections. At Folsom Street/Essex Street, this congestion primarily affects the two southern eastbound lanes on Folsom Street that facilitate turns onto southbound Essex Street. At Bryant Street/Sterling Street, this congestion primarily affects the two eastbound lanes on Bryant Street that turn onto the Bay Bridge on-ramp; the “through” travel lane on eastbound Bryant Street operates relatively free of congestion. The single lane on the westbound approach to this intersection on Bryant Street turns directly onto the on-ramp and is frequently congested during the PM peak hour.

Transit

Currently, one transit line serves the Islands from the Transbay Terminal in downtown San Francisco; the Muni line 108-Treasure Island. At the Transbay Terminal, passengers can access regional and other local public transportation services including many Muni, Golden Gate

Transit, AC Transit, and SamTrans lines. BART is within walking distance of the Transbay Terminal, and Caltrain can be reached via a transfer to another Muni line. Figure IV.E.5: Existing Public Transit Network, illustrates the public transit network in downtown San Francisco and Treasure Island.

The Muni line 108-Treasure Island provides 24-hour service between the Transbay Terminal and Treasure Island via the Bay Bridge using a 40-foot motor coach. On Treasure Island, the line operates on a loop on M Avenue, 13th Street, H Avenue and California Avenue.[5] Scheduled service frequency is every 15 minutes during the morning, afternoon, and evening weekday peak periods and every 20 minutes during the weekend peak period; however, the actual run time for the line varies depending on congestion on the Bay Bridge. During the peak periods, the line has a run time of approximately 10 minutes from Treasure Island inbound towards the Transbay Terminal and a run time of approximately 8 minutes outbound from the Transbay Terminal to Treasure Island. The line spends approximately 15 minutes circulating on the Islands. Depending on the direction of travel (e.g., service to or from downtown San Francisco), the line is currently operating between 20 and 58 percent of capacity during the AM peak hour, and between 48 and 61 percent of capacity during the PM peak hour. During the Saturday peak hour, when scheduled service is every 20 minutes, the line operates between 46 and 70 percent of capacity.

At the Transbay Terminal, Muni Line 108-Treasure Island riders can connect to several other transit lines operating inside, adjacent to, or within a short walk of the Transbay Terminal. Muni operates 80 transit lines throughout San Francisco with stops within 2 blocks of 90 percent of all residences in the city. The agency is responsible for operating buses, light rail lines, cable cars, and the historic street cars in the City of San Francisco. In addition to the Muni line 108-Treasure Island, Muni lines 5-Fulton, 6-Parnassus, 14-Mission (including the 14L-Mission Limited and 14X-Mission Express), 38-Geary, 38L-Geary Limited, and 76-Marin Headlands have stops at the Transbay Terminal, facilitating direct connections to the 108-Treasure Island. The closest BART station to the Transbay Terminal is the Embarcadero Station located about one block away. The Ferry Building is located about five blocks from the Transbay Terminal and accommodates service to the East Bay and North Bay.

The existing Muni line 108-Treasure Island serving the project site was assessed by calculating the existing capacity utilization (riders as a percentage of capacity) at the maximum load point (the point of greatest demand). Data collected as part of SFMTA’s Transit Effectiveness Project (“TEP”) was used to calculate the capacity utilization, which was then compared to Muni’s

[5] In December 2009, SFMTA eliminated the segment of the 108-Treasure Island bus route between the Transbay Terminal and the Caltrain terminal at Fourth Street and Townsend Street, and rerouted service on Treasure Island from Avenue M to Avenue H.

SOURCE: Fehr & Peers, 2009

FIGURE IV.E.5: EXISTING PUBLIC TRANSIT NETWORK capacity utilization standard of 85 percent. A similar assessment was also conducted for the four downtown Screenlines.[6] "Approach to Impact Analysis", p. IV.E.47, presents the analysis methodology for the transit capacity utilization and screenline analyses.

AC Transit is the primary bus operator for the East Bay, including Alameda and western Contra Costa Counties, and provides lines to the City of San Francisco and San Mateo County. AC Transit operates 27 "transbay" bus lines between the East Bay and the Transbay Terminal, many of which operate only during commute periods.

The **Golden Gate Bridge, Highway, and Transportation District ("GGBHTD")** provides bus and ferry service between the North Bay (Marin and Sonoma Counties) and San Francisco. Within San Francisco, Golden Gate Transit bus lines 4, 8, 18, 24, 26, 27, 44, 54, 72, 73, 76, 10, 70, 80 and 101 operate on surface streets, with stops adjacent to the Transbay Terminal offering service to Marin and Sonoma Counties. Golden Gate Transit also operates ferry service between the Larkspur and Sausalito Ferry Terminals in Marin County and the San Francisco Ferry Building.

SamTrans, operated by the San Mateo County Transit District, provides bus and rail service in San Mateo County, and provides bus service between San Mateo County and San Francisco. SamTrans lines DX, FX, KX, MX, NX, PX, RX, 292, and 397 serve downtown San Francisco and the Transbay Terminal area, and provide connections to San Mateo County destinations.

BART operates regional rail transit service connecting San Francisco with the East Bay and northern San Mateo County. Although no direct connections from the Transbay Terminal are available to BART, the Bay Area's regional rapid transit system, connections can be made at nearby facilities. Passengers can transfer between the Transbay Terminal and BART by walking two blocks north from Mission Street to the Montgomery Street Station on Market Street. Passengers can use BART to reach Pittsburg/Bay Point, Richmond, Fremont, Dublin, Millbrae, SFO and points in between.

Caltrain provides rail passenger service on the Peninsula and the Santa Clara Valley between Gilroy and San Francisco. The San Francisco Caltrain terminal is at Fourth Street between King Street and Townsend Street. To reach Caltrain, passengers could walk to the Montgomery Street Station and either take BART to Millbrae, where passengers can transfer directly to Caltrain, or board the Muni 10-Townsend, N-Judah or T-Third Street light rail lines, which provide service to

---

[6] The concept of screenlines is used to describe the magnitude of travel to or from the greater downtown San Francisco area by corridors, and to compare estimated transit ridership to available capacity. Screenlines are hypothetical lines that would be crossed by persons traveling between downtown and other parts of San Francisco and the region. Individual transit lines are grouped into screenlines across which the transit lines travel.

the Fourth Street/King Street Caltrain Station, or the peak hour Muni express buses 80X, 81X and 82X, or Muni 76-Marin Headlands on Sundays.

San Francisco Bay Area Water Emergency Transportation Authority ("WETA") is responsible for implementing the Ferry Implementation and Operations Plan (the "IOP") for the Bay Area, with a focus on building and operating a comprehensive public water transit system of ferries, feeder buses, and terminals to increase regional mobility in the Bay Area. There is no ferry service currently serving Treasure Island. However, the IOP proposes new ferry service between the San Francisco Ferry Building and Treasure Island. Existing ferry berths are located at the Ferry Building in San Francisco and include lines between San Francisco and Oakland, Alameda, and Vallejo that are operated by the WETA; ferry service provided by other operators includes service between San Francisco and Sausalito, Larkspur and Tiburon, as described above.

Bicycles

Existing bicycle facilities in the transportation study area include routes that are part of the San Francisco Bicycle Network. Bikeways are typically classified as Class I, Class II, or Class III facilities.[7] Class I bikeways are paths with exclusive right-of-way for use by bicyclists or pedestrians. Class II bikeways are bicycle lanes striped within the paved areas of roadways and established for the preferential use of bicycles; Class III bikeways are signed bicycle routes that allow bicycles to share travel lanes with vehicles. Figure IV.E.6: Existing Bicycle Route Network, presents the bicycle routes in downtown San Francisco and in the South of Market area, as identified in the San Francisco Bicycle Route System map.

Currently on Treasure Island, there is a short bicycle lane striped on Avenue of the Palms and a pathway around the western side of the island. No bicycle facilities exist on the Bay Bridge.

Bicycles are allowed on most BART trains, except during peak commute hours (generally between 6:00 and 9:00 AM, and between 4:00 and 6:30 PM), or at any time on crowded cars. Caltrain allows a limited number of bicycles on all trains, and most Muni buses, including the Muni line 108-Treasure Island, are outfitted with racks to also carry a limited number of bicycles. Caltrans operates a transbay bicycle shuttle during morning and evening commute periods to transport bicyclists (and their bicycles) between the East Bay and San Francisco, but does not currently stop at Yerba Buena Island. The new east span of the Bay Bridge is expected to provide a bicycle and pedestrian path between Emeryville/Oakland and the Islands. BATA has recently completed a feasibility study examining the potential for a new bicycle/pedestrian path

[7] Bicycle facilities are defined by the State of California in the California Streets and Highway Code Section, 890.4.

SOURCE: Fehr & Peers, 2009

FIGURE IV.E.6: EXISTING BICYCLE ROUTE NETWORK on the west span of the Bay Bridge. BATA has subsequently initiated a Project Study Report to examine design alternatives. If this project is constructed, there would be a continuous bicycle and pedestrian facility from Emeryville/Oakland to San Francisco, with connections to the Islands.

Pedestrians

The pedestrian environment surrounding the Ferry Building in downtown San Francisco is presented because the Proposed Project would include a ferry connection between Treasure Island and the Ferry Building. In addition, a discussion of the pedestrian environment in the vicinity of the Transbay Terminal is presented because the San Francisco terminus of the Muni line 108-Treasure Island is at the terminal. Existing pedestrian facilities on Treasure Island are not discussed because the Proposed Project would substantially alter and improve the existing street network on Treasure Island. The pedestrian network on Yerba Buena Island is limited and would be improved with the Proposed Project. Proposed Project improvements are presented in the "Impacts," subsection on pp. IV.E.30 to IV.E.47.

The San Francisco Ferry Building currently serves ferries arriving and departing from Sausalito, Tiburon, Larkspur, Oakland, Alameda, and Vallejo approximately every half hour during the peak period (except for the Sausalito ferry, which departs approximately every 60 to 90 minutes). In addition to ferry activity, the Ferry Building is used as an indoor marketplace, houses several offices and restaurants, and provides sidewalk space for a twice weekly farmers' market. With these uses, and its proximity to downtown San Francisco, the surrounding area experiences high levels of pedestrian activity.

The Embarcadero separates the Ferry Building from the rest of downtown San Francisco. The waterfront was redesigned after the elevated Embarcadero freeway structure was damaged in the 1989 Loma Prieta earthquake. In lieu of reconstructing the freeway decks, the City of San Francisco and Caltrans designed the new roadway as a six-lane, at-grade facility with a light rail line within the median. In addition to the Ferry Building, several other properties along the waterfront were redeveloped as office and/or restaurant uses. A wide sidewalk and mixed-use path is provided along the Bay (east) side of The Embarcadero and around the Ferry Building. The path is generally 25 feet wide; near the Ferry Building, the path widens to between 30 and 45 feet.

As a result of the relatively recent reconstruction of The Embarcadero, most of the pedestrian facilities in the area surrounding the Ferry Building are consistent and generally ADA-compliant. Major pedestrian crossings at The Embarcadero occur at the foot of Market Street and the Ferry Building, as well as at both of the adjacent intersections along The Embarcadero at Washington and Mission Street. In front of the Ferry Building, there are three crossing points – a central main (80-foot wide) crosswalk directly between the Ferry Building and Market Street, and two narrower crosswalks on either end of Justin Hermann Plaza. Pedestrian crossings across The Embarcadero are signalized. Figure IV.E.7: Pedestrian Study Crosswalks in Downtown San Francisco, presents the locations where crosswalk Level of Service analyses were conducted.

Existing pedestrian density and LOS at the crosswalks near the Ferry Building are presented in Table IV.E.16, p. IV.E.94.

The crosswalks in the vicinity of Ferry Building operate at acceptable levels of service during all peak hours. Based on observations during the peak hours, platoons of pedestrians form routinely while waiting for a signal to cross The Embarcadero. Although enough pedestrians are present to cause slight delays for those that walk faster than others, there is sufficient space in the crosswalk for faster pedestrians to navigate around others. Most crosswalks operate with relatively little delay or congestion. While the crosswalk directly in front of the Ferry Building becomes more congested during peak periods, it nevertheless operates within acceptable service conditions (i.e., LOS D conditions or better).

The existing Transbay Terminal is located at First and Mission Streets, and is scheduled for demolition and reconstruction as part of the Transbay Transit Center Project. Preconstruction activities are currently underway, and construction of the new Transit Center started in spring 2010, and is expected to be completed in 2015. A temporary terminal, located on the block bounded by Main, Folsom, Beale and Howard Streets, opened in spring 2010, and serves commuters during demolition and construction of the new Transit Center.

Pedestrian trips to and from the existing terminal occur from all directions, with the majority of trips to and from the north. Existing pedestrian conditions at the nearby crosswalks, walkways and corner queuing area generally operate at acceptable levels, with limited locations where pedestrian movements are restricted (e.g., at the northwest corner of Beale/Howard). The proposed Transit Center District Plan project includes a comprehensive plan for improvements and changes to streets, circulation and open spaces in the area to support the existing, planned, and proposed land uses and activity in the area. Improvements would include reconfiguration of existing rights-of-way to accommodate the anticipated increases in pedestrian volumes that would result from the intensification of land uses, extension of Caltrain and the construction of High Speed Rail.

Loading and Parking

Existing loading and parking conditions were not quantitatively assessed on the Islands since the existing roadway network is proposed to be reconfigured and off-street and on-street parking and loading facilities would be provided in new quantities and configuration.

SOURCE: Fehr & Peers, 2009

FIGURE IV.E.7: PEDESTRIAN STUDY CROSSWALKS IN DOWNTOWN SAN FRANCISCO

In general, existing parking and loading operations on Treasure Island occur off-street within parking and loading areas designated for the individual buildings. On-street parking is permitted on most of the major roadways, except on the perimeter road and California Avenue. On Yerba Buena Island, on-street parking and loading is not permitted. Residential areas include off-street parking facilities.

Emergency Access

The Islands are currently served by both the San Francisco Police Department and Fire Department. The Fire Department operates Fire Station 48 on Avenue D on Treasure Island. The Islands could also be served by Fire Station 35, the fire boat headquarters, located at Pier 22 ½ at The Embarcadero and Harrison Street. The Bay Bridge is the only existing emergency access to and from the Islands and San Francisco or the East Bay. The primary on-island emergency routes include roadways leading to the Bay Bridge, including Avenue of the Palms and Treasure Island Boulevard. When the Bay Bridge is congested during peak periods, emergency vehicles maneuver around vehicles and into other open travel lanes, similar to other congested roadways in San Francisco. The California Vehicle Code requires drivers to make way for emergency vehicles. In an emergency situation under congested conditions, emergency vehicles maneuver around traffic and use any available space, regardless of whether or not that space is in a striped travel lane.

REGULATORY FRAMEWORK

This section provides a summary of the plans and policies of the City and County of San Francisco, and regional, state, and federal agencies that have policy and regulatory control over the Proposed Project site. These plans and policies include the *San Francisco General Plan*, the San Francisco Bicycle Plan, and the Transit First Policy.

Federal, State, and Regional

There are no Federal, State, or regional transportation regulations applicable to the Proposed Project.

Local

San Francisco General Plan

The Transportation Element of the *San Francisco General Plan* is composed of objectives and policies that relate to the eight aspects of the citywide transportation system: General Regional Transportation, Congestion Management, Vehicle Circulation, Transit, Pedestrian, Bicycles, Citywide Parking, and Goods Management. The Transportation Element references San

Francisco's "Transit First" Policy in its introduction, and contains the following objectives and policies that are directly pertinent to consideration of the Proposed Project:

Objective 2: Use the transportation system as a means for guiding development and improving the environment.

Policy 2.1: Use rapid transit and other transportation improvements in the city and region as the catalyst for desirable development, and coordinate new facilities with public and private development.

Policy 2.4: Organize the transportation system to reinforce community identity, improve linkages among interrelated activities, and provide focus for community activities.

Objective 9: Improve bicycle access to San Francisco from all outlying corridors.

Policy 9.2: Where bicycles are prohibited on roadway segments, provide parallel routes accessible to bicycles or shuttle services that transport bicycles.

Objective 11: Establish public transit as the primary mode of transportation in San Francisco and as a means through which to guide future development and improve regional mobility and air quality.

Objective 14: Develop and implement a plan for operational changes and land use policies that will maintain mobility and safety, despite a rise in travel demand that could otherwise result in system capacity deficiencies.

Policy 14.2: Ensure that traffic signals are timed and phased to emphasize transit, pedestrian, and bicycle traffic as part of a balanced multimodal transportation system.

Policy 14.3: Improve transit operation by implementing strategies that facilitate and prioritize transit vehicle movement and loading.

Policy 14.4: Reduce congestion by encouraging alternatives to the single-occupancy auto through the reservation of right-of-way and enhancement of other facilities dedicated to multiple modes of transportation.

Policy 14.7: Encourage the use of transit and other alternative modes of travel to the private automobile through the positioning of building entrances and the convenient location of support facilities that prioritizes access from these modes.

Objective 18: Establish a street hierarchy system in which the function and design of each street are consistent with the character and use of the adjacent land.

Policy 18.2: Design streets for a level of traffic that serves, but will not cause a detrimental impact on, adjacent land uses or eliminate the efficient and safe movement of transit vehicles and bicycles.

Policy 18.4: Discourage high-speed through traffic on local streets in residential areas through traffic "calming" measures that are designated not to disrupt transit service or bicycle movement…"

Objective 23: Improve the city's pedestrian circulation system to provide for efficient, pleasant, and safe movement.

Policy 23.2: Widen sidewalks where intensive commercial, recreational, or institutional activity is present and where residential densities are high.

Policy 23.3: Maintain a strong presumption against reducing sidewalk widths, eliminating crosswalks, and forcing indirect crossings to accommodate automobile traffic.

Policy 23.6: Ensure convenient and safe pedestrian crossings by minimizing the distance pedestrians must walk to cross a street.

Objective 24: Improve the ambiance of the pedestrian environment.

Objective 28: Provide secure and convenient parking facilities for bicycles.

Policy 28.1: Provide secure bicycle parking in new governmental, commercial, and residential developments.

Policy 28.3: Provide parking facilities which are safe, secure, and convenient.

Objective 34: Relate the amount of parking in residential areas and neighborhood commercial districts to the capacity of the city's street system and land use patterns.

Policy 34.1: Regulate off-street parking in new housing so as to guarantee needed spaces without requiring excesses and to encourage low auto ownership in neighborhoods that are well served by transit and are convenient to neighborhood shopping.

Policy 34.3: Permit minimal or reduced off-street parking for new buildings in residential and commercial areas adjacent to transit centers and along transit preferential street.

Objective 35: Meet short-term parking needs in neighborhood shopping districts consistent with preservation of a desirable environment for pedestrians and residents.

Policy 35.1: Provide convenient on-street parking specifically designed to meet the needs of shoppers dependent upon automobiles.

Policy 35.2: Assure that new neighborhood shopping district parking facilities and other auto-oriented uses meet established guidelines.

Objective 39: Make freeway and major surface street improvements to accommodate and encourage truck/service vehicles in industrial areas away from residential neighborhoods.

<u>San Francisco Bicycle Plan</u>

The San Francisco Bicycle Plan describes a City program to provide the safe and attractive environment needed to promote bicycling as a transportation mode. The San Francisco Bicycle Plan identifies the citywide bicycle route network, and establishes the level of treatment (i.e., Class I, Class II or Class III facility) on each route. The Plan also identifies near-term improvements that could be implemented within the next five years, as well as policy goals, objectives and actions to support these improvements. It also includes long-term improvements, and minor improvements that would be implemented to facilitate bicycling in San Francisco.

<u>Transit First Policy</u>

In 1998, the San Francisco voters amended the City Charter (Charter Article 8A, Section 8A.115) to include a Transit-First Policy, which was first articulated as a City priority policy by the Board of Supervisors in 1973. The Transit-First Policy is a set of principles which underscore the City's commitment that travel by transit, bicycle, and foot be given priority over the private automobile. These principles are embodied in the policies and objectives of the Transportation Element of the *San Francisco General Plan*. All City boards, commissions, and departments are required, by law, to implement transit-first principles in concluding City affairs.

IMPACTS

SIGNIFICANCE CRITERIA

The Planning Department's Initial Study Checklist Form provides a framework of issues to be considered in evaluating a project's impacts under CEQA. Implementation of a project could have a potentially significant impact related to transportation if the project were to:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, established by the county congestion management agency for designated roads or highways (unless it is practical to achieve the standard through increased use of alternative transportation modes);
- Result in a change in air traffic patterns, including either an increase in traffic levels, obstructions to flight, or a change in location, that causes substantial safety risks;
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses;
- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., conflict with policies promoting bus turnouts, bicycle racks, etc.) regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities, or cause a substantial increase in transit demand which cannot be accommodated by existing or proposed transit capacity or alternative travel modes.

Below is a list of significance criteria used by the San Francisco Planning Department to assess whether a proposed project would result in significant impacts. These criteria are organized by mode to facilitate the transportation impact analysis; however, the transportation significance criteria are essentially the same as the ones presented above.

- The operational impact on signalized intersections is considered significant when project-related traffic causes the intersection level of service to deteriorate from LOS D or better to LOS E or F, or from LOS E to LOS F. The project may result in significant adverse impacts at intersections that operate at LOS E or F under existing conditions depending upon the magnitude of the project's contribution to the worsening of the average delay per vehicle. In addition, the project would have a significant adverse impact if it would cause major traffic hazards or contribute considerably to cumulative traffic increases that would cause deterioration in levels of service to unacceptable levels.

  The operational impacts on freeway mainline segments and freeway on-ramp merge and off-ramp diverge operations are considered significant when project-related traffic causes the level of service to deteriorate from LOS D or better to LOS E or LOS F, or from LOS E to LOS F. In addition, a project would have a significant effect on the environment if it would contribute substantially to traffic volumes at study merge and diverge sections already operating at LOS E or LOS F.

  Further, because all vehicular trips generated by this project would require access to and travel on the Bay Bridge, the project would be considered to have a significant impact if it would substantially increase queuing on bridge approaches, either in San Francisco or the East Bay.

- The project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service; or cause a substantial increase in delays or operating costs such that significant adverse impacts in transit service levels could result. With the Muni and regional transit screenlines analyses, the project would have a significant effect on the transit provider if project-related transit trips would cause the capacity utilization standard to be exceeded during the PM peak hour.

- The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.

- The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.

- A project would have a significant effect on the environment if it would result in a loading demand during the peak hour of loading activities that could not be accommodated within proposed on-site loading facilities or within convenient on-street loading zones, and created potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians.

- The project would have a significant effect on the environment if it would result in inadequate emergency access.

- Construction-related impacts generally would not be considered significant due to their temporary and limited duration. However, in circumstances involving large development plans where construction would occur over long periods of time, impacts on transportation and circulation systems due to construction may be considered significant.

TRANSPORTATION IMPROVEMENTS ASSUMED IN THE ANALYSIS

Street Network Improvements on Treasure Island and Yerba Buena Island

The Proposed Project would largely reconfigure existing streets on Treasure Island, as illustrated on Figure IV.E.8: Proposed Treasure Island and Yerba Buena Island Street System.[8] The planned street design for Treasure Island provides a layout to accommodate higher-density development sites, a Transit Hub, and open space. There are four main levels in the hierarchy of streets planned for Treasure Island:

- Major Arterials – California Avenue and Avenue C are the main east/west and north/south streets, respectively, on Treasure Island. Major arterials would generally include one 12-foot wide traffic lane in each direction (11-foot wide lanes when buses travel in only one direction), 8-foot wide parking bays, and 5-foot wide Class II bicycle lanes in each direction. Additional lanes may be added to Major Arterial streets as needed for dedicated left and right turn lanes. Landscaping and sidewalks would be provided on both sides of the street, although their widths would vary. Major arterials would provide primary access to the Bay Bridge. Their function is consistent with the same-titled street type designation in the Transportation Element of the *San Francisco General Plan*.
- Secondary Arterials – Secondary Arterials are roadways with similar characteristics to Major Arterials, but that do not provide primary access to the Bay Bridge. There would be two Secondary Arterials on Treasure Island: First Street, between Avenue of the Palms and Avenue D, and Avenue D, between First Street and California Avenue. Generally, they would include an 11-foot wide traffic lane and a 7-foot wide parking bay. Parking bays would be 8-feet wide when a 5-foot wide Class II bicycle lane is provided. To minimize bus conflicts, a 6-foot wide flex lane would be added between parking bays and the travel lane where parking occurs adjacent to the bus lines in the area near the Transit Hub. Similar to Major Arterials, there would be landscaping and sidewalks on both sides of the street. Their function is consistent with the same-titled street type designation in the Transportation Element of the *San Francisco General Plan*.
- Collector Streets – These roadways facilitate movement through and around the urban core, developed neighborhoods, and open space. They include a 10-foot wide traffic lane and a 7-foot wide parking bay in each direction. Where a Class II bicycle lane is present, the parking bay would be 8-feet wide. Collector Streets would also have sidewalks and landscaping on both sides of the street. Their function is consistent with the same-titled street type designation in the Transportation Element of the *San Francisco General Plan*.
- Shared Public Ways – These pedestrian- and bicycle-priority public rights-of-way are proposed primarily within the Cityside neighborhood with one shared public way in the Island Core neighborhood. These streets prioritize pedestrian and bicycle use of the entire right-of-way, while allowing occasional slow-moving vehicles to access local land uses and parking to provide necessary services. They may be designed with special paving, a variety of amenities, landscaping and seating, as well as pockets of on-street

[8] The street names shown on Figure IV.E.8 are for identification purposes only and subject to change.

SOURCE: Perkins + Will, May 4, 2009; Fehr & Peers, 2009

FIGURE IV.E.8: PROPOSED TREASURE ISLAND AND YERBA BUENA ISLAND STREET SYSTEM

parking, and are consistent with design standards of the San Francisco "Better Streets" guidelines.[9]

Unlike the street system on Treasure Island, which would be reconstructed, the roadway system on Yerba Buena Island would largely remain in its current configuration, with the exception of improved emergency vehicle access, bicycle and pedestrian circulation improvements, and modifications to serve the revised Bay Bridge ramp configurations described on pp. IV.E.4 – IV.E.9.

Macalla Road on Yerba Buena Island would be converted to one-way operations, such that vehicles could only travel on Macalla Road from the Bay Bridge ramps to its terminus at the intersection with Treasure Island Road. The other major streets on Yerba Buena Island, which include Treasure Island Road, Hillcrest Road, South Gate Road, and a small section of Macalla Road east of the new westbound ramps, would continue to provide two-way operations. As noted earlier, with reconstruction of the westbound ramps as part of the proposed Ramps Project, the westbound on-ramp to the Bay Bridge on the west side of Yerba Buena Islands would be for transit and emergency vehicle access only.

Streets on Yerba Buena Island would also have four street classifications:

- Major Arterials – Major arterials on Yerba Buena Island would generally provide access between Treasure Island and the Bay Bridge, and include Treasure Island Road, South Gate Road, Hillcrest Road, and Macalla Road. Treasure Island Road, South Gate Road, and Hillcrest Road would include 12-foot wide travel lanes in each direction (11-feet wide when separated by a median or dedicated turn lane), and a 5-foot wide Class II bicycle lane.
    - On Treasure Island Road, a bicycle lane would be provided in the south and east-bound directions only (i.e., from Treasure Island towards the Bay Bridge only). A short section on Treasure Island Road near the existing Bay Bridge westbound on-ramp would have a 14-foot wide travel lane and a Class III bicycle route.[10] There would be sidewalks provided on Treasure Island Road between Treasure Island and Macalla Road. No sidewalks would be provided on the section of Treasure Island Road between Macalla Road and the Bay Bridge.
        - Macalla Road would be reconfigured to allow one-way vehicular traffic only, from the Bay Bridge northwesterly towards Treasure Island Road. This street

---

[9] The Draft Better Streets Plan (June 2008) focuses on creating a positive pedestrian environment through measures such as careful streetscape design and traffic calming to increase pedestrian safety. The Proposed Project roadway cross-sections were designed to safely accommodate multi-modal transportation within the Project site, and include roadway and streetscape improvements on roadways outside of the Project site.

[10] The adoption of Mitigation Measure M-TR-24 could require the removal of the proposed bicycle lane on Treasure Island Road to accommodate a transit-only lane if congestion on Treasure Island Road adversely affects transit operations. If the proposed bicycle lane is removed, cyclists would continue to have a Class II contra-flow facility connecting Treasure Island and the Bay Bridge, via Macalla Road (see Impact TR-33).

would provide one 11-foot wide travel lane, a five-foot Class II bicycle lane on the right-hand side, and a 6-foot wide contra-flow bicycle lane on the left-hand side. A 5-foot wide sidewalk would also be provided on the left-hand side.

- Secondary Arterials – The main access road into the central development and open space area would be designated as a Secondary Arterial street. The Secondary Arterial would provide a 15-foot wide travel lane in each direction (a 30-foot wide curb-to-curb roadway) and a 5-foot wide sidewalk on the north side of the street. The wide travel lanes would be designed to accommodate future transit and emergency vehicle access.
- Collector Streets – The Collector Street on Yerba Buena Island would be a one-way roadway, forming a loop traveling clockwise. It would include a 20-foot wide travel lane with 5-foot wide sidewalks on both sides of the street.
- Private Streets – The primary access to homes within the main western and eastern residential districts on Yerba Buena Island would be private streets. The private streets would include 11-foot wide travel lanes in each direction. The streets have been designed to accommodate emergency vehicle access, with turnaround areas and wider curb return radii at intersections.

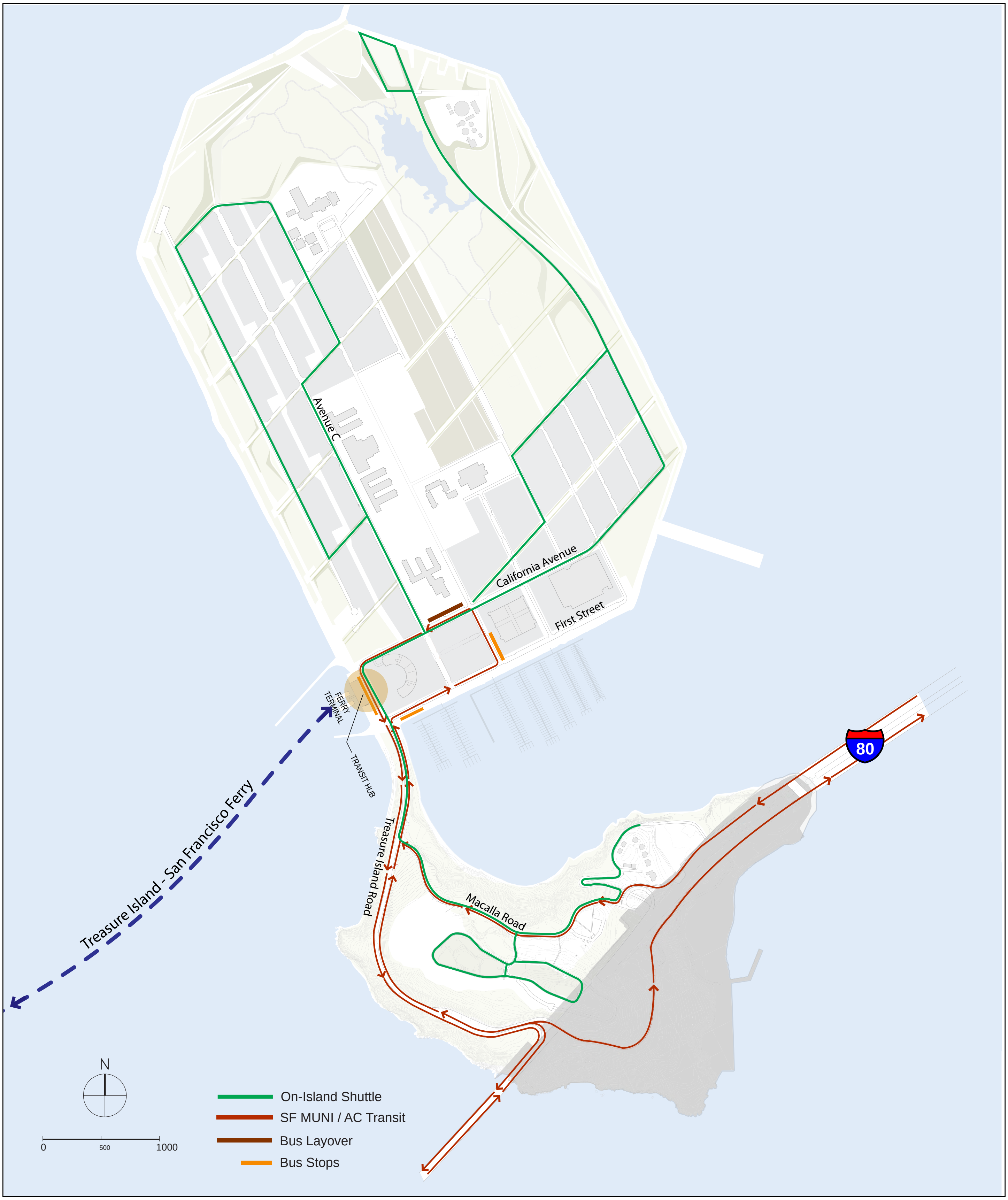
Transit Improvements

The transportation analysis assumes a set of transit improvements for which full funding has been identified.[11] The Proposed Project would include a new inter-modal bus and ferry terminal (Transit Hub) on the western shore of Treasure Island. As described below, the Transit Hub would be the consolidated terminal for Muni's 108-Treasure Island line, the new AC Transit service, and the Islands shuttle line. The Transit Hub would also include bicycle lockers.

The proposed transit circulation plan is illustrated on Figure IV.E.9: Proposed Transit Circulation Plan, and include the following:

- New ferry service between the Transit Hub and downtown San Francisco. Ferries would operate with 50-minute headways during peak hours to and from downtown San Francisco between 5 AM and 9 PM (corresponding to a single ferry operating between Treasure Island and one of the existing docks in San Francisco);
- Muni line 108-Treasure Island would operate at its current 15-minute peak headway but would no longer circulate around most of Treasure Island. Instead, it would circulate only around the Transit Hub and the Island Core neighborhood. The 108-Treasure Island would continue to operate 24-hours per day, including overnight owl service;

[11] The Treasure Island Transportation Plan was prepared as an exhibit to the 2006 Development Plan and Term Sheet (2006 Term Sheet) that was endorsed by the TIDA Board and San Francisco Board of Supervisors. The 2006 Transportation Plan included substantial improvements to the transit infrastructure and service, however, since full funding for these improvements has not been identified, a less robust transit service plan for which full funding has been identified was assumed for the impact analysis.



SOURCE: Perkins+Will

FIGURE IV.E.9: PROPOSED TRANSIT CIRCULATION PLAN

- New bus transit service operating between the Islands and downtown Oakland (operated by AC Transit) at approximately 10-minute headways during peak hours and less frequent service during off-peak hours; generally, bus service to Oakland would be provided between approximately 5 AM and 10 PM.
- A fleet of alternative fuel shuttle-buses that circulate throughout the Islands, with timed transfers at the Transit Hub offering fare-free rides to residents and visitors of the Islands.

In addition to the Transit Hub and service enhancements described above, the Proposed Project would provide a number of physical infrastructure improvements designed to prioritize transit movements, including bus stops and layover areas. In addition, as part of the Ramps Project, the existing westbound on-ramp to the Bay Bridge on the western side of Yerba Buena Island would be converted for transit and emergency vehicle access only. Buses traveling between the Islands and San Francisco would access the Bay Bridge via the transit and emergency vehicle access only westbound on-ramp and exit the Bay Bridge from the existing eastbound off-ramp on the west side of the Island. Buses would travel on Treasure Island Road between Treasure Island and the Bay Bridge ramps. In the event that the Ramps Project is not approved by the SFCTA and constructed by Caltrans, the existing westbound on-ramp on the west side of Yerba Buena Island would be used by both westbound buses and other vehicles.

Buses traveling between the Islands and the East Bay would use the new eastbound on-ramp on the east side of Yerba Buena Island to be constructed as part of the Bay Bridge East Span project. To access this on-ramp, buses leaving the Islands would travel along Treasure Island Road and Hillcrest Road. Buses traveling from the East Bay to the Islands would use either the existing westbound off-ramp on the east side of Yerba Buena Island or the proposed reconstructed westbound off-ramp, depending on whether the Ramps Project is approved and constructed. To access the Islands from the East Bay, buses would exit the Bay Bridge and travel on Macalla Road to its intersection with Treasure Island Road.

Bus circulation within Treasure Island would be along a one-way, two-block loop in the counter-clockwise direction. AC Transit and Muni buses would travel east on First Street, where they would make their first stop. Buses would continue east on First Street, then north on Avenue D, where they would make a second stop. After this stop, buses would turn west onto California Avenue, where they would finish their run and layover until beginning their return trip. The return trip back to the Bay Bridge would involve continuing west on California Avenue and then south on Avenue of the Palms, with a stop at the new ferry terminal and Transit Hub in front of Building One, between California Avenue and First Street. From the Transit Hub, buses would continue across the causeway onto Yerba Buena Island via Treasure Island Road and continue toward the Bay Bridge. The proposed Muni line 108-Treasure Island would increase the distance some Job Corps commuters and visitors would need to walk to access a Muni bus stop because the 108-Treasure Island line would no longer circulate to the interior of Treasure Island.

However, the Job Corps commuters and visitors would be able to use the on-island shuttle, as described below.

The Proposed Project would also include a new, fare-free on-island shuttle system with three proposed lines: two serving the neighborhoods on Treasure Island (including the Job Corps), and a third serving Yerba Buena Island. Each of the three shuttle lines would provide continuous service from early morning to late evening. The fare-free shuttles would stop at the Transit Hub on Treasure Island, facilitating transfers to ferry and outbound Transbay bus service. In addition to the Transit Hub stop, the shuttles would stop at the two other stops where express bus lines from downtown San Francisco and Oakland drop off, allowing for convenient connections. The three shuttle lines would operate on a pulse schedule, with departures and arrivals matching the ferry service, the Muni line 108-Treasure Island, and AC Transit service at the Transit Hub.[12]

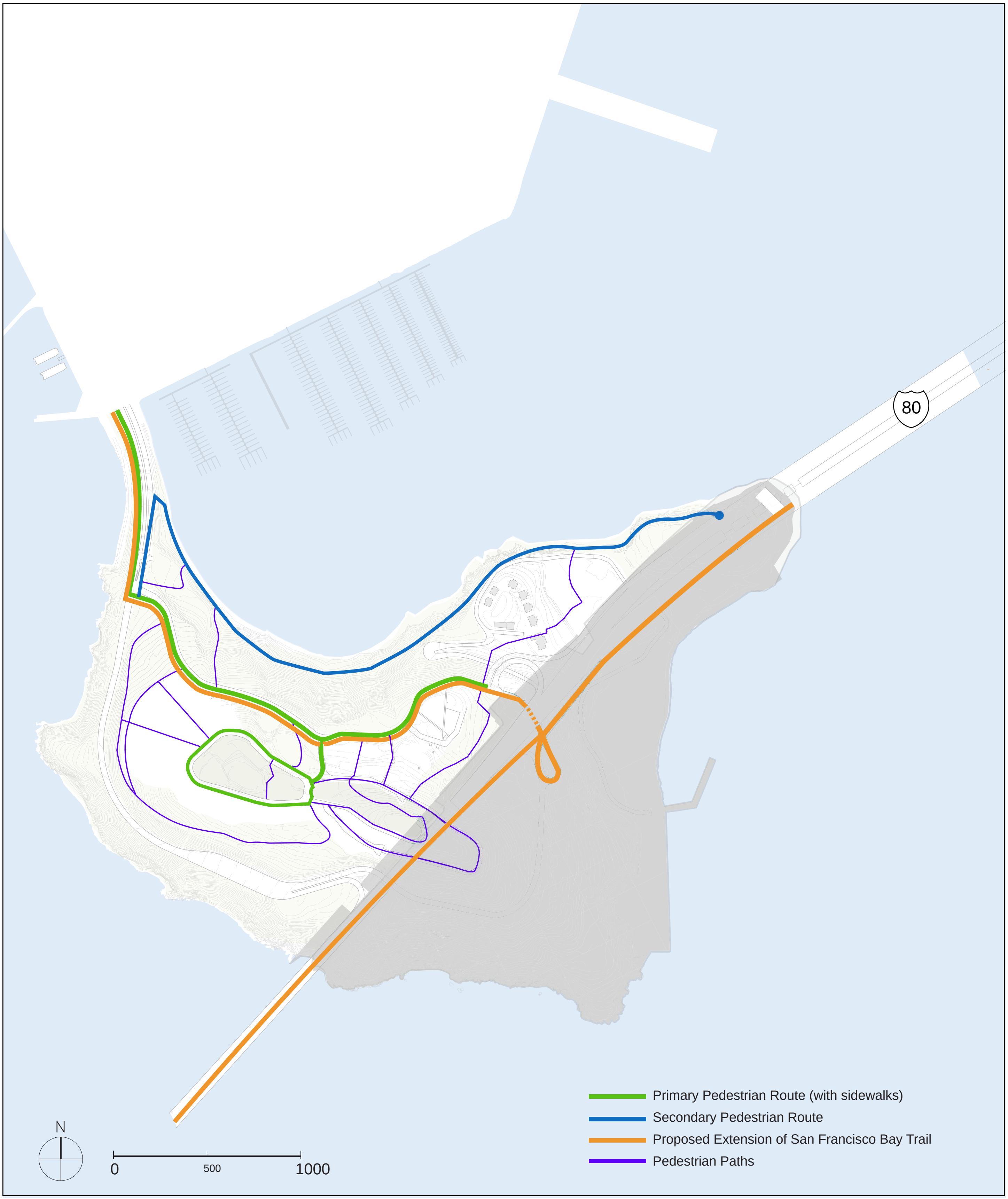
Pedestrian Circulation Improvements

The pedestrian circulation network would encourage walking as the primary mode within the Development Plan Area. The comprehensive network of new sidewalks and shared streets would facilitate travel from and to transit facilities, shopping, schools and recreational uses on the Treasure Island. Generally, sidewalks on Treasure Island would be about 6 feet wide plus four to five feet of landscaping separating the sidewalk from adjacent roadways. Due to topography constraints, sidewalks on Yerba Buena Island would be limited to only one side of the street in many cases, and on some streets where there are no pedestrian destinations sidewalks are not proposed. However, several pedestrian trails would be provided through the open spaces and development areas on Yerba Buena Island. The proposed pedestrian circulation plan for Yerba Buena Island indicating the location of sidewalks is presented on Figure IV.E.10: Conceptual Yerba Buena Island Pedestrian Circulation Plan; all streets on Treasure Island would have sidewalks, except for the Shared Public Ways, where pedestrians would have priority over the entire right-of-way.

Bicycle Circulation Improvements

The Proposed Project includes new bicycle facilities on both Treasure Island and Yerba Buena Island. Figure IV.E.11: Proposed Bicycle Circulation Plan, illustrates the proposed bicycle circulation network for the Islands. On Treasure Island, the Proposed Project would provide a Class I shared bicycle and pedestrian path around the perimeter of the Island and through portions of the open space areas. In addition, the Proposed Project would include a Class I bicycle-only facility around the perimeter of the residential development. Class II bicycle lanes would be striped on the Major Arterial Roadways (Avenue C and California Avenue), and on First Street in

[12] A pulse schedule is a timed transfer concept which seeks to schedule vehicles from various routes to arrive at transfer stations simultaneously to optimize operations and improve service quality.



SOURCE: Perkins+Will

FIGURE IV.E.10: CONCEPTUAL YERBA BUENA ISLAND PEDESTRIAN CIRCULATION PLAN

SOURCE: Perkins + Will

FIGURE IV.E.11: PROPOSED BICYCLE CIRCULATION PLAN

the westbound direction only. Other streets on Treasure Island would be designed to be bicycle-friendly by encouraging slow auto speeds and through development of a grid street network to provide direct routes and disperse traffic; however, no exclusive bicycle right-of-way would be provided and bicycles would share space on those streets with autos and, on the Shared Public Ways, with pedestrians.

On Yerba Buena Island, the bicycle circulation network would consist of a one-way counterclockwise Class II bicycle lane loop around Treasure Island Road, Hillcrest Road, and Macalla Road, with connections to the planned bicycle/pedestrian path on the new Bay Bridge east span. One exception to the continuous Class II facility loop would be on a short section of Treasure Island Road, where the westbound on-ramp to the Bay Bridge diverges from Treasure Island Road, which is on an elevated structure. On this section, the Proposed Project calls for a Class III facility, with special colored pavement and frequent in-street stencils and signage to alert bicycles, autos, and buses that they must share the roadway at this location (see Figure IV.E.15).

In addition, a contra-flow Class II bicycle lane would be provided on Macalla Road. The Macalla Road bicycle lane would provide a shorter, yet steeper, alternative route from Treasure Island to the Bay Bridge. Other streets on Yerba Buena Island would allow shared bicycle/auto use, but no exclusive bicycle right-of-way would be provided.

There are four intersections on Yerba Buena Island at which enhanced bicycle treatments would be provided:

- **Hillcrest Road at South Gate Road -** The proposed bicycle treatments at this intersection are illustrated on Figure IV.E.12: Proposed Hillcrest Road at South Gate Road Intersection Configuration. This intersection would be a standard, three-legged side-street stop-controlled intersection. Movements on Hillcrest Road and the two eastbound ramps would be uncontrolled and the South Gate Road approach would be stop-controlled. Bicyclists traveling on the Class II bicycle lane on Hillcrest Road would be uncontrolled, and would be able to cross the intersection to access the Bay Bridge bicycle path on the north side of this intersection.
- **Macalla Road at the Bay Bridge Westbound On-Ramp -** The proposed bicycle treatments at this intersection are shown on Figure IV.E.13: Proposed Macalla Road at Bay Bridge Westbound On-Ramp Intersection Configuration. If the Ramps Project is constructed, the shared bicycle/pedestrian path connecting Yerba Buena Island to the Bay Bridge would continue along the west side of South Gate Road until the intersection with Macalla Road and the Bay Bridge westbound ramps. On the north side of this intersection, the shared path would end, and bicyclists destined for Treasure Island would need to cross Macalla Road at a new crosswalk. North of this crossing, Macalla Road would provide one travel lane northbound (toward Treasure Island) and would have a Class II bicycle lane in each direction, one being a contra-flow lane.

SOURCE: AECOM, 2009

FIGURE IV.E.12: PROPOSED HILLCREST ROAD AT SOUTH GATE ROAD INTERSECTION CONFIGURATION

SOURCE: AECOM, 2009

FIGURE IV.E.13: PROPOSED MACALLA ROAD AT BAY BRIDGE WESTBOUND ON-RAMP INTERSECTION CONFIGURATION

SOURCE: AECOM, 2009

FIGURE IV.E.14: PROPOSED TREASURE ISLAND ROAD AT MACALLA ROAD INTERSECTION CONFIGURATION

- **Treasure Island Road at Macalla Road -** The proposed bicycle treatments at this intersection are shown on Figure IV.E.14: Proposed Treasure Island Road at Macalla Road Intersection Configuration. Bicyclists using Treasure Island Road to access the contra-flow bicycle lane on Macalla Road from Treasure Island would need to turn left across the opposing direction of traffic on Treasure Island Road to access Macalla Road. The Proposed Project would provide a new five-foot wide bicycle-only left-turn lane from Treasure Island Road to Macalla Road adjacent to a 12-foot wide travel lane on Treasure Island Road and separated from oncoming traffic by an 11-foot median. The bicycle-only turn lane and wide median would facilitate the left turn maneuver, and provide a clear and safe route to access Macalla Road from Treasure Island Road.
- **Treasure Island Road at Hillcrest Road/Westbound Transit and Emergency Vehicle-Only On-Ramp -** The proposed bicycle treatments at this intersection are shown on Figure IV.E.15: Proposed Treasure Island Road at Bay Bridge Westbound On-Ramp (West Side) Intersection Configuration. At this juncture, bicycles traveling southbound on Treasure Island Road would need to travel through the divergence of the proposed transit and emergency vehicle-only westbound on-ramp to the Bay Bridge. Approaching this junction, Treasure Island Road would have a six-foot wide bicycle lane and a three-foot wide chevron buffer separating the bicycle lane from a 12-foot wide travel lane. Just past the ramp junction, where bicyclists would cross over Treasure Island Road to merge onto Hillcrest Road, the existing roadway, which is on a bridge structure, narrows to 14 feet, which would not be adequate to provide a travel lane and a Class II bicycle lane. Since the roadway is on a bridge structure at this location, widening the roadway would not be a feasible option. Instead, an approximately 350 foot long section would be marked with shared-use arrows stenciled on the pavement reminding drivers and bicyclists to share the space. Once sufficient roadway width is provided, the roadway would return to having an 11-foot wide travel lane with a five-foot wide bicycle lane.

Also, if the Manual on Uniform Traffic Control Devices (MUTCD) is amended to permit colored pavement treatments and the SFMTA permits the proposed bicycle lane treatments, colored bicycle lane pavement treatments would be installed to increase bicycle visibility and safety at the following locations:

- Hillcrest Road approach to South Gate Road and the Bay Bridge bicycle/pedestrian path;
- Macalla Road contra-flow bicycle lane at intersecting cross-streets; and
- Treasure Island Road/Macalla Road intersection.
    - Bicycle-only left-turn lane from Treasure Island Road to the contra-flow bicycle lane on Macalla Road; and
    - Bicycle-only section of median on Treasure Island Road at Macalla Road.

Although colored bicycle lane pavement is not approved in the MUTCD, which is published by the Federal Highway Administration (“FHWA”) and governs traffic control devices used in the United States, the City of San Francisco Bicycle Plan includes the use of colored bicycle lanes to further enhance the bicycle environment and safety. The Federal Highway Administration (“FHWA”) recently approved a study proposed by SFMTA of solid and dashed green pavement for bicycle lanes. If the use of colored pavement materials is approved by the FHWA and the

SOURCE: AECOM, 2009

BICYCLE LANE

XXX XXX SIGNS THAT WOULD BE POSTED

FIGURE IV.E.15: PROPOSED TREASURE ISLAND ROAD AT BAY BRIDGE WESTBOUND ON-RAMP (WEST SIDE) INTERSECTION CONFIGURATION

Although Caltrans and BATA are considering alternatives for a shared use Class I bicycle facility on the west span of the Bay Bridge, that project is currently in its early planning stages and has not been assumed to be in place for purposes of this analysis. As noted above, a bicycle connection between Yerba Buena Island and the East Bay is currently under construction on the new east span of the Bay Bridge and has been assumed to be in place. Neither of these projects would be part of the Proposed Project. The Proposed Project would not preclude the implementation of either of these projects.

Transportation Demand Management Plan

The Proposed Project would develop and implement a Transportation Demand Management ("TDM") Plan designed to reduce use of single-occupant vehicles and to increase the use of rideshare, transit, bicycle, and walk modes for trips to and from, as well as within the Proposed Project. The TDM plan is contained within the 2006 Transportation Plan, and includes the following:[13]

- **Treasure Island Transportation Management Agency ("TITMA").** The Treasure Island Transportation Management Act of 2008 (AB 981) authorizes the San Francisco Board of Supervisors to designate a board or agency to serve as the transportation management agency for the Islands. The TITMA was created to, among other things, administer and oversee the collection of revenues from parking, transit passes and congestion pricing, and the disbursement of funds to transit operators.
- **Congestion Pricing.** As part of implementing the Proposed Project, TITMA would administer a variable congestion fee to residents of the Islands for accessing the Bay Bridge. Fees would be charged to Island residents for auto access between the Bay Bridge and the Islands during periods of peak congestion. This "congestion pricing" program is designed to discourage residents from making auto trips during peak travel periods and encourage other modes of travel to and from the Islands. The amounts and hours that fees would be charged would be controlled by the TITMA; however, as currently envisioned and analyzed in this report, the fees would be charged between 6 and 9 AM and between 4 and 7 PM, in both directions, Monday through Friday. One of the key attributes of this program is that the TITMA would have the authority to adjust the amounts and duration of charges to dynamically respond to changing travel behaviors. The State legislature authorized the use of congestion pricing for Treasure Island/Yerba Buena Island in 2008 (Chapter 317, Stats. of 2008).
- **Parking Program.** There would be no free parking on the Islands. Parking for residents, employees, and visitors would occur in off-street facilities and on-street, short-term, metered spaces. In addition, parking would be unbundled from residential units, meaning that housing units would not be sold or leased with a dedicated parking space. A dedicated parking space would need to be purchased or leased at a separate cost and the cost of parking would not be included in the purchase or rent price for housing.

[13] The Proposed Project TDM elements have been updated since the 2006 Transportation Plan, although the general nature of the TDM Plan remains the same as the 2006 Transportation Plan.

- **Travel Coordinator.** The travel coordinator would be hired by the TITMA, and would be charged with providing travel options to Island users, including assistance with finding the best customized transit options for individuals. The travel coordinator would be responsible for developing and distributing outreach and marketing materials and monitoring the performance of most island TDM measures.
- **Car-Share Program.** A car-share program would be implemented on the Islands, providing members access to automobiles without having to purchase a car. This would likely be an extension of one or more of the car-share services currently provided throughout the rest of San Francisco. The operator of this program on the Islands has not yet been determined, nor has the exact number of car share spaces proposed for the Island. Car-share vehicles would be subject to the same on-island parking fees as other vehicles, unless parked in their designated parking space. The *Treasure Island and Yerba Buena Island Design for Development* would require the provision of car-share spaces in new buildings based on number of dwelling units, similar to the requirements in the *San Francisco Planning Code*.
- **Transit Hub.** All bus transit serving the Islands would serve the proposed ferry terminal. This would be the single spot on Treasure Island where all transit lines connect, including the on-island shuttles. The Transit Hub would provide the opportunity for centralized ticket sales, schedule and line information, and other transit amenities.
- **Prepaid Transit Voucher.** A comprehensive residential "prepaid transit voucher" program would be operated by the TITMA, whereby residents and hotel guests would be required to purchase transit passes (e.g., Muni Fast Pass, commuter checks, TransLink (Clipper) credit, etc.). The prepaid transit voucher would provide a subsidy to transit operators, and would reduce the "out-of-pocket" cost for transit use by residents and hotel patrons, and would thereby encourage residents to use transit regularly. The monetary value of the transit voucher that would be required would vary, but it is proposed to be similar in value to a Muni Fast Pass.
- **Bicycle Fleet.** A bicycle rental system would be provided for visitors and residents from a secure central "bicycle station" at the Transit Hub. The bicycle station would be attended during daylight hours, offering rentals to the public seven days per week. During unattended hours, access to the bicycle fleet would be available to Island residents with an access card. This program would be funded and administered by TITMA.
- **Carpool and Vanpools.** The Islands' travel coordinator would provide carpool and vanpool matching services for Islands' residents.
- **Ramp Metering.** Signals would be installed to limit, or "meter", the number of vehicles than can enter the Bay Bridge from the Islands during peak commute periods. Ramp metering would be implemented for all on-ramps on Yerba Buena Island to control the volume of vehicles accessing the bridge, and to make entering the freeway a safer maneuver. Ramp metering could be implemented in one of two ways; either on the ramps themselves, as part of the separate Ramps Project proposed by SFCTA and Caltrans, or through signals on Yerba Buena Island roadways approaching the Bay Bridge. Any ramp metering on the Yerba Buena Island on-ramps themselves would be operated by Caltrans. Ultimately, Caltrans and TITMA would coordinate to facilitate effective implementation of this mechanism.

- **Guaranteed Ride Home Program.** All Islands residents and employees who become registered as carpool or transit riders would be reimbursed for return travel by taxi in the event of an emergency when an alternative means of travel is unavailable.

As described in more detail below, the analysis of the Proposed Project, including the estimate of trips generated by the Proposed Project, takes into account implementation of these TDM features.

APPROACH TO ANALYSIS

This section presents the methodology for developing Existing plus Project, 2030 Cumulative No Project, and 2030 Cumulative plus Project conditions, and information considered in the travel demand and impact analysis. Specifically, in the following order, this section describes:

1. Approach to impact analysis, including analysis years and analysis methodology;
2. Methodology used to forecast travel demand for the Proposed Project, and the results of the forecast;
3. Transportation improvements assumed to be in place as part of the Future 2030 Cumulative No Project conditions; and
4. Methodology for development of 2030 Cumulative No Project conditions traffic forecasts.

Approach to Impacts Analysis

The impacts of the Proposed Project on the surrounding roadway facilities were analyzed using the guidelines set forth in the City of San Francisco Planning Department's *2002 Transportation Impact Analysis Guidelines for Environmental Review (SF Guidelines)*, modified to account for the unique location and character of the Proposed Project, as explained in more detail below. These guidelines provide direction for analyzing transportation conditions and in identifying the transportation impacts of a proposed project in the City of San Francisco.

The analysis of the Proposed Project was conducted for existing and future year 2030 conditions. "Existing plus Project" conditions assess the near-term impacts of the Proposed Project, while "2030 Cumulative plus Project" conditions assess the long-term impacts of the Proposed Project in combination with other development. Project impacts were assessed by comparing existing conditions with the Proposed Project to existing conditions without the Proposed Project, as well as by comparing the 2030 Cumulative plus Project to 2030 No Project conditions. Year 2030 was selected as the future analysis year because regional travel demand forecasting models used in this analysis developed by the San Francisco County Transportation Authority ("SFCTA"), the Metropolitan Transportation Commission ("MTC"), and the Alameda County Congestion Management Agency ("ACCMA") develop traffic and transit forecasts for cumulative development and growth through the year 2030.[14] Although the buildout of the Proposed Project would occur over a period of years, the analysis assesses the impacts of the full buildout of the Proposed Project compared to both existing and future year 2030 conditions. Because the actual phasing of development would be market-driven and is unknown, it was determined that comparing the Proposed Project at full buildout against the two comparison points would best capture the full range of transportation impacts of the Proposed Project.

Freeway Analysis

The impacts of the Proposed Project on the Bay Bridge were analyzed by determining how the Project would increase the existing and forecasted vehicle queues leading to the bridge approaches. Observations were made on the following roadway segments in the East Bay and San Francisco:

- I-80 Westbound from Richmond to the Toll Plaza;
- I-580 Westbound from I-980 to the Toll Plaza;
- I-880 Northbound from I-980 to the Toll Plaza;
- Bryant Street (eastbound) between Second Street and Sixth Street;
- Harrison Street (eastbound) between First Street and Third Street;
- Harrison Street (westbound) between First Street and The Embarcadero;
- First Street (southbound) between Bay Bridge On-Ramp and Market Street; and
- Folsom Street (eastbound) between Essex Street and Fourth Street.

The Bay Bridge currently operates at or near vehicular capacity in the peak direction most weekdays during the morning and evening peak hours (westbound in the AM and eastbound in the PM). Queues leading to the bridge deck in the peak directions represent unmet demand (i.e., traffic that would like to be on the bridge, but is trapped in congestion leading up to the bridge). During periods when the Bay Bridge operates at its capacity, additional demand for travel on the Bay Bridge is constrained by the bridge approaches, including the East Bay Toll Plaza, which meters westbound traffic, and the on-ramps to the Bay Bridge from San Francisco which restrict the flow onto the Bay Bridge in the eastbound direction. The queues forming on these roadways may be exacerbated by additional traffic from the Proposed Project; therefore, the analysis of the Proposed Project's impacts on the Bay Bridge is described in terms of increases to peak direction queuing on the East Bay or San Francisco approaches to the bridge. In addition to analyzing the

[14] The travel demand models incorporate the Association of Bay Area Governments (ABAG) land use and socio-economic database and growth forecasts for the year 2030, which provide forecasts of economic and population growth for San Francisco, as well as for the remaining eight Bay Area counties, as well as the Metropolitan Transportation Commission's (MTC) Regional Transportation Plan and SFCTA's Countywide Transportation Plan. Within San Francisco, the San Francisco Planning Department is responsible for allocating ABAG's countywide growth forecasts to each SFCTA Traffic Analysis Zone (TAZ), based upon existing zoning and approved plans, using an area's potential zoning capacity and the anticipated extent of redevelopment of existing uses.

queue lengths on the bridge approaches, the localized impacts on the Bay Bridge associated with Proposed Project traffic entering and exiting the Bay Bridge at the ramps connecting Yerba Buena Island to the Bay Bridge were analyzed. For purposes of ramp analysis, speed and gap data were collected at the Yerba Buena Island freeway on-ramps and off-ramps to calculate ramp merge and diverge LOS for the ramps between the Islands and the Bay Bridge.[15] Unlike most freeway on-ramps, the ramps onto the Bay Bridge from Yerba Buena Island are stop-controlled, providing drivers with very limited acceleration distance to merge with the freeway travel lanes. Therefore, analysis of the on-ramps as if they were typical "uncontrolled" freeway merges does not provide a complete understanding of the operations of the on-ramps. Instead, the analysis of on-ramps was performed two ways:

> First, the on-ramps were analyzed as STOP-sign controlled intersections, consistent with methods documented by the Transportation Research Board ("TRB") in the *2000 HCM* for unsignalized intersections. For intersections, LOS is based on "control delay." Control delay is defined as the delay directly associated with the traffic control device (i.e., a stop sign or a traffic signal) and specifically includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. These delay estimates are considered meaningful indicators of driver discomfort and frustration, fuel consumption, and lost travel time. Table IV.E.1 presents the relationship between LOS and control delay for unsignalized intersections.

> Second, the on-ramps were analyzed as typical ramp merge sections, consistent with the *2000 HCM* Chapter 25 methodology for ramp merge junctions. Off-ramps from the Bay Bridge to Yerba Buena Island were treated as typical uncontrolled "diverge" sections and analyzed consistent with the methods described in the *2000 HCM* Chapter 25. Ramp junction LOS is based on vehicular density. Ramp LOS analysis was conducted for typical weekday AM and PM peak hours and Saturday afternoon peak hour conditions and is described using LOS criteria similar to intersection LOS, as shown in Table IV.E.1.

---

[15] The operations of roadway facilities are described with the term level of service ("LOS"). LOS is a qualitative description of traffic flow based on such factors as speed, travel time, delay, and freedom to maneuver. Six levels are defined from LOS A, with the best operating conditions, to LOS F, with the worst operating conditions. LOS E represents "at-capacity" operations. Operations are designated as LOS F when volumes exceed capacity, resulting in stop-and-go conditions. LOS is a general term that is used for all types of roadway facilities. Depending on the type and design of the exact facility being analyzed (e.g., a signalized intersection, a stop-controlled ramp, or a pedestrian crosswalk), more specific criteria are applied.

Table IV.E.1: Ramp Junction Level of Service Criteria

LOS	Description	Merge/Diverge Analysis Method	Stop-Controlled Intersection Analysis Method
		Density (Passenger Cars Per Mile Per Lane)	Average Control Delay (Seconds per Vehicle)
A	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. Little or no delay.	< 10	≤ 10.0
B	Free-flow speeds are maintained. The ability to maneuver with the traffic stream is only slightly restricted. Short traffic delays.	> 11 to 20	10.1 to 15.0
C	Flow with speeds at or near free-flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver. Average traffic delays.	> 20 to 28	15.1 to 25.0
D	Speeds decline slightly with increasing flows. Freedom to maneuver with the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort. Long traffic delays.	> 28 to 35	25.1 to 35.0
E	Operation at capacity. There are virtually no usable gaps within the traffic stream, leaving little room to maneuver. Any disruption can be expected to produce a breakdown with queuing. Very long, noticeable traffic delays.	> 35	35.1 to 50.0
F	Represents a breakdown in flow. Extreme delay with volume exceeding capacity.	Demand exceeds capacity	> 50.0

Source: *2000 HCM*, Transportation Research Board, 2000.

As discussed in “Regional Access” in “Setting,” pp. IV.E.2 – IV.E.10, the SFCTA and Caltrans are currently preparing a Project Report and Environmental Document for the Yerba Buena Ramps Improvement Project that would replace the existing westbound on- and off-ramps located on the eastern side of Yerba Buena Island with new ramps that replicate the functional role of current ramps. The Yerba Buena Ramps Improvement Project is needed to address seismic deficiencies, improve traffic safety, and correct design standards so that the improved westbound on- and off-ramps would operate as typical ramps. However, since the Ramps Project has not been formally approved and/or finalized, the analysis of ramp junction performance for the Proposed Project was conducted with and without implementation of the Yerba Buena Ramps Improvement Project. For the scenario in which the ramps are improved, because they would operate as standard ramps, no STOP-sign controlled analysis was completed. For the scenario in which the ramps remain in their current configuration with stop signs near the merge point, the ramps were analyzed the same as existing conditions (using both stop-controlled and merge/diverge section analysis methodologies).

For freeway ramp analyses, locations where the Project would result in a change from LOS D or better under No Project conditions to LOS E or LOS F, or from LOS E to LOS F, with the project are identified as significant project impacts. At locations that would operate at LOS E or LOS F under No Project conditions, and would continue to operate at LOS E or LOS F with the project, the project trips, as a percentage of total traffic volumes on the ramps were reviewed to determine whether the increase would contribute considerably to unacceptable conditions on the ramp.

Intersection Analysis

The analysis of the study intersections was conducted using a method documented in the *2000 HCM*. As discussed in the Freeway Analysis section, for intersections, LOS is based on "control delay." Control delay is defined as the delay directly associated with the traffic control device (i.e., a stop sign or a traffic signal) and specifically includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. These delay estimates are considered meaningful indicators of driver discomfort and frustration, fuel consumption, and lost travel time. Table IV.E.2, below, presents the relationship between LOS and control delay for signalized intersections.

The Proposed Project was determined to have a significant traffic impact at an intersection if project-generated trips would cause an intersection operating at LOS D or better under No Project conditions to operate at LOS E or LOS F, or intersections operating at LOS E under No Project conditions to deteriorate to LOS F conditions. At intersections that would operate at LOS E or LOS F under No Project conditions, and would continue to operate at LOS E or LOS F under conditions with the Proposed Project, the increase in Proposed Project vehicle trips was reviewed at the critical movements to determine whether the increase would contribute considerably to unacceptable levels of service.[16] For 2030 Cumulative plus Project conditions, if it was determined that the Proposed Project would have a significant project-specific impact at an intersection, then the impact would also be considered a significant cumulative impact. In addition, the Project was determined to have a significant adverse impact if it contributed considerably to cumulative traffic increases that would cause deterioration in levels of service to unacceptable levels.

[16] At an intersection, the critical traffic movements operate with the highest volume-to-capacity ratio. In other words, the critical movements are the most congested movements.

Table IV.E.2: Signalized Intersection Level of Service Criteria

Control/ LOS	Description of Operations	Average Control Delay (seconds per vehicle)
A	Insignificant Delays: No approach phase is fully used and no vehicle waits longer than one red indication.	≤ 10
B	Minimal Delays: An occasional approach phase is fully used. Drivers begin to feel restricted	> 10.0 and ≤ 20.0
C	Acceptable Delays: Major approach phase may become fully used. Most drivers feel somewhat restricted	> 20.0 and ≤ 35.0
D	Tolerable Delays: Drivers may wait through no more than one red indication. Queues may develop but dissipate rapidly without excessive delays	> 35.0 and ≤ 55.0
E	Significant Delays: Volumes approaching capacity. Vehicles may wait through several signal cycles and long queues form upstream	> 55 and ≤ 80
F	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections	> 80.0

Source: *2000 HCM*, Transportation Research Board, 2000.

Transit Analysis

The impact of additional transit ridership generated by the Proposed Project was assessed by comparing the projected ridership to the available transit capacity. Transit "Capacity Utilization" refers to transit riders as a percentage of the capacity of a transit line, or group of lines combined and analyzed as screenlines across which the transit lines travel. The transit capacity utilization analysis was conducted for two conditions:

- At the point of greatest demand (i.e., the maximum load point) for the existing and proposed transit lines serving the Islands. (e.g., Muni line 108-Treasure Island, AC Transit service to the East Bay, ferry service between Treasure Island and downtown San Francisco); and,
- At the four standard downtown San Francisco screenlines used to assess impacts on transit service between downtown and the rest of the City. The downtown screenline analysis is conducted at the maximum load point for most transit lines traveling into and out of downtown San Francisco. A quantitative analysis of regional service providers was not conducted. Some transit riders traveling to and from the Island may travel on regional transit lines in the peak direction of travel, but the number of riders would be negligible and would not substantially affect the screenlines.

The number of existing AM and PM peak hour riders was obtained from Muni monitoring data. Future year 2030 Cumulative No Project conditions transit ridership was forecasted using the SFCTA San Francisco Chained Activity Model Process ("SF-CHAMP") travel demand model, as prepared for the Transit Center District Plan.[17] The service capacity of each line was estimated by multiplying the passenger capacity of each transit vehicle by the number of actual trips that occurred when the ridership data was collected. For service provided by Muni, the capacity includes seated passengers and an appreciable number of standing passengers per vehicle (the number of standing passengers is between 30 and 80 percent of the seated passengers depending upon the specific transit vehicle configuration). The maximum loads, including both seated and standing passengers, vary by vehicle type and are 45 passengers for a 30-foot bus, 63 passengers for a 40-foot bus, 94 passengers for a 60-foot bus, and 119 passengers for a light-rail vehicle. Muni intends to operate the Treasure Island service with 40-foot buses, and the capacity for this type of vehicle was used in the calculations. The percent utilization of capacity was then calculated by comparing the ridership demand to the capacity provided. Muni has established a capacity utilization standard of 85 percent. Analysis of new transit service anticipated to be provided as part of the Proposed Project was conducted by comparing the estimated demand to the proposed capacity (based on proposed vehicle type and service levels). For service provided by AC Transit and WETA, the analysis assumes a capacity utilization standard of 100 percent for the new ferry and AC Transit services, consistent with WETA and AC Transit standards, respectively.

Downtown screenlines examine the overall utilization of Muni transit capacity into and out of downtown San Francisco from the Northeast, Northwest, Southeast, and Southwest of San Francisco. Because transit travel into downtown San Francisco in the AM and out of downtown in the PM, travel across the screenlines tends to be the most congested transit flow in the City. The transit analysis includes an assessment of the degree to which the Proposed Project would create demand for transit service across four screenlines surrounding downtown San Francisco in the peak directions.

In addition to an evaluation of transit ridership and capacity, the Proposed Project's impacts on transit were also measured in terms of increases to transit travel times on lines likely to experience Proposed Project-related increases in traffic congestion. The analysis identified intersection approaches where Proposed Project-generated vehicle trips would substantially increase transit delay.

The Proposed Project was determined to have a significant transit impact if project-generated transit trips would cause a transit line or downtown screenlines operating at less than its capacity utilization standard under No Project conditions, to operate at more than capacity utilization conditions (i.e., at more than 85 percent capacity utilization for Muni, and at more than 100 percent capacity utilization for AC Transit and WETA). The Proposed Project was determined to have a significant impact if it would cause a substantial increase in delays. The Proposed roject

[17] Technical Memorandum – Transit Center District Plan – Transit Network Analysis, February 2, 2009. AECOM.

would have a significant contribution to a cumulative transit impact if it was determined to have a significant project impact.

Bicycle and Pedestrian Analyses

The project impact analysis includes a qualitative assessment of pedestrian and bicycle conditions on the Islands. Bicycle conditions are assessed as they relate to the Proposed Project site, including bicycle routes, safety and right-of-way issues, conflicts with traffic, and grade changes. In addition, the bicycle and pedestrian facilities located near the Ferry Building in San Francisco are also evaluated for Existing and Existing plus Project conditions since ferry transit service is expected to serve the Proposed Project, adding pedestrians and bicycles to the circulation system near the Ferry Building in San Francisco. Existing weekday AM and PM peak hour pedestrian volumes were collected at five crosswalks near the Ferry Building (across both directions of The Embarcadero), including Washington Street, Ferry Building (North), Market Street, Don Chee Way, and Mission Street. In addition, Saturday peak hour pedestrian volumes were collected at Market Street and Don Chee Way since those crosswalks in particular experience high pedestrian volumes on weekends. The crosswalk study locations are shown on Figure IV.E.7 on p. IV.E.24. Based on Proposed Project-generated increases in ferry ridership, the potential impact of these additional ferry passengers on the capacity of existing marked crossings on The Embarcadero was evaluated.

The level of service for the study crosswalks was calculated using the methodology presented in the *2000 HCM*. Crosswalk LOS levels are measures of the amount of space (square feet) each pedestrian has in the crosswalk (i.e., density). These measures depend on pedestrian volumes, signal timing, crosswalk dimensions and roadway widths. LOS A represents free-flowing pedestrian conditions, while LOS F indicates that there are substantial restrictions to pedestrian movement and speed. Table IV.E.3 shows the LOS criteria for pedestrians, based on the *2000 HCM* methodology.

Table IV.E.3: Pedestrian Level of Service Criteria at Signalized Crossings

LOS	Pedestrian Delay (seconds/pedestrian)	Likelihood of Non-Compliance due to Delay	Density (ft^2/pedestrian)
A	≤ 10	Low	> 13
B	10.1 – 20	Low to Moderate	> 10 – 13
C	20.1 - 30	Moderate	> 6 – 9.9
D	30.1 – 40	Moderate to High	> 3 – 5.9
E	40.1 - 60	High	> 2 – 2.9
F	> 80	Very High	< 2

Source: *2000 HCM*, Transportation Research Board, 2000.

Loading Analysis

Loading analysis for the Proposed Project was conducted by comparing the loading supply that would be required per the *Design for Development* to the projected demand that would be generated by the proposed land uses. The loading analysis was conducted for the Proposed Project as a whole and for specific building uses, specifically retail, industrial and commercial spaces. Peak loading demands were determined using methods consistent with the *SF Guidelines*.

Construction Analysis

Potential short-term construction impacts were addressed using the construction phasing plan for the Proposed Project. The construction impact evaluation addresses the staging and duration of construction activity, truck routings, barge activity, estimated daily truck and vessel volumes, street and/or sidewalk closures and impacts on Bay Bridge traffic.

Parking Analysis

Parking analysis for the Proposed Project was conducted by comparing the proposed parking supply that would be permitted per the *Design for Development* to the projected demand that would be generated by the proposed land uses. The peak parking demand for the proposed residential and non-residential uses was calculated based on the methodology contained in the *SF Guidelines.* Some of the non-residential parking supply is expected to be available to multiple non-residential land uses and since land uses do not experience peak parking demand simultaneously, a shared parking analysis was conducted. The shared parking analysis for the non-residential uses was conducted by dividing the proposed development on the Islands into zones (using the proposed districts identified on pp. II.21-II.22 of Chapter II, Project Description) and comparing the temporal changes in demand for each use in the zone over the course of a typical day. Temporal changes in demand were estimated using methods described in *Shared Parking*, 2nd Edition.[18] The time during which each zone is expected to experience its peak parking demand, and the associated peak parking demand, is reported and compared with the proposed parking supply.

Proposed Project Travel Demand

This section presents the travel demand methodology, including total person trip generation by mode, vehicle trip generation, parking demand and loading demand. As described in Chapter II, Project Description, the existing housing on both Islands would be replaced as part of the Proposed Project, as well as almost all of the commercial and educational activities. The trip-

[18] Urban Land Institute, *Shared Parking, 2nd Edition, 2005.*

generating activities that were presumed to remain are those generated by the existing 37-acre Treasure Island Job Corps campus and the existing U.S. Coast Guard facilities.

Estimating the net-new project trip generation involved forecasting the number of trips generated by build-out of the Proposed Project, less the number of trips associated with the existing uses on-site that would remain or be replaced by the Proposed Project. The methods commonly used for forecasting trip generation of development projects in San Francisco are based on person-trip generation rates, trip distribution information, and mode split data described in the *SF Guidelines*. These data are based on a number of detailed travel behavior surveys conducted within San Francisco. The data in the *SF Guidelines* are generally accepted as more appropriate than conventional methods because of the relatively unique mix of uses, density, availability of transit, and cost of parking commonly found in San Francisco. However, the methods described in the *SF Guidelines* cannot be directly applied to the Proposed Project because of its large scale, specific location and distinctive character. Similarly, standard trip generation rates, such as those provided by Trip Generation, 7th Edition, 2003, Institute of Transportation Engineers ("ITE"), would not be suitable for the Proposed Project, unless appropriate adjustments were made to account for the Proposed Project size, mix, and availability of transit. Therefore, the trip generation forecasts were developed to account for the amount of development as well as specific development design variables such as mix of land uses and the proposed TDM Plan (e.g., congestion pricing).

To account for the trip-making patterns of the Proposed Project, a state-of-the-practice trip generation forecasting method was used in this analysis. This method was originally developed by Fehr & Peers and others for the U.S. Environmental Protection Agency ("EPA") and has been endorsed for use in project-specific and planning-level analyses by a number of jurisdictions, including the California Department of Transportation ("Caltrans"). This method is commonly referred to as the "4D" method, and generally accounts for the following factors that may influence travel behavior:

- Development scale—the amount of trips generated increases as the amount of development increases;
- Density of the project—the higher the project's density, the less vehicular traffic generated per unit of development;
- Diversity of uses—an appropriate mix of uses can lead to internalization of trips and trip-linking within a project; and,
- Design of project—a walkable, pedestrian- and bicycle-oriented circulation system can help to reduce automobile dependence within a project site.

The general concept behind the 4D method is that projects that deviate from a base case (in this case, ITE trip generation rates that represent a "national average") with respect to the four bulleted variables above exhibit different traffic generation patterns. The sensitivity of travel behavior to changes in the four variables, or elasticity, was derived from travel behavior surveys from the Bay Area to help estimate how traffic generation changes as a function of changes in the 4Ds. Those elasticities are used to adjust the base case trip generation to account for the project's density, diversity, and pedestrian/bicycle friendliness (i.e., design) compared to typical suburban developments reflected in the ITE trip generation rates. Applying the 4D method results in a percentage reduction in trip generation from the base case (i.e., as obtained from the ITE *Trip Generation* manual). This reduction reflects "internal trips" that would occur, but would not be off-Islands (i.e., they would remain on the Islands and would occur by walking and bicycling).

The travel demand analysis assumes implementation of the Proposed Project's improvements to transit service and the TDM program, as described above.

The steps in determining the Proposed Project's trip generation by mode include:

1. The total amount of person-trips generated by the Proposed Project was estimated using vehicle trip generation rates described in the ITE Trip Generation manual (and other sources, as necessary) and average vehicle occupancy survey data from the *SF Guidelines* and national surveys.[19]
2. Adjustments were made based on research conducted by Fehr & Peers and others to account for the unique nature of the project, including the mix of uses, the density, and the high quality of pedestrian and bicycle amenities proposed.
3. The percentage of total trips expected to use transit based on the high level of transit service proposed by the Project was forecasted based on survey data from San Francisco for similar locations.
4. The general origins and destinations of person-trips leaving the Islands were forecasted based on regional travel demand forecasting models and engineering judgment.
5. The person trips by auto, ferry, and bus forecasted to leave the Islands were assigned to specific lines, based on the mode choice identified in Step 3 and the trip distribution identified in Step 4.
6. The effects of implementing ramp metering and congestion pricing on weekdays for residents entering and departing the Islands by auto were predicted based on recent studies regarding the sensitivity of drivers to factors such as time delay and cost increases, with the decrease in auto trips re-assigned to transit.[20] The congestion pricing analysis assumed that High Occupancy Vehicles ("HOVs") with three or more persons (i.e., HOV 3+) would be exempt from the congestion pricing fee.

The result of steps 1-6 above is a projected person-trip generation, by land use and by mode, for the weekday AM and PM and Saturday peak hours. Table IV.E.4 shows the net person trips that

[19] Trip generation estimates for land uses in the project description that are not contained in the ITE *Trip Generation* manual were estimated using survey data taken at facilities for the proposed land use, or estimated based on typical number of users for the athletic fields.
[20] The transit costs for residents were adjusted to account for the prepaid transit vouchers.

would be generated by the project during the weekday AM and PM peak hours and the Saturday peak hour in both directions of travel (i.e., entering and leaving the Islands).

Table IV.E.4: Person-Trip Generation by Land Use

Land Use	Size	Peak Hour Person-Trip Generation[1]		
		AM	**PM**	**Saturday**
Residential	8,000 d.u.	5,008	5,938	5,750
Hotel (Treasure Island)	450 Rooms	890	427	523
Hotel (Yerba Buena Island)	50 Rooms	27	35	101
Retail	207,000 square feet	995	3,029	3,272
Open Space (Athletic Fields)	40 acres	0	688	1,376
Open Space (Other)	260 acres	115	222	933
Marina	400 slips[2]	38	88	126
Flex	202,000 square feet[3]	113	696	761
Office	100,000 square feet	285	278	58
Police/Fire	30,000 square feet	285	61	61
School	105,000 square feet	789	528	0
Community Center	48,500 square feet	126	130	101
Cultural Park/Museum	75,000 square feet	0	302	260
	Subtotal	*8,671*	*12,422*	*13,321*
	Internal/Linked Trip Reduction	*3,296 (38%)*	*4,850 (39%)*[4]	*5,743 (43%)*[4]
Total Net External Person-Trip Generation[5]		**5,375**	**7,423**	**7,562**

Notes:

[1] Trips occurring during the peak one hour during the weekday AM peak period of 7 to 9 AM, weekday PM peak period of 4 to 6 PM, and Saturday midday peak period of 1 to 3 PM.

[2] The Marina use has already been analyzed in a prior EIR and is not part of the Proposed Project (although the construction of landside services associated with the Marina are included). The trip generation associated with the Marina is presented for informational purposes because it will be used to assess cumulative conditions.

[3] Includes the non-retail portion of the adaptive reuse: 22,000 square feet food production/industrial/manufacturing, 150,000 square feet entertainment, and 30,000 square feet community/office uses.

[4] A 41% reduction was assumed for internal trips for the majority of Proposed Project uses during the PM peak hour, while a 10% reduction for internal trips was assumed for the cultural park. The result is an effective 39% reduction for the Proposed Project. For Saturday peak hour conditions, the trip generation analysis resulted in an effective 44% reduction for internal/linked trips.

[5] The Total External Person-Trip Generation does not account for the effects of congestion pricing or reduction in trips due to existing uses to be removed.

Source: Fehr & Peers, 2010

Travelers mode choice is influenced by a number of factors, including travel times, convenience, out-of-pocket costs, comfort, and other characteristics. A person's perception of these factors relative to various modal choices is different, depending on the specific origin and destination of the trip. The congestion pricing analysis involved applying factors related to direct costs (monetary costs such as transit fares, gasoline and maintenance costs, tolls) and indirect costs (travel time), as well as the price elasticity of demand to the origin-destination trip tables for trips between the Islands and external origins and destinations.[21]

The analysis involved calculating the percentage increase in travel cost for autos for an origin-destination pair when a congestion pricing fee is introduced. The increase in auto travel costs results in an estimated percent decrease in travel demand by auto. The Islands represent a unique scenario in that vehicle trips coming to or leaving the Islands during the AM and PM peak hours have no alternative vehicle routes. Therefore, any reduction in auto travel demand translates into corresponding increases in demand for other modes. Thus, the decrease in auto person trips associated with the congestion pricing fee was met with a corresponding increase in HOV 3+, bus and ferry trips. It is possible that instead of shifting from peak hour auto trips to peak hour transit trips, travelers may shift from peak hour auto trips to off-peak auto trips (a phenomenon commonly known as peak period spreading). However, analyzing a scenario in which all trips remain in the peak hour and assuming that trips shift from auto to transit ensures that a worst-case analysis of transit impacts is conducted. While the congestion pricing analysis focuses on peak hour effects, the congestion pricing scheme has been designed by the project sponsors to remain flexible with respect to time of day, amount charged, and directionality, among other factors, such that it can dynamically respond to changes over time. The effect of a $5.00 weekday peak hour congestion pricing fee would be expected to result in a reduction of 49 vehicle trips during the AM peak hour, and 43 vehicle trips during the PM peak hour.

The effect of the introduction of ramp metering to the Islands was also assessed with respect to travel demand because ramp metering would increase the travel time (and effective cost) for vehicles leaving the Islands. While it is anticipated that only the residents of the Island would pay the congestion fee, all vehicles with two or fewer people per vehicle would be required to wait for a ramp meter to enter the Bay Bridge during peak travel times. The analysis assumes that HOV 3+ trips would be able to bypass the meters, at least for the reconstructed westbound on-ramp. To calculate whether there would be a noticeable change in travel mode associated with meter delay, the same methodology utilizing the value of time principle as used for the congestion pricing analysis to forecast shifts from SOV and HOV 2, to HOV 3+, bus and ferry as applied to ramp metering. The analysis showed that effects of ramp metering would be relatively small; less than 0.5 percent reduction in vehicle trips during the AM and PM peak hours. This small change was considered negligible and therefore, the analysis does not account for any mode shift associated with ramp metering.

Table IV.E.5 summarizes the Proposed Project peak hour person-trips by mode and vehicle trips for the weekday AM and PM peak hours, and the Saturday peak hour. The external trips would occur via ferry, bus and auto; during the AM and PM peak hours approximately 12 to 14 percent

[21] Price elasticity of demand – concept that price elasticity of demand for a commodity changes as a result of change in price of same commodity.

Table IV.E.5: Person-Trip Generation by Mode

Peak hour	Person-Trip Generation[1]				Vehicle-Trips[2]
	External			Internal	
	Ferry	Bus	Auto	Other[3]	
AM					
Proposed Project	605	721	4,051	3,296	2,026
Less Existing Uses to be Removed[4]	*0*	*-142*	*-582*	*0*	*-364*
Congestion Pricing Adjustment	*+34*	*+44*	*-78*	*0*	*-49*
Net New Trips	**641 (14%)**[5]	**621 (13%)**[5]	**3,391 (73%)**[5]	**3,296**	**1,613**
PM					
Proposed Project	787	952	5,683	4,850	2,811
Less Existing Uses to be Removed[4]	*0*	*-92*	*-490*	*0*	*-306*
Congestion Pricing Adjustment	*+30*	*+39*	*-69*	*0*	*-43*
Net New Trips	**817 (12%)**[5]	**898 (13%)**[5]	**5,124 (75%)**[5]	**4,850**	**2,462**
Saturday					
Proposed Project	473	696	6,393	5,743	3,161
Less Existing Uses to be Removed[4]	*0*	*-101*	*-480*	*0*	*-300*
Congestion Pricing Adjustment	*0*	*0*	*0*	*0*	*0*
Net New Trips	**473 (7%)**[5]	**595 (9%)**[5]	**5,913 (84%)**[5]	**5,743**	**2,861**

Notes:

1 This analysis assumes no external pedestrian or bicycle trips onto or off of the Islands. With construction of the new east span bicycle/pedestrian path, it is possible that some bicycle trips may occur. However, this number is expected to be very minor and not likely to affect the overall conclusions of this study. Further, the potential new bicycle facility on the west span is still in the conceptual discussion phases, and is not assumed to be in place in this analysis.

2 Vehicle-trips include passenger vehicles and vans.

3 Includes internal bicycle and pedestrian trips, and a relatively small number of internal auto trips (e.g., between Yerba Buena Island and Treasure Island).

4 Based on counts of peak hour vehicle traffic on the Islands and assumes that the existing trip generation of the Job Corps center would remain the same.

5 Percentages shown are of total external trips. Some totals do not add up due to rounding.

Source: Fehr & Peers, 2010

of peak hour external trips would occur by ferry, 13 percent would occur by bus, and 73 to 75 percent would occur by auto. During the Saturday peak hour, about 7 percent of peak hour external trips would occur by ferry, 9 percent by bus, and 84 percent by auto. The number of vehicle trips generated by the Proposed Project during the peak hours would be 1,613 vehicles during the weekday AM peak hour, 2,462 vehicles during the PM peak hour, and 2,861 vehicles during the Saturday peak hour.

Project trip distribution was based on information obtained from three travel demand forecasting models: the SFCTA's SF–CHAMP, the MTC and the ACCMA travel demand models.

Table IV.E.6 presents the distribution of the Proposed Project person trips to and from San Francisco and areas outside of San Francisco. The percentages shown are the aggregated trip distribution percentages for all trip types (work and non-work) and modes (transit and auto). For trips within San Francisco, the local SF-CHAMP model was used to determine the percent distribution among the four Superdistricts within the City. Overall, 64 percent of trips would be to and from the rest of San Francisco, 21 percent to and from the East Bay, 3 percent to and from the North Bay, and 12 percent to and from the South Bay.[22] Within San Francisco, the majority would be to and from Superdistrict 1, which includes the downtown central business district and South of Market area.

Table IV.E.6: Proposed Project Trip Distribution Patterns[1]

	Place of Trip Origin/Destination							
	San Francisco					East Bay	North Bay	South Bay
	Total	**SD1**	**SD2**	**SD3**	**SD4**			
Average Model Trip Distribution	**64%**	35%	9%	18%	2%	**21%**	**3%**	**12%**

Note:
[1] The geographic distribution shown in the table is for external project trips.

Source: SFCTA, ACCMA, MTC, 2009; Fehr & Peers, 2010

<u>Loading Demand</u>

The *SF Guidelines* methodology for estimating freight loading/loading demand was used to calculate the Proposed Project demand. Daily truck trips generated for each of the land uses in the Proposed Project were calculated based on the rates per 1,000 square feet contained in the *SF Guidelines*, then converted to hourly demand based on a 9-hour day and a 25-minute average stay. Average hourly demand was converted to a peak hour demand by applying a peaking factor, as specified in the *SF Guidelines*. Table IV.E.7 presents the number of trucks that would be generated by the Proposed Project land uses on a daily basis, and the demand for loading dock spaces during the peak hour of loading activities.

[22] The intersection analysis did not include intersections in the East Bay because, unlike downtown San Francisco, there is no central place or roadway where a majority of trips would converge. Studying individual intersections would not reflect the way that trips from the Proposed Project would disperse throughout the East Bay via the major freeways and cities such as Oakland, Berkeley, Richmond, San Leandro, and Fremont.

Table IV.E.7: Proposed Project Loading Demand

Land Use	Size	Daily Truck Trip Rate[6]	Daily Truck Generation	Peak hour Loading Dock Space Demand
Office	130,000 sq ft[1]	0.21	27	2
Retail	320,000 sq ft[2]	0.22	70	5
Restaurant	37,000 sq ft	3.60	133	8
Hotel	450,000 sq ft (500 rooms)	0.09	41	2
Institutional	138,500 sq ft[3]	0.10	14	1
Manufacturing	22,000 sq ft[4]	0.51	11	1
Residential	9,577,150 sq ft (8,000 dwelling units)	0.03	287	17
Total			**583 Trucks**	**36 Spaces**

Notes:

[1] Includes 100,000 square feet of new office plus 30,000 square feet of community uses/offices planned in adaptive reuse of Building 1.
[2] Includes all non-restaurant retail (170,000 square feet) and 150,000 square feet of entertainment uses proposed for adaptive reuse of Building 3.
[3] Includes 13,500 square feet of community facilities, 35,000 square feet for Pier 1 Community Center, 15,000 square foot sailing center, and 75,000 square foot museum. Similar to parking analysis, loading demand for elementary school and police/fire facility will be provided separately within their facilities. Neither demand nor supply for elementary school and police/fire facility is included in this analysis.
[4] Includes 22,000 square feet of food production space proposed in adaptive reuse of Building 2.
[5] Typical peak hour of truck loading space demand occurs between 10 AM and 1 PM. Peak hour generation assumes deliveries occur between 8 AM and 5 PM, average park time of 25 minutes per vehicle, and that the peak hour deliveries occur at a 25 percent higher rate than other hours.
[6] Per thousand square feet.

Source: *SF Guidelines*, 2002 and Fehr & Peers, 2010

<u>Parking Demand</u>

The *SF Guidelines* methodology for estimating parking demand was used to calculate the parking demand associated with the Proposed Project land uses and a shared parking analysis was applied to the non-residential parking demand. Parking demand was estimated separately for residential and non-residential uses as follows:

- Residential Parking Demand—For individual development projects, residential parking demand is estimated based on the number and type of housing unit (i.e., studios/one bedroom versus two and two-plus bedroom units, and affordable versus market rate housing) that would be constructed.
- Non-Residential Parking Demand—Non-residential demand was estimated by determining the peak parking demand estimates for each land use within the neighborhoods using the methodology within the *SF Guidelines*, and applying the Urban Land Institute ("ULI") shared parking methodology to estimate the supply-reducing

effect of shared parking.[23] The resulting parking demand reflects the maximum parking required to accommodate the Proposed Project's mix of non-residential land uses.

Table IV.E.8: Proposed Project Parking Demand, presents the residential and non-residential parking demand for each neighborhood on the Islands.

Table IV.E.8: Proposed Project Parking Demand

District	Peak Residential Parking Demand	Peak Shared Non-Residential Parking Demand	Total Peak Parking Demand[1]
Cityside	4,134	92	4,226
Eastside	2,032	48	2,080
Island Core	3,737	1,546	5,283
Open Space	0	395	395
Total Treasure Island [2]	**9,903**	**2,081**	**11,984**
Yerba Buena Island	259	57	316
Total Proposed Project[3]	**10,162**	**2,138**	**12,300**

Notes:

[1] Shared parking analysis based on peak parking demands calculated using *SF Guidelines* Parking Demand methodology and ULI *Shared Parking* methodology for temporal distribution of parking demand by land uses.

[2] Excludes Yerba Buena Island. Peak demand for all of Treasure Island is not the same as the total peak parking demand for each neighborhood because the neighborhoods experience their peak demands at different times of the day.

[3] Excludes parking demand associated with the Job Corps and U.S. Coast Guard.

Source: Fehr & Peers, 2010.

Future 2030 No Project Transportation Improvements

As described in "Regional Access" on pp. IV.E.2-IV.E.10, there are a number of ongoing and proposed improvements to the Bay Bridge ramps at Yerba Buena Island. For the purposes of this transportation analysis, the following transportation improvements were assumed to be in place as part of the Future 2030 Cumulative No Project conditions:

- The improvements at the eastbound on-ramp on the east side of Yerba Buena Island that will be reconstructed as part of the replacement of the Bay Bridge East Span project were assumed to be in place.
- The improvements to the westbound on- and off-ramps on the east side of Yerba Buena Island currently being evaluated by Caltrans and SFCTA as part of the Ramps Project (i.e., reconstruction of the westbound on-ramp on the east side of Yerba Buena Island,

[23] *Shared Parking*, published by the Urban Land Institute ("ULI"), provides the industry standard method of estimating the supply-reducing effects of shared parking. It provides the temporal distribution of parking demands (as a percentage of their peak demand) for various land uses for each hour of a typical day. The hourly demands of each use are summed together and the highest overall parking demand was identified as the combined peak demand.

replacement/reconstruction of the westbound off-ramp on the east side of Yerba Buena Island, and the conversion of the westbound on-ramp on the west side of Yerba Buena Island to a transit and emergency vehicle access-only lane) were also assumed in the transportation analysis. However, an analysis was also conducted to determine the Proposed Project impacts that would occur if the Ramps Project was not constructed.[24]

The San Francisco Planning Department is undertaking a comprehensive planning process for the area surrounding the new Transbay Transit Center and issued a Draft Transit Center District Plan (TCDP) for public review in November 2009. The study area for the Transbay Transit Center is roughly bounded by Market Street, The Embarcadero, Folsom Street, and Third Street. The TCDP proposes changes to the transportation network within the study area, such as conversion of existing one-way streets to two-way and reducing the number of travel lanes on some streets. The Planning Department is preparing an EIR analyzing the Draft TCDP, and plans to hold a series of public meetings and workshops to further develop and refine the recommendations in the Draft TCDP. It is likely that a number of elements of the Draft TCDP, including the roadway system recommendations, will continue to change and evolve over the course of the public review process, and will be further informed by the environmental review process currently under way for the Draft TCDP. Therefore, the proposed roadway changes described in the Draft TCDP have not been analyzed as part of this EIR, as it remains unknown whether or not they will be adopted in their current form or substantially revised. Ultimately, the impacts of such roadway changes will be evaluated in the environmental review document for the TCDP, which will include the additional traffic associated with the Proposed Project.

Development of 2030 Cumulative No Project Conditions Traffic Forecasts

Future conditions traffic forecasts for the Bay Bridge were developed based on a comparison of the future year 2030 output from the SFCTA and ACCMA travel demand forecasting models. The worst-case (i.e., highest) forecasts for each direction for each peak hour from each model were chosen as the 2030 baseline conditions analysis because of considerable variation between the models' respective forecasts. Weekday AM and PM peak hour traffic volumes on the westbound and eastbound approaches of the Bay Bridge would increase without the Proposed Project as follows:

- In the AM peak hour, westbound queues in the East Bay would increase by 5,400 vehicles;
- In the AM peak hour, eastbound queues in downtown San Francisco would either stay unchanged or increase by about 250 vehicles;

[24] In addition to ramp changes, the SFCTA and Caltrans are also evaluating retrofit of the nine viaduct structures on the west side of Yerba Buena Island. Retrofit of these structures is separate from this project. As the retrofit would be a seismic safety project only and no changes to roadway alignment or capacity are proposed, the transportation impacts described in this Section would be the same whether the retrofit project was implemented or not.

- In the PM peak hour, westbound queues in the East Bay would increase by 200 vehicles; and
- In the PM peak hour, eastbound queues in downtown San Francisco would increase by 4,700 vehicles.

Table IV.E.9 and Figure IV.E.16: No Project and With Project East Bay Queuing Approaching the Bay Bridge, present the expected year 2030 Cumulative No Project queuing at the approaches to the Bay Bridge.

Table IV.E.9: Existing and 2030 Cumulative No Project Peak Hour Queuing on Bay Bridge Approaches (Miles)

	Approach	No. of Lanes[1]	Existing[2]			2030 Cumulative No Project		
			AM	**PM**	**Sat**	**AM**	**PM**	**Sat**
East Bay Approaches	I-80 WB	3	2.7	0.0[3]	0.0	5.5 – 8.0	0.1 (Within Toll Plaza Area)	0.0
	I-580 WB	3	1.5	0.0[3]	0.0	1.9 – 2.5		0.0
	I-880 WB	3	0.7	0.0[3]	0.0	1.0 – 5.6		0.0
San Francisco Approaches[4]	Harrison WB @ First	2	0.0	0.2	0.0	0.0	0.2	0.0
	Bryant EB @ Second	2	0.0	0.2	0.0	0.0	0.2	0.0
	Folsom EB @ Essex	2	0.0	0.3	0.0	0.0	0.5	0.0
	First SB @ Howard	2	0.0	0.4	0.0	0.0	0.7	0.0
	Bryant EB @ Fifth	3	0.0	0.1	0.0	0.0	0.5	0.0

Notes:

1 The number of lanes shown represents the number of lanes of queued traffic serving the Bay Bridge from each facility.

2 Assumes queued vehicle density of 150 vehicles per lane per mile for freeway and 264 vehicles per lane per mile for city streets based on aerial photo observations.

3 Most queues observed on westbound approaches in the PM peak period were due to weaving in the I-80/I-580/I-880 interchange and not necessarily due to bridge over-saturation or the service volume of the toll plaza.

4 Queues based on intersection turning movement forecast. Additional unserved demand would be queued on eastbound I-80 approaching the Bay Bridge.

Source: Fehr & Peers, 2010.

Approach	Existing AM Queue	Year 2030 No Project AM Queue	Project Contribution
I-80 WB	2.66 miles	5.5 - 8.0 miles	0.8 miles
I-580 WB	1.5 miles	1.9 - 2.5 miles	0.5 miles
I-880 WB	0.74 miles	1.0 - 5.6 miles	0.2 miles

SOURCE: Fehr & Peers, 2009

FIGURE IV.E.16: NO PROJECT AND WITH PROJECT EAST BAY QUEUING APPROACHING THE BAY BRIDGE

2030 Cumulative No Project freeway volume forecasts for Saturday conditions were developed using a linear growth factor based on the growth observed between the existing and 2030 Cumulative No Project PM peak hour freeway forecasts. The factor was applied to existing Saturday peak hour volumes to develop 2030 Cumulative No Project Saturday peak hour forecasts. That process produced the following Saturday peak hour forecasts for travel on the Bay Bridge:

- In the Saturday peak hour, westbound volumes would be 8,150 vehicles per hour
- In the Saturday peak hour, eastbound volumes would be 8,500 vehicles per hour

Since Saturday peak hour traffic volumes under 2030 Cumulative No Project conditions would be less than the Bay Bridge capacity of 9,000 vehicles per hour, queues would not occur within the East Bay or on downtown San Francisco streets.

PROJECT IMPACTS

Construction Impacts

Impact TR-1: Construction of the Proposed Project would occur over a long period of time and would result in significant impacts on the transportation and circulation network. ***(Significant and Unavoidable with Mitigation)***

Construction and build out of the Proposed Project would be phased and is expected to occur over approximately 15 to 20 years; however, the actual timing of construction would depend on market conditions and other factors. Proposed Project construction is expected to involve four major phases. The first phase would include demolition of existing uses and construction of horizontal infrastructure and portions of the geotechnical stabilization. The subsequent three phases would include development of the proposed new land uses and associated infrastructure extensions, as needed.

The construction schedule would be coordinated with the other current land-owners on the Islands who would remain (i.e., Department of Labor and the U.S. Coast Guard) and the construction of the Bay Bridge East Span project (by Caltrans) to minimize conflicts with the existing traffic onto and off of the Islands. The project sponsors would enter into an agreement with the U.S. Coast Guard with respect to construction schedule, construction activities, and maintenance of access to existing Coast Guard facilities on Yerba Buena Island. Construction staging would occur on the Islands, although truck traffic would be required to access the Islands via the Bay Bridge.

Construction activity would be expected to occur on Monday through Saturday, between 7 AM and 8 PM, and the typical work shift for most construction workers would be from 7 AM to approximately 3:30 PM. Construction is not anticipated to typically occur on Sundays or major holidays.

Construction materials and equipment used on the Islands would be transported by truck and/or barge throughout the construction of the Proposed Project. Based on the amount and type of construction materials to be used and disposed of during construction, Table IV.E.10 estimates the maximum number of truck and barge trips that the project sponsors expect to be generated during construction of the Proposed Project.[25] Table IV.E.10 lists trips either by year or in total; where total trips are provided, it is expected that the trips would be spread out throughout the 20-year duration of construction. It is important to note that not all of these activities would be generating truck traffic simultaneously, and some activities are presented as total trips while others as annual figures, so the total annual truck traffic is not necessarily the sum of each row. Further, the number of truck trips would be considerably less than the amount of new vehicle traffic generated by the Proposed Project.

Table IV.E.10: Proposed Project Construction Traffic

Construction Use	Equipment and Materials Deliveries and Disposal Trips	
	Truck Trips	Barge Trips
Equipment Transport[1]	200 per year	20 total
Demolition	100 total	–
Construction Materials[1]	100,000 total	1,000 total
Asphalt	2,500 total	–
Aggregate	100 per year	–
Concrete	2,000 per year	–
Utilities[1]	2,000 total	300 total
Landscaping[1]	500 total	200 total

Note:

[1] The number of truck and barge trips will be determined by the needs of the construction crew. The maximum number of trips is listed for each; however, both transport methods would be used so the total number of trips for each would differ from what is listed.

Source: TICD (BKF), 2009.

Traffic-related construction impacts would be concentrated on the Bay Bridge, primarily in the vicinity of the Bay Bridge ramps to the Islands, and on local streets on Yerba Buena and Treasure Islands. Trucks using the Bay Bridge ramps are likely to be slower at accelerating onto and decelerating from the Bay Bridge than a typical passenger car, which may cause some minor, temporary, and localized delay to traffic on the Bay Bridge near the ramps.

[25] *Treasure Island Infrastructure Update*, Section 5.6, p. 5 April 20, 2009.

Construction activities conducted by barge would be regulated by the Coast Guard. All construction-related vessel traffic in San Francisco Bay is regulated by the Coast Guard under the Vessel Traffic Service ("VTS") program. All vessel operators have to inform the VTS of marine traffic in the Bay, and where a significant amount of traffic is anticipated, appropriate Notices to Mariners need to be coordinated with the Harbor Safety Committee and the VTS.

The Proposed Project would involve construction of a new street system, which would require temporary closure of traffic and parking lanes and sidewalks on the Islands. These closures could last the entire duration of construction of particular phases, and it is possible that more than one area could be closed simultaneously. These closures may involve temporary disruptions to the routes and stops for the Muni line 108-Treasure Island, the new AC Transit bus line, and the new Islands shuttle service, resulting in the need for rerouting. Changes to transit lines would be coordinated and approved, as appropriate, by SFMTA, AC Transit, and TITMA.

Closure of one or more travel lanes is not expected to cause severe congestion on the Islands because existing traffic volumes on the Islands are relatively low. However, the closures may create difficulties for bicycle and pedestrian circulation during construction. Mitigation Measure M-TR-1 would ensure that temporary accommodations for pedestrians and bicyclists would be maintained to minimize these potential disruptions.

Construction activities for the early phases of development may overlap with the final phases of construction of the new Bay Bridge east span which is expected to be completed by late 2013. This is discussed as part of cumulative construction impacts (see Impact TR-39 on p. IV.E.118).

In summary, the project construction activities could result in temporary impacts to the transportation system, including increased delay and congestion on the Bay Bridge near the ramps during the peak periods, and disruption to transit, pedestrian, bicycle, and vehicular traffic on the Islands due to roadway closures. Given the magnitude and duration of potential construction activities, and their potential impact on ramp operations on the Bay Bridge, these construction-related transportation impacts would be considered significant.

<u>Mitigation Measure M-TR-1: Construction Traffic Management Plan</u>

The project sponsors shall develop and implement a Construction Traffic Management Plan ("CTMP"), consistent with the standards and objectives stated below and approved by TIDA, designed to anticipate and minimize transportation impacts of various construction activities associated with the Proposed Project.

The Plan shall disseminate appropriate information to contractors and affected agencies with respect to coordinating construction activities to minimize overall disruptions and ensure that overall circulation on the Islands is maintained to the extent possible, with particular focus on ensuring pedestrian, transit, and bicycle connectivity. The CTMP shall supplement and expand, rather than modify or supersede, any manual, regulations, or provisions set forth by SFMTA, Department of Public Works ("DPW"), or other City departments and agencies.

Specifically, the CTMP shall:

- Identify construction traffic management best practices in San Francisco, as well as other jurisdictions that, although not being implemented in the City, could provide valuable information for a project of the size and characteristics of Treasure Island and Yerba Buena Island.
- As applicable, describe procedures required by different departments and/or agencies in the City for implementation of a Construction Traffic Management Plan, such as reviewing agencies, approval processes, and estimated timelines. For example:
    - The construction contractor will need to coordinate temporary and permanent changes to the transportation network on Treasure Island and Yerba Buena Island with TIDA. Once Treasure Island streets are accepted as City streets, temporary traffic and transportation changes must be coordinated through the SFMTA's Interdepartmental Staff Committee on Traffic and Transportation ("ISCOTT") and will require a public meeting. As part of this process, the CTMP may be reviewed by SFMTA's Transportation Advisory Committee ("TASC") to resolve internal differences between different transportation modes.
    - For construction activities conducted within Caltrans right-of-way, Caltrans Deputy Directive 60 (DD-60) requires a separate Transportation Management Plan and contingency plans. These plans shall be part of the normal project development process and must be considered during the planning stage to allow for the proper cost, scope and scheduling of the TMP activities on Caltrans right-of-way. These plans should adhere to Caltrans standards and guidelines for stage construction, construction signage, traffic handling, lane and ramp closures and TMP documentation for all work within Caltrans right-of-way.
- Changes to transit lines would be coordinated and approved, as appropriate, by SFMTA, AC Transit, and TITMA. The CTMP would set forth the process by which transit route changes would be requested and approved. Require consultation with other Island users, including the Job Corps and Coast Guard, to assist coordination of construction traffic management strategies. The project sponsors shall proactively coordinate with these groups prior to developing their CTMP to ensure the needs of the other users on the Islands are addressed within the Construction Traffic Management Plan.
- Identify construction traffic management strategies and other elements for the Proposed Project, and present a cohesive program of operational and demand management strategies designed to maintain acceptable levels of traffic flow during periods of construction activities. These include, but are not limited to, construction strategies, demand management activities, alternative route strategies, and public information strategies. For example, the project sponsors may develop a circulation plan for the Island during construction to ensure that existing users can clearly navigate through the construction zones without substantial disruption.

Implementation of Mitigation Measure M-TR-1, a Construction Traffic Management Plan, would help reduce the Proposed Project's construction-related traffic impacts. However, given the magnitude of the proposed development and the duration of the construction period, some disruptions and increased delays could still occur even with implementation of Mitigation Measure M-TR-1 (including ramp operations on the Bay Bridge), and it is possible that significant construction-related transportation impacts on regional roadways could still occur. Construction-related transportation impacts would therefore, remain significant and unavoidable.

Operational Impacts

Except near ramp merge and diverge sections, operations on the Bay Bridge are anticipated to operate similar to existing conditions (i.e., at capacity in peak directions during peak periods) since additional travel demand would be constrained by the toll plaza in the East Bay, eastbound on-ramp approaches in downtown San Francisco, and by ramp metering at the westbound on-ramp on Yerba Buena Island. Therefore, since the bridge's approaches limit the number of vehicles that can reach the bridge, the Bay Bridge mainline would not exceed current peak volumes (i.e., its capacity). Generally, although Bay Bridge mainline operations would operate similarly to today's peak hour conditions, through-traffic on the Bay Bridge could experience some increased congestion in the eastbound direction near the eastbound diverge section at Yerba Buena Island.

<u>Bay Bridge Operations – Ramp Junction Merge/Diverge</u>

Impact TR-2: Implementation of the Proposed Project would contribute to existing LOS E operating conditions during the weekday PM peak hour, and result in significant impacts during the Saturday peak hour at the eastbound off-ramp (west side of Yerba Buena Island). ***(Significant and Unavoidable with Mitigation)***

Table IV.E.11 summarizes the ramp merge and diverge levels of service for the AM, PM, and Saturday peak hours.[26] (For conditions without the Ramps Project, the tables also present the stop-controlled intersection levels of service for the AM, PM, and Saturday peak hours.) Figure IV.E.17: Existing plus Project Bay Bridge Travel Demand (With New Westbound On-Ramps), illustrates the demand volumes on the ramps, and Figure IV.E.16 illustrates the resulting vehicle queues.

---

[26] Under conditions with the proposed reconstruction of the westbound ramps on the east side of Yerba Buena Island, the westbound on-ramp on the west side of the Island would be converted to transit and emergency vehicle-only. Under these conditions, no analysis of the transit and emergency vehicle-only westbound on-ramp was performed because volumes would be very low. Under conditions without the reconstruction of the westbound ramps, both a side-street stop analysis and a ramp merge analysis were conducted.

Table IV.E.11: Ramp Junction Analysis – Existing, Existing plus Project, and 2030 Cumulative plus Project Conditions

Ramp	Peak Hour	Existing		Existing plus Project		2030 Cumulative plus Project	
		Ramp Merge Density/ LOS[2]	Stop-Controlled Delay/LOS[3]	Ramp Merge Density/ LOS[2]	Stop-Controlled[1] Delay/ LOS[3]	Ramp Merge Density/ LOS[2]	Stop-Controlled[1] Delay/LOS[3]
Ramp Junction LOS without Ramps Project							
Eastbound On-Ramp (East side)	AM	22.3/C	**74.2/F**	24.1/C	N/A	27.9/C	N/A
	PM	27.8/C	**>80/F**	26.3/C	N/A	28.4/C	N/A
	Sat	24.5/C	**>80/F**	26.5/C	N/A	28.5/C	N/A
Eastbound Off-Ramp (West side)	AM	30.1/D	N/A	33.4/D	N/A	33.4/D	N/A
	PM	**36.2/E**	N/A	**39.3/E**	N/A	**39.3/E**	N/A
	Sat	32.3/D	N/A	**39.7/E**	N/A	**39.7/E**	N/A
Eastbound Off-Ramp (East side)[4]	AM	N/A	N/A	26.6/C	N/A	26.6/C	N/A
	PM	N/A	N/A	30.4/D	N/A	30.4/D	N/A
	Sat	N/A	N/A	30.8/D	N/A	30.8/D	N/A
Westbound On-Ramp (West side)	AM	27.9/C	**>80/F**	26.4/C	**>80/F**	26.8/C	**>80/F**
	PM	25.1/C	**>80/F**	25.0/C	**>80/F**	26.9/C	**>80/F**
	Sat	24.6/C	**>80/F**	23.8/C	**>80/F**	25.1/C	**>80/F**
Westbound On-Ramp (East side)[4]	AM	N/A	N/A	27.3/C	**>80/F**	27.1/C	**>80/F**
	PM	N/A	N/A	26.4/C	**>80/F**	27.1/C	**>80/F**
	Sat	N/A	N/A	25.1/C	**>80/F**	25.9/C	**>80/F**
Westbound Off-Ramp (East side)	AM	32.8/D	N/A	32.5/D	N/A	32.6/D	N/A
	PM	29.4/D	N/A	32.6/D	N/A	32.6/D	N/A
	Sat	28.5/D	N/A	31.8/D	N/A	31.8/D	N/A
Ramp Junction LOS with Ramps Project (on Reconstructed Westbound Ramps)							
Westbound On-Ramp (East side)[5]	AM	N/A	N/A	24.0/C	N/A	28.4/C	N/A
	PM	N/A	N/A	25.2/C	N/A	28.2/C	N/A
	Sat	N/A	N/A	29.6/D	N/A	31.6/D	N/A
Westbound Off-**Ramp (East side)**	AM	N/A	N/A	26.0/C	N/A	26.0/C	N/A
	PM	N/A	N/A	26.1/C	N/A	26.1/C	N/A
	Sat	N/A	N/A	25.4/C	N/A	25.4/C	N/A

Notes:

LOS E and LOS F conditions highlighted in **bold**. N/A = Not Applicable

[1] Under conditions without the Ramps Project, existing stop-control would remain in place on both westbound on-ramps. Under these conditions, similar to the analysis of existing conditions, both the HCM merge analysis and the HCM stop-controlled intersection analysis were performed. There are no stop signs at the off-ramps; therefore, there is no analysis for these ramps in the “Stop-controlled” column.

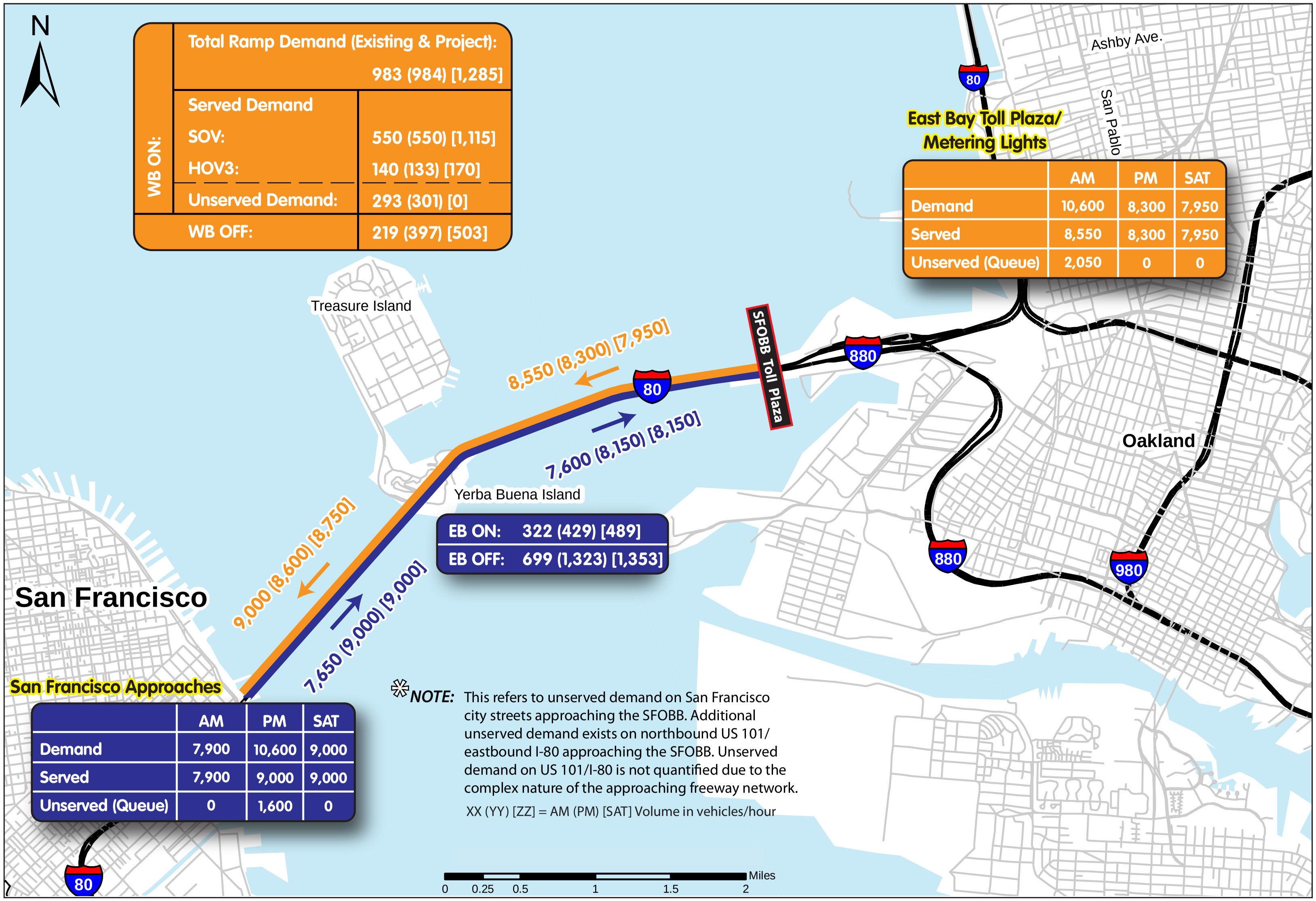
[2] Density measured in passenger cars per mile per lane.

[3] Delay measured in seconds per vehicle.

[4] The eastbound off-ramp (east side) and westbound on-ramp (east side) were closed due to construction at the time the existing conditions data were collected, and therefore no ramp merge results are shown under the Existing column. Both ramps have since been reopened.

[5] Under conditions with the Ramps Project, the westbound on-ramp (west side) is planned to be for transit and emergency vehicle access only. Thus, under conditions with the Ramps Project, ramp junction analysis was only performed for the westbound on-ramp (east side) because volumes would be very small on the westbound on-ramp (west side). Conditions at other YBI ramps would not change from those presented for conditions without the Ramps Project.

Source: Fehr & Peers, 2010.



SOURCE: Fehr & Peers, 2009

FIGURE IV.E.17: EXISTING PLUS PROJECT BAY BRIDGE TRAVEL DEMAND (WITH NEW WESTBOUND ON-RAMPS)

Based on the merge/diverge analysis, the Proposed Project would contribute traffic to the eastbound off-ramp diverge section on the west side of Yerba Buena Island, which was observed to operate at LOS E in the PM peak hour under existing conditions. Proposed Project traffic would comprise a majority of the traffic using the off-ramp during the PM peak hour and the project's contribution would therefore, be considered substantial and a significant impact. The Proposed Project would also cause this same off-ramp diverge section to deteriorate from LOS D to LOS E in the Saturday peak hour. This means that during the weekday PM and Saturday peak hours, the roadway area on the Bay Bridge approaching the off-ramp would be operating near its capacity with virtually no usable gaps in the traffic stream and little room to maneuver, with notable congestion and/or queuing extending onto the Bay Bridge.

The primary cause for deficient operations at the eastbound off-ramp on the west side is its design, with a short deceleration distance followed by a tight curve. This design causes exiting vehicles to begin deceleration on the bridge mainline. To improve the operations of this diverge section, the off-ramp would need to be reconstructed to provide more deceleration distance and a less-severe curve. Reconstruction of this ramp would require major construction on the Bay Bridge, Yerba Buena Island, and Treasure Island Road, and is not contemplated at this time by the Ramps Project. These improvements were evaluated in the Project Study Report for the Ramps Project conducted by Caltrans and the SFCTA in December 2007 and were found to be infeasible.[27]

<u>Mitigation Measure M-TR-2: Expanded Transit Service</u>

As a means to reduce vehicular travel to and from the Islands, additional transit capacity shall be provided. The project sponsors shall work with WETA and SFMTA to develop and implement the Proposed Project's transit operating plan. Elements of the plan include, but are not limited to:

- Additional ferry service to reduce peak period headways from 50-minutes to as much as 15-minute headways during the AM and PM peak periods.
- Increased frequency on the Muni line 108-Treasure Island service to reduce peak period headways from 15 minutes to as low as 7-minute headways in the AM peak period and as low as 5 minutes in the PM peak period.
- New bus service to another location in San Francisco (e.g., to the San Francisco Civic Center area) with frequencies as low as 12-minutes during the AM and PM peak periods. Service shall be provided between approximately 5 AM and 10 PM.

The proposed East Bay bus service would not change as part of this Mitigation Measure. Although specific headways are suggested as part of this Mitigation Measure, SFMTA and WETA would maintain the authority to modify service levels and routes as part of their ongoing system-wide operations management.

[27] Project Study Report on I-80 in the City and County of San Francisco at Yerba Buena Island from Post Mile 7.6 to Post Mile 8.1, Caltrans, December 2007.

The additional transit capacity (in terms of increased frequencies) and transit accessibility (due to a new line) to San Francisco has been designed to reduce transit travel times and would make transit use a more attractive travel mode. The enhanced transit service has been designed to increase the transit mode share (including bus and ferry) from 27 to 44 percent during the AM peak hour, and from 25 to 40 percent during the PM peak hour. Correspondingly, the number of peak hour project-generated vehicle trips would decrease from 1,613 vehicles to 1,228 vehicles during the AM peak hour (a decrease in the number of vehicles of about 24 percent), and from 2,462 vehicles to 1,983 vehicles during the PM peak hour (a decrease in the number of vehicles of about 20 percent). During the Saturday peak hour, the transit mode share would increase from 16 percent to 26 percent, and the number of peak hour vehicles would decrease from 2,861 vehicles to 2,437 vehicles per hour (a decrease in the number of vehicles of about 15 percent).

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the Proposed Project's impacts to the eastbound off-ramp diverge section would be reduced. However, for the weekday PM and Saturday peak hours this reduction in vehicle trips would have only a slight benefit to congestion around the off-ramp diverge section, and the levels of service would remain the same as those shown in Table IV.E.12. Further, although the project sponsors are working with WETA and SFMTA to ensure that the service proposed as part of this Expanded Transit Service mitigation measure is available, sources for full funding for the additional transit service contemplated under this Expanded Transit Service mitigation measure have not been identified or secured, and its implementation must be considered uncertain. Therefore, the Mitigation Measure would not reduce the Proposed Project's impacts to less than significant levels. The Proposed Project's impacts to this ramp diverge section would remain significant and unavoidable.

As noted above, Mitigation Measure M-TR-2 would result in a mode shift from auto to transit. The impacts of the shift from auto to transit are discussed, as appropriate, within the individual impact statements. For example, the impacts of additional transit ridership associated with this mitigation measure are discussed in Impact TR-19.

<u>Bay Bridge Operations – Ramp Delays without and with the Ramps Project</u>

Impact TR-3: Under conditions without the Ramps Project, implementation of the Proposed Project would result in significant impacts at the two westbound on-ramps. ***(Significant and Unavoidable with Mitigation)***

Traffic volumes destined for the westbound Bay Bridge would exceed the capacity of the westbound on-ramps to the Bay Bridge, resulting in queues. These queues would increase vehicular travel times and cause traffic delay. Figure IV.E.18: Existing plus Project Bay Bridge Travel Demand (No New Westbound On-Ramps), illustrates the Bay Bridge and Yerba Buena Island ramp demand volumes and resulting volume of queued vehicles for conditions if the new

Table IV.E.12: Ramp Junction Analysis – Proposed Project, and Project with Mitigation Measure M-TR-2 (Expanded Transit Service)

Ramp	Peak Hour	Existing plus Project		Existing plus Project with Mitigation Measure M-TR-2	
		Ramp Merge Density/LOS[2]	Stop-Controlled[1] Delay/LOS[3]	Ramp Merge Density/LOS[2]	Stop-Controlled[1] Delay/LOS[3]
Ramp Junction LOS without Ramps Project					
Eastbound On-Ramp (East side)	AM	24.1/C	N/A	23.7/C	N/A
	PM	26.3/C	N/A	25.9/C	N/A
	Sat	26.5/C	N/A	26.1/C	N/A
Eastbound Off-Ramp (West side)	AM	33.4/D	N/A	32.6/D	N/A
	PM	**39.3/E**	N/A	**39.3/E**	N/A
	Sat	**39.7/E**	N/A	**39.4/E**	N/A
Eastbound Off-Ramp (East side)	AM	26.6/C	N/A	26.2/C	N/A
	PM	30.4/D	N/A	30.4/D	N/A
	Sat	30.8/D	N/A	29.9/D	N/A
Westbound On-Ramp (West side)	AM	26.4/C	**>80/F**	26.4/C	**>80/F**
	PM	25.0/C	**>80/F**	25.0/C	**>80/F**
	Sat	23.8/C	**>80/F**	23.8.C	**>80/F**
Westbound On-Ramp (East side)	AM	27.3/C	**>80/F**	27.3/C	**>80/F**
	PM	26.4/C	**>80/F**	26.4/C	**>80/F**
	Sat	25.1/C	**>80/F**	25.1/C	**>80/F**
Westbound Off-Ramp (East side)	AM	32.5/D	N/A	32.1/D	N/A
	PM	32.6/D	N/A	32.1/D	N/A
	Sat	31.8/D	N/A	31.5/D	N/A
Ramp Junction LOS with Ramps Project (on Reconstructed Westbound Ramps)					
Westbound On-Ramp (East side)[4]	AM	24.0/C	N/A	23.8/C	N/A
	PM	25.2/C	N/A	25.1/C	N/A
	Sat	29.6/D	N/A	28.4/D	N/A
Westbound Off-Ramp (East side)	AM	26.0/C	N/A	25.7/C	N/A
	PM	26.1/C	N/A	25.6/C	N/A
	Sat	25.4/C	N/A	25.1/C	N/A

Notes:

LOS E and LOS F conditions highlighted in **bold**. N/A = Not Applicable

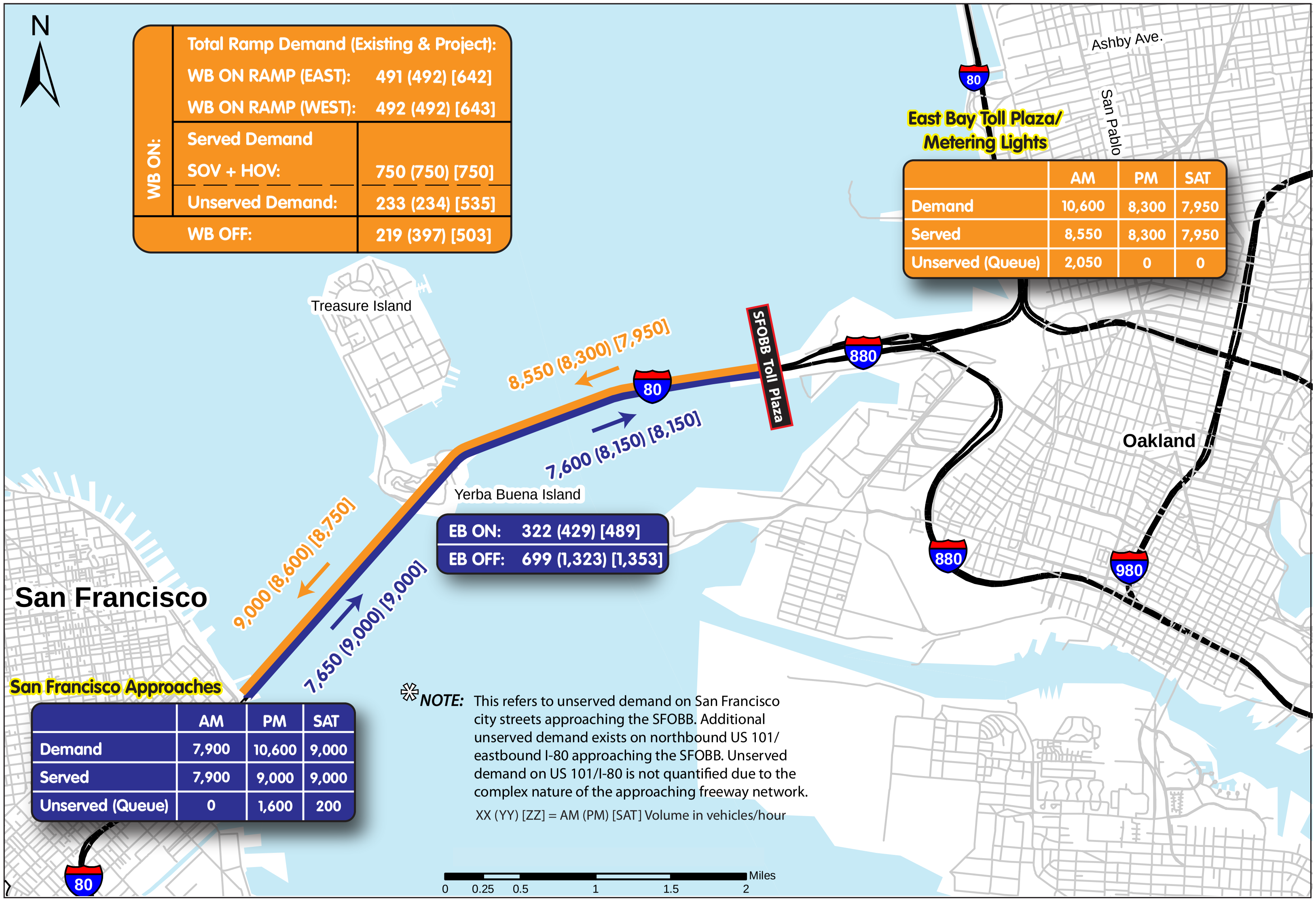
[1] Under conditions without the Ramps Project, existing stop-control will remain in place on both westbound on-ramps. Under these conditions, similar to the analysis of existing conditions, both the HCM merge analysis and the HCM stop-controlled intersection analysis were performed. There are no stop signs at the off-ramps; therefore, there is no analysis for these ramps in the "Stop-controlled" column.

[2] Density measured in passenger cars per mile per lane.

[3] Delay measured in seconds per vehicle.

[4] Under conditions with the Ramps Project, the westbound on-ramp (west side) is planned to be transit and emergency vehicle-only. Thus, under conditions with the Ramps Project, ramp junction analysis was only performed for the westbound on-ramp (east side) because volumes would be very small on the westbound on-ramp (west side). Conditions on other YBI ramps would not change from those presented for conditions without the Ramps Project.

Source: Fehr & Peers, 2010.



SOURCE: Fehr & Peers, 2009

FIGURE IV.E.18: EXISTING PLUS PROJECT BAY BRIDGE TRAVEL DEMAND (NO NEW WESTBOUND ON-RAMPS) westbound on-ramps are not reconstructed as part of the Ramps Project. Figure IV.E.19: Existing plus Project Maximum On-Island Queue, illustrates the physical extents of queues on the Islands. Table IV.E.13 presents the average delays for the peak hours of analysis associated with the two westbound on-ramps.

Table IV.E.13: Maximum On-Ramp Queues and Average Delays – Existing plus Project Conditions

Peak hour	Existing Ramps[1, 2,4] miles (minutes:seconds)	With Ramps Project[1] miles (minutes:seconds)
AM	0.45 **(2:06)**	1.23 **(5:12)**
PM	0.45 **(2:06)**	1.10 **(4:54)**
Saturday[3]	0.68 **(2:54)**	0.00 (0:00)

Notes:

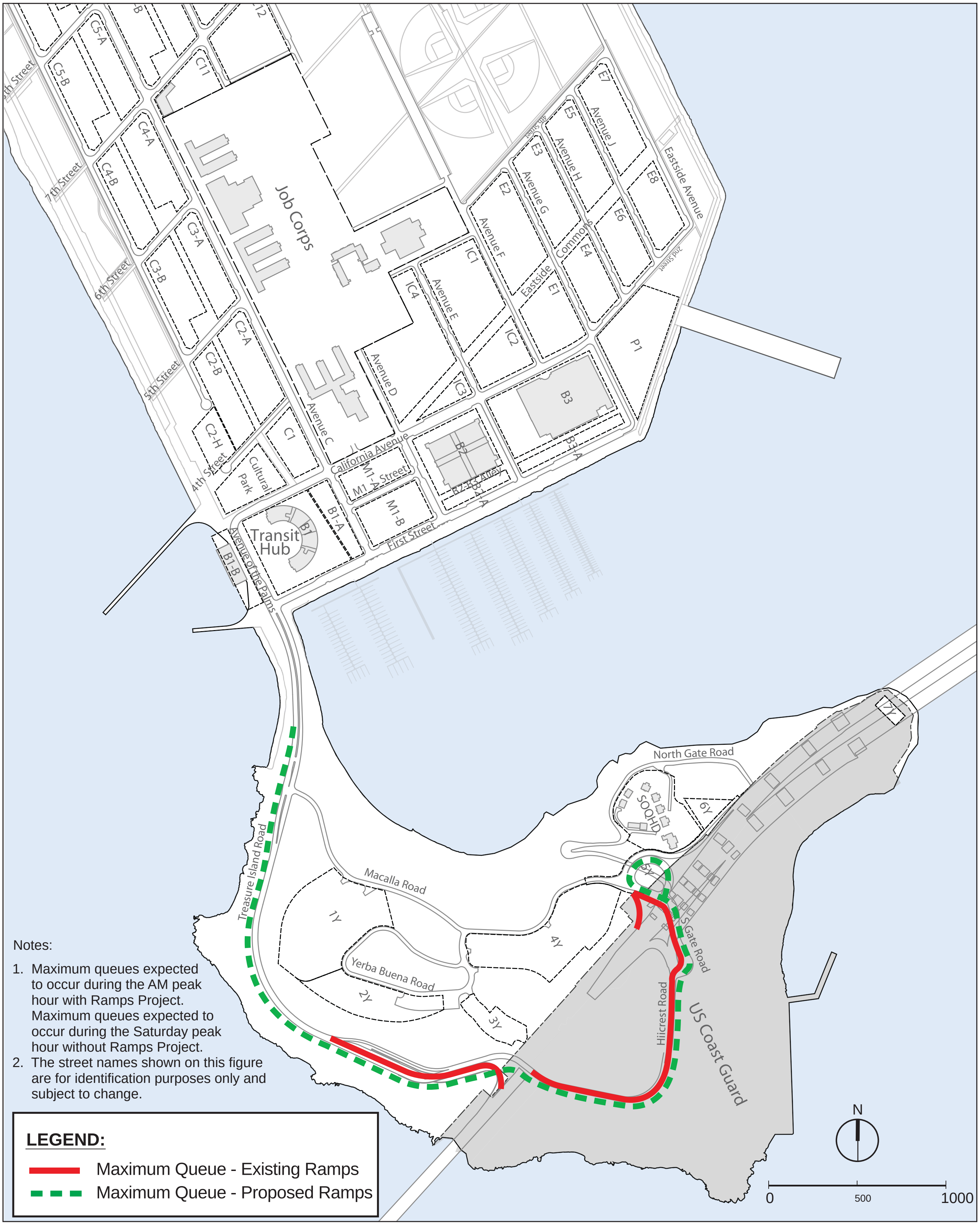
1 Delays greater than 35 seconds per vehicle highlighted in **bold**.
2 Includes planned reconstruction of the eastbound ramp on the east side of Yerba Buena Island as part of the Bay Bridge East Span project.
3 Ramp metering not assumed to be in operation during the Saturday peak hour.
4 Queues and delays presented for Existing Ramps are for each of the two ramps; traffic was assumed to split equally between the two westbound on-ramps.

Source: Fehr & Peers, 2010.

Although delays associated with on-ramp congestion are not typically analyzed for purposes of identifying impacts, this analysis includes an analysis of ramp delays. There are two reasons why this analysis was performed for the unique case of the Proposed Project. First, because the existing configuration of the ramps includes STOP signs at the ramp merge points, a side-street stop controlled analysis was conducted to better understand the operation of these unique ramps. (This allows for a comparison of delays at this stop-controlled operation under the current ramp configuration with the proposed ramp reconfiguration that would include ramp meters). The second reason why this analysis was performed for this project is that unlike most development projects, the ramps onto the Bay Bridge form the only egress from the Islands and there are no alternate vehicular travel routes. Because of this unique condition, this type of analysis is important to understanding the vehicular travel time implications of the Proposed Project and various ramp configurations.

Based on the STOP-sign controlled analysis, which was conducted only for conditions in which the westbound ramps on the east side of Yerba Buena Island are not reconstructed and in which case the two westbound on-ramps would remain STOP-sign controlled, the Proposed Project would contribute substantial traffic to both westbound ramps.[28] As shown in Table IV.E.11, both westbound on-ramps would operate at LOS F in the AM, PM, and Saturday peak hours. Delays would be considered a significant impact to both westbound on-ramps in the AM, PM, and

[28] The project-generated traffic would constitute over half of the total traffic using the on-ramps.



Notes:

1. Maximum queues expected to occur during the AM peak hour with Ramps Project. Maximum queues expected to occur during the Saturday peak hour without Ramps Project.
2. The street names shown on this figure are for identification purposes only and subject to change.

LEGEND:

Maximum Queue - Existing Ramps

Maximum Queue - Proposed Ramps

SOURCE: Perkins + Will, May 4, 2009; Fehr & Peers, 2009

FIGURE IV.E.19: EXISTING PLUS PROJECT MAXIMUM ON-ISLAND QUEUE

Saturday peak hours under conditions in which those ramps remain STOP-sign controlled. If the existing configuration were to remain, it is unlikely that the existing STOP signs would be removed or that other physical improvements would be made to the on-ramps.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the Proposed Project's impacts to ramp delays at the two STOP-sign controlled westbound on-ramps from Yerba Buena Island to the Bay Bridge would be reduced. This mitigation measure would reinforce the proposed TDM practices included as part of the Proposed Project, including ramp metering, congestion pricing, etc., designed to encourage mode shift to transit. Aside from increasing transit, as proposed by Mitigation Measure M-TR-2, there do not appear to be other proven techniques that would achieve the desired mode shift. As presented in Table IV.E.12, p. IV.E.76, for the weekday AM and PM and Saturday peak hours, even with implementation of Mitigation Measure M-TR-2, vehicles would still experience delays consistent with LOS F operations, and the Proposed Project's impacts to delay approaching the on-ramps would remain significant and unavoidable.

Impact TR-4: Under conditions with the Ramps Project, implementation of the Proposed Project would result in a significant impact during the AM and PM peak hours at the ramp meter at the westbound on-ramp (east side of Yerba Buena Island). ***(Significant and Unavoidable with Mitigation)***

If the Ramps Project is implemented, and if as part of the Ramps Project the west side westbound on-ramp is converted to transit and emergency vehicle access only, stop control devices would be eliminated and all westbound traffic (except transit vehicles destined for San Francisco) would be consolidated to the westbound on-ramp on the east side of Yerba Buena Island. This improvement, consequently, would simply relocate the source of vehicular delay from existing stop signs at the two ramp merges to a new ramp meter upstream of the single remaining merge on the east side of Yerba Buena Island.

The delay associated with the ramp meter is shown in Table IV.E.13. As presented in Table IV.E.13 and illustrated on Figure IV.E.19, p. IV.E.79, the Proposed Project may result in extensive queues on Treasure Island Road that may interfere with traffic circulation. (The queues may also affect transit circulation, which is discussed later in Impacts TR-24 through TR-27.) Under conditions with the Ramps Project, queues would reach over one mile on Treasure Island Road just past the intersection with Macalla Road. However, queues would not extend onto Treasure Island.

Although the delays are technically caused by a ramp meter signal, the LOS criteria for unsignalized intersections were applied because the ramp meter signal functions more like a stop sign than a traditional traffic signal. Ramp meter signals would be installed either as part of the Caltrans Bay Bridge East Span project, or as part of the Proposed Project. Vehicular traffic delay under conditions with the reconstructed westbound ramps would be just over 5 minutes in the AM peak hour and just under five minutes in the PM peak hour. This would be a significant impact. Traffic would experience minimal delays in the Saturday peak hour since ramp meters were assumed not to be in operation during that time.

As shown on Figure IV.E.19, p. IV.E.79, queues on the Islands and associated delay may affect the U.S. Coast Guard operations around Yerba Buena Island and their access to the Bay Bridge. Primary access between the Coast Guard station and the eastbound on-ramp is via South Gate Road (which connects with North Gate Road). With the Proposed Project, South Gate Road would be two-way between Hillcrest Road and the intersection with Macalla Road and North Gate Road to allow for direct access onto the eastbound Bay Bridge on-ramp and bypass of queued vehicles on Hillcrest Road. The intersection of South Gate Road with Hillcrest Road is located at the eastbound on-ramp to the Bay Bridge, about 150 feet from the Bay Bridge mainline structure.[29] Under conditions when there is a queue at the eastbound on-ramp, vehicles on South Gate Road would access the eastbound queue via forced-flow conditions similar to conditions at a four-way STOP-sign controlled intersection (e.g., queued vehicles on Hillcrest Road would allow vehicles stopped on South Gate Road to access Hillcrest Island Road under alternate vehicle right-of-way). Since South Gate Road terminates at the intersection with Hillcrest Road and the eastbound on-ramp, the vehicle delays experienced by Coast Guard vehicles when there are queued conditions on Hillcrest Road would be less than if South Gate Road was one-way westbound. If South Gate Road was one-way westbound, Coast Guard vehicles bound for the Bay Bridge would be required to travel around Yerba Buena Island via Macalla Road, Treasure Island Road and Hillcrest Road, and would experience the queued conditions for a longer distance.

Vehicles exiting Coast Guard facility driveways on Hillcrest Road would be required to travel within queued conditions for some period of time. The duration of travel within queued conditions and added delays would depend on the day of week, time of day, and conditions on the Bay Bridge. Based on existing driveway locations, Coast Guard vehicles would be within queued conditions for a distance of between 50 and 550 feet from the eastbound on-ramp, compared with a maximum queue of about 1.2 miles (6,340 feet) on Hillcrest Road.

Coast Guard vehicles are equipped with lights and sirens, and during emergency conditions, would be able to bypass queued vehicles. In addition, the longest potential queue the Coast Guard vehicles would have to wait in would be about one-tenth of a mile, based on the distance between the places such vehicles access the main YBI circulation route and the Bay Bridge. Accordingly, the Proposed Project would not be expected to substantially affect access to the Coast Guard station.

[29] The north leg of the intersection of Hillcrest Road and South Gate Road is the on-ramp onto the Bay Bridge eastbound.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the Proposed Project's impacts on ramp delays at the ramp meter at the reconstructed westbound on-ramp would be reduced. However, as shown in Table IV.E.14, with the proposed reconstructed on-ramps, delay would remain significant and unavoidable in the weekday peak hours.

Table IV.E.14: Maximum On-Ramp Queues and Delays – Existing plus Project and Existing plus Project with Mitigation Measure M-TR-2

	Existing plus Project		Existing plus Project with Mitigation Measure M-TR-2	
Peak hour	**Existing Ramps[1, 2] miles (minutes:seconds)**	**Proposed Ramps[1,2] miles (minutes:seconds)**	**Existing Ramps[3] (minutes:seconds)**	**Proposed Ramps miles (minutes:seconds)**
AM	0.45 **(2:06)**	1.23 **(5:12)**	0.07 (0:30)	0.81 **(3:24)**
PM	0.45 **(2:06)**	1.10 **(4:54)**	0.07 **(0:48)**	0.54 **(2:36)**
Saturday[4]	0.68 **(2:54)**	0.00 (0:00)	0.37 **(2:24)**	0.00 (0:00)

Notes:

[1] Delays greater than 35 seconds per vehicle highlighted in **bold**.

[2] Includes planned reconstruction of the eastbound ramps on the east side of Yerba Buena Island as part of the Bay Bridge East Span project.

[3] Delays for the Existing, Stop-Controlled ramps are shown in Table IV.E.12 as operating at greater than 80 second delays and LOS F; calculated distances do not reflect this more detailed analysis and therefore are not shown here to avoid confusion.

[4] Ramp metering not assumed to be in operation during the Saturday peak hour.

Source: Fehr & Peers, 2010.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the Proposed Project's impacts on ramp delays at the ramp meter at the reconstructed westbound on-ramp would be reduced by nearly one-half. However, as illustrated in Table IV.E.14, above, vehicles would still experience delays consistent with LOS E and LOS F operations, and the Proposed Project's impacts on delay approaching the on-ramps would remain significant and unavoidable.

Impact TR-5: Under conditions without and with the Ramps Project, implementation of the Proposed Project would result in less than significant impacts at three ramp locations. *(Less than Significant)*

Under conditions without and with the Ramps Project, the eastbound on-ramp and the eastbound off-ramp on the east side of Yerba Buena Island, and the westbound off-ramp on the east side of Yerba Buena Island would operate at acceptable levels under Existing plus Project conditions (see Table IV.E.11). Therefore, the Proposed Project would result in less-than-significant impacts at these three ramps.

In summary, the Proposed Project would result in significant and unavoidable impacts to the eastbound off-ramp (west side) irrespective of whether the Ramps Project or Mitigation Measure M-TR-2 is implemented. Furthermore, if the Ramps Project is not implemented, the Proposed Project would result in significant and unavoidable impact to the westbound on-ramps (both sides of Yerba Buena Island) irrespective of whether Mitigation Measure M-TR-2 is implemented. On the other hand, if the Ramps Project is implemented, the Proposed Project would result in a significant and unavoidable impact to the westbound on-ramp on the east side of Yerba Buena Island only, irrespective of whether Mitigation Measure M-TR-2 is implemented. This is because the westbound on-ramp on the west side of Yerba Buena Island would be converted to a transit- and emergency vehicle-only ramp and all traffic destined for San Francisco would be funneled to the westbound on-ramp on the east side of Yerba Buena Island where it would be constrained by the metering lights. The Proposed Project would result in less than significant impacts at the eastbound on-ramp, eastbound off-ramp, and westbound off-ramp on the east side of Yerba Buena Island.

Bay Bridge Operations – Queuing at Toll Plaza Approaches

Impact TR-6: Implementation of the Proposed Project would result in a significant impact on queuing at the Bay Bridge toll plaza during the weekday AM peak hour, with and without the Ramps Project. *(Significant and Unavoidable with Mitigation)*

With the addition of Proposed Project traffic, some vehicles that would otherwise be on the Bay Bridge would be displaced, increasing queues at the toll plaza in the East Bay. For example, if the Bay Bridge operates at capacity in the westbound direction during the AM peak hour today, and a project on the Islands were to add 50 vehicles to the westbound on-ramp on Yerba Buena Island, those trips would displace 50 vehicles that would otherwise be able to travel westbound on the Bay Bridge. This would increase the westbound queue at the Bay Bridge toll plaza by 50 vehicles. A similar phenomenon would occur in the opposite direction in the PM peak hour, with project-generated traffic adding to queues on the eastbound approaches to the Bay Bridge, including surface streets in downtown San Francisco (equal to the number of vehicles the Proposed Project adds to downtown streets). The latter phenomenon is discussed under Impact TR-7.

The Proposed Project would add approximately 471 net new westbound vehicle trips to the critical sections of the Bay Bridge operating at capacity during the AM peak hour. These new trips would displace a similar amount of traffic on the Bay Bridge and increase queues on the westbound approach in the AM peak hour by approximately 471 vehicles. The Proposed Project's increase to queues approaching the Bay Bridge from the East Bay in the AM peak hour would be considered significant.

Although Caltrans generally aims to work cooperatively with local jurisdictions regarding ramp metering, Caltrans retains the ultimate control of both the proposed ramp meters on Yerba Buena Island and the Bay Bridge toll plaza metering lights. It is possible that, in consultation with TITMA, Caltrans would reduce the metering rate for the on-ramps on Yerba Buena Island and allow more traffic to enter the Bay Bridge from the East Bay. This would reduce the Proposed Project's impacts on queuing at the East Bay toll plaza, but would increase queues on the Islands. The analysis presented in this report describes a worst case for bridge and queuing conditions at the East Bay toll plaza; spillover effects in the East Bay outside of the toll plaza and its approaches are expected to be minimal.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the Proposed Project's impacts on queues approaching the Bay Bridge from the East Bay would be reduced. This mitigation measure would reinforce the proposed TDM strategies (such as travel coordinator, prepaid transit vouchers, congestion pricing, guaranteed ride home) designed to reduce use of single-occupant vehicles and to increase the use of transit (see TDM Plan in Section "Transportation Improvements Assumed in the Analysis" on pp. IV.E.30-IV.E.47). However, the Proposed Project would continue to increase queues on the East Bay bridge approaches during the AM peak hour, which would be a significant and unavoidable impact.

Bay Bridge Operations – Queuing on San Francisco Streets Approaches to Bay Bridge

Impact TR-7: Implementation of the Proposed Project would result in a significant impact on queuing on San Francisco streets approaching Bay Bridge during the weekday PM peak hour, under conditions with and without the Ramps Project. ***(Significant and Unavoidable with Mitigation)***

With implementation of the Proposed Project, queues approaching the eastbound Bay Bridge from surface streets in San Francisco in the PM peak hour would increase by approximately 523 vehicles, although this unserved demand would be dispersed among multiple surface streets in San Francisco approaching the bridge. The Proposed Project's increase to queues approaching the Bay Bridge from downtown San Francisco in the PM peak hour would be considered a significant impact.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the Proposed Project's impacts to queues approaching the Bay Bridge from downtown San Francisco would be reduced. However, the Proposed Project would continue to increase queues on the bridge approaches from downtown San Francisco during the PM peak hour, which would be considered a significant and unavoidable impact.

In summary, the Proposed Project would have significant and unavoidable impacts on queuing at the toll plaza and on San Francisco streets approaching the Bay Bridge during the AM and PM peak hours, respectively. These impacts would occur irrespective of whether or not the Ramps Project was implemented. While Mitigation Measure M-TR-2 would somewhat reduce this impact, it would remain significant and unavoidable.

Intersection Traffic Impacts

Under Existing plus Project conditions, Proposed Project impacts were assessed by comparing conditions with the Proposed Project, to existing conditions without the Proposed Project. The Proposed Project was determined to have a significant traffic impact at an intersection if Proposed Project-generated trips would cause an intersection operating at LOS D or better under existing conditions to operate at LOS E or LOS F, or intersections operating at LOS E under existing conditions to deteriorate to LOS F conditions. At intersections that currently operate at LOS E or LOS F under Existing Conditions, and would continue to operate at LOS E or LOS F with the Proposed Project, the increase in Proposed Project vehicle trips was reviewed to determine whether the increase would contribute considerably to critical movements operating at LOS E or LOS F. The "Approach to Analysis" discussion, p. IV.E.47, presents the methodology used to determine Proposed Project impacts and whether the Proposed Project would contribute considerably to intersections currently operating at LOS E or LOS F conditions.

Table IV.E.15 presents the comparison of intersection LOS for Existing and Existing plus Project conditions. The results indicate that of the 17 study intersections, the Proposed Project would result in significant impacts at nine intersections.

- The Proposed Project would result in project-specific impacts at six signalized study intersections that operate at LOS D or better under Existing conditions and would deteriorate to LOS E or LOS F under Existing plus Project conditions, or that operate at LOS E under Existing conditions and would deteriorate to LOS F under Existing plus Project conditions (Impact TR-8 through Impact TR-13).
- The Proposed Project would contribute considerably to critical movements at one signalized study intersection that operates at LOS E or LOS F under Existing conditions and would continue to operate at LOS E or LOS under Existing plus Project conditions, resulting in a project-specific impact (Impact TR-14).
- The Proposed Project would have less than significant contributions at three signalized study intersections that operate at LOS E or LOS F under Existing conditions and that would continue to operate at LOS E or LOS F under Existing plus Project conditions (Impact TR-15).
- The Proposed Project would have less than significant impacts at five signalized intersections that would operate at LOS D or better under Existing plus Project conditions (Impact TR-16).
- The Proposed Project would contribute considerably to two uncontrolled study intersections that operate poorly under Existing conditions, resulting in a project-specific impact (Impact TR-17 and Impact TR-18)

Table IV.E.15: Intersection Levels of Service – Existing and 2030 Cumulative Conditions

Intersection	Peak hour	Existing			Existing plus Project			2030 Cumulative No Project			2030 Cumulative plus Project		
		Delay[1]	LOS[2]	v/c	Delay[1]	LOS[2]	v/c	Delay[1]	LOS[2]	v/c	Delay[1]	LOS[2]	v/c
1. Fremont/Howard	AM	17.8	B	0.78	19.2	B	0.81	38.5	D	1.01	47.3	D	1.04
	PM	44.1	D	0.96	46.3	D	0.99	**>80**	**F**	**1.29**	**>80**	**F**	**1.32**
	Sat	13.2	B	0.51	14.1	B	0.57	17.3	B	0.68	20.4	C	0.74
2. Fremont/Folsom	AM	28.9	C	0.68	30.4	C	0.71	**>80**	**F**	**1.56**	**>80**	**F**	**1.60**
	PM	23.9	C	0.41	24.5	C	0.46	32.7	C	0.59	33.2	C	0.64
	Sat	20.4	C	0.17	20.8	C	0.23	21.2	C	0.23	21.6	C	0.29
3. Fremont/I-80 WB Off-Ramp/Harrison	AM	10.9	B	0.36	11.0	B	0.39	**>80**	**F**	**2.87**	**>80**	**F**	**2.89**
	PM	25.1	C	0.80	29.5	C	0.86	32.9	C	0.88	35.1	D	0.92
	Sat	10.4	B	0.20	10.7	B	0.23	10.9	B	0.24	11.2	B	0.28
4. First/Market	AM	33.4	C	0.70	43.8	D	0.72	**>80**	**F**	**1.10**	**>80**	**F**	**1.12**
	PM	**72.8**	**E**	**0.81**	**>80**	**F**	**0.91**	**>80**	**F**	**0.95**	**>80**	**F**	**1.14**
	Sat	18.5	B	0.58	28.0	C	0.61	28.9	C	0.66	**55.0**	**E**	**0.71**
5. First/Mission	AM	14.8	B	0.77	15.2	B	0.79	21.1	C	0.93	49.2	D	1.03
	PM	**67.8**	**E**	**0.88**	**>80**	**F**	**0.94**	**>80**	**F**	**1.18**	**>80**	**F**	**1.24**
	Sat	16.3	B	0.55	21.1	C	0.75	22.0	C	0.80	26.3	C	0.84
6. First/Howard	AM	14.6	B	0.79	15.4	B	0.82	**>80**	**F**	**1.38**	**>80**	**F**	**1.39**
	PM	**73.7**	**E**	**1.12**	**74.5**	**E**	**1.13**	**>80**	**F**	**2.18**	**>80**	**F**	**2.19**
	Sat	22.2	C	0.42	19.3	B	0.48	13.1	B	0.61	15.9	B	0.66
7. First/Folsom	AM	12.1	B	0.52	12.0	B	0.53	19.1	B	0.81	19.1	B	0.83
	PM	**70.6**	**E**	**1.14**	**>80**	**F**	**1.26**	**>80**	**F**	**1.45**	**>80**	**F**	**1.57**
	Sat	17.3	B	0.33	17.6	B	0.38	6.1	A	0.47	7.0	A	0.52
8. First /Harrison/I-80 EB On-Ramp	AM	29.0	C	0.63	28.4	C	0.66	25.5	C	0.83	26.7	C	0.87
	PM	**>80**	**E**	**1.29**	**>80**	**F**	**1.42**	**>80**	**F**	**1.41**	**>80**	**F**	**1.53**
	Sat	10.7	B	0.55	13.3	B	0.63	26.0	C	0.71	44.6	D	0.80
9. Essex/Harrison /I-80 EB On-Ramp[3]	AM	7.4	A	0.37	7.5	A	0.39	18.3	B	0.69	18.2	B	0.71
	PM	**>80**	**F**	1.22	**>80**	**F**	**1.31**	**>80**	**F**	**1.48**	**>80**	**F**	**1.49**
	Sat	15.1	B	0.36	15.6	B	0.39	21.2	B	0.63	23.0	C	0.68
10. Second/Folsom	AM	13.4	B	0.50	13.5	B	0.51	**>80**	**F**	**1.25**	**>80**	**F**	**1.27**
	PM	**59.4**	**E**	**0.93**	**68.0**	**E**	**0.99**	**>80**	**F**	**1.53**	**>80**	**F**	**1.59**
	Sat	14.8	B	0.34	14.9	B	0.39	21.2	C	0.56	23.1	C	0.61
11. Second/Bryant	AM	11.1	B	0.37	11.1	B	0.38	34.6	C	0.74	41.1	D	0.76
	PM	32.4	C	0.90	32.8	C	0.92	**57.4**	**E**	**1.11**	**63.0**	**E**	**1.15**
	Sat	11.5	B	0.38	11.6	B	0.39	12.1	B	0.44	12.2	B	0.45

Table IV.E.15 (continued)

Intersection	Peak hour	Existing			Existing plus Project			2030 Cumulative No Project			2030 Cumulative plus Project		
		Delay[1]	LOS[2]	v/c	Delay[1]	LOS[2]	v/c	Delay[1]	LOS[2]	v/c	Delay[1]	LOS[2]	v/c
12. The Embarcadero / Harrison	AM	**68.6**	**E**	**0.81**	**68.5**	**E**	**0.81**	**>80**	**F**	**0.88**	**>80**	**F**	**0.88**
	PM	38.5	D	0.85	48.6	D	0.85	**>80**	**F**	**1.22**	**>80**	**F**	**1.22**
	Sat	12.0	B	0.39	12.2	B	0.40	14.9	B	0.51	15.0	B	0.52
13. Bryant /Fifth /I-80 EB On-Ramp[3]	AM	22.0	C	0.56	23.5	C	0.58	>**80**	**F**	**1.27**	**>80**	**F**	**1.27**
	PM	>**80**	**F**	**1.65**	**>80**	**F**	**1.74**	**>80**	**F**	**2.49**	**>80**	**F**	**2.51**
	Sat	53.2	D	0.70	**61.3**	**E**	**0.73**	53.4	D	0.93	**73.3**	**E**	**1.05**
14. Harrison /Fifth /I-80 WB Off-Ramp	AM	25.1	C	0.51	26.7	C	0.54	31.6	C	0.67	34.7	C	0.71
	PM	51.0	D	0.89	**63.5**	**E**	**0.93**	**>80**	**F**	**1.01**	**>80**	**F**	**1.11**
	Sat	25.9	C	0.56	25.2	C	0.62	29.4	C	0.79	33.1	C	0.84
15. Avenue of the Palms/First Street [4]	AM				18.1	B	0.85						
	PM				40.5	D	1.03						
	Sat				50.6	D	1.09						

Notes:

[1] Whole intersection weighted average stopped delay expressed in seconds per vehicle calculated using methods described in the *2000 HCM*. In rare cases, if the Proposed Project adds traffic to movements with lower average delay than the average delay for the entire intersection, the Proposed Project could result in lower average delay per vehicle than the "No Project" condition.

[2] Intersections operating at LOS E or LOS F conditions highlighted in **bold.**

[3] Intersections 9 and 14 are uncontrolled intersections without stop signs or traffic signals; therefore, a level-of-service analysis is not applicable and these intersections are not included in this table.

[4] Since the Proposed Project would substantially change travel patterns onto and off of the Island, this intersection at Avenue of the Palms/First Street on Treasure Island was not analyzed under Existing Conditions.

Source: Fehr & Peers, 2010

Impact TR-8: Implementation of the Proposed Project would result in a significant project impact at the signalized intersection of First/Market. *(Significant and Unavoidable with Mitigation)*

During the PM peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of First/Market to deteriorate from LOS E to LOS F, resulting in a significant project impact. The degradation in LOS at this intersection would primarily be due to increases to the southbound through traffic, which combined with existing evening commute traffic destined for the Bay Bridge, would cause the intersection to deteriorate to unacceptable conditions.

Traffic signals at this intersection are timed to prioritize transit movements on Market Street. As a result, modifications to signal timing to provide more capacity for southbound traffic would likely impact transit operations on Market Street, which would be inconsistent with the City's Transit First policy. Further, providing additional traffic lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment provided on Market Street.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but it would continue to operate at LOS F conditions during the PM peak hour. The Proposed Project's traffic impact at the study intersection of First/Market would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-9: Implementation of the Proposed Project would result in a significant project impact at the signalized intersection of First/Mission. *(Significant and Unavoidable with Mitigation)*

During the PM peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of First/Mission to deteriorate from LOS E to LOS F conditions, resulting in a significant project impact. The degradation in LOS at this intersection would primarily be due to increases to the southbound through traffic, which, combined with existing evening commute traffic destined for the Bay Bridge, would deteriorate conditions to unacceptable levels.

Traffic signals at this intersection are timed to prioritize transit movements on Mission Street. As a result, modifications to signal timing to provide more capacity for southbound traffic would likely impact transit operations on Mission Street, which would be inconsistent with the City's Transit First policy. Providing additional traffic lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment encouraged by the City of San Francisco and proposed as part of the Transit Center District Plan currently under study.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but it would continue to operate at LOS F conditions during the PM peak hour. The Proposed Project's traffic impacts at the study intersection of First/Mission would therefore, remain significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-10: Implementation of the Proposed Project would result in a significant project impact at the signalized intersection of First/Folsom. ***(Significant and Unavoidable with Mitigation)***

During the PM peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of First/Folsom to deteriorate from LOS E to LOS F conditions, resulting in a significant project impact. The degradation in LOS at this intersection would primarily be due to Proposed Project-related traffic increases along First Street destined to the Bay Bridge on-ramp at First/Harrison. Travel lane capacity at this intersection has been maximized, and providing additional travel lanes would require substantial reduction in sidewalk widths, which would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco and proposed as part of the Transit Center District Plan currently under study.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but it would continue to operate at LOS F conditions during the PM peak hour. The Proposed Project's traffic impacts at the study intersection of First/Folsom would therefore, remain significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-11: Implementation of the Proposed Project would result in a significant project impact at the signalized intersection of First/Harrison/I-80 Eastbound On-Ramp. ***(Significant and Unavoidable with Mitigation)***

During the PM peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of First/Harrison/I-80 Eastbound On-Ramp to deteriorate from LOS E to LOS F conditions, resulting in a significant project impact. The degradation in LOS at this intersection would primarily be due to Proposed Project-related traffic increases along First Street destined to the Bay Bridge on-ramp. Travel lane capacity at this intersection has been maximized, and providing additional travel lanes at these intersections would require substantial reduction in sidewalk widths, which would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but it would continue to operate at LOS F conditions during the

PM peak hour. The Proposed Project's traffic impact at the study intersection of First/Harrison/I-80 Eastbound On-Ramp would therefore, remain significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-12: Implementation of the Proposed Project would result in a significant project impact at the signalized intersection of Bryant/Fifth/I-80 Eastbound On-Ramp. *(Significant and Unavoidable with Mitigation)*

During the Saturday peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of Bryant/Fifth/I-80 Eastbound On-Ramp to deteriorate from LOS D to LOS E conditions, resulting in a significant project impact. In addition, with implementation of the Proposed Project, the intersection would continue to operate at LOS F conditions during the PM peak hour. The Proposed Project contribution to traffic volumes at the critical movements was examined and it was determined that the Proposed Project vehicle trips would contribute considerably to the critical movements, thereby resulting in a significant project impact.

The degradation in LOS at this intersection is primarily due to increases to the southbound through traffic and to northbound traffic on Fifth Street turning onto the I-80 Eastbound On-Ramp. Providing additional travel lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment encouraged by the City of San Francisco. Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but the intersection would continue to operate at LOS E during the Saturday peak hour and at LOS F during the PM peak hour, and the Proposed Project would continue to substantially contribute to these poor operating conditions during the PM peak hour. Therefore, no feasible mitigation measures have been identified to reduce Proposed Project's impacts to less than significant levels, and the traffic impact at this intersection would remain significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-13: Implementation of the Proposed Project would result in a significant project impact at the signalized intersection of Fifth/Harrison/I-80 Westbound Off-Ramp. *(Significant and Unavoidable with Mitigation)*

During the PM peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of Fifth/Harrison/I-80 Westbound Off-Ramp to deteriorate from LOS D to LOS E, resulting in a significant project impact. The degradation in LOS at this intersection would primarily be due to Proposed Project-related traffic increases along Fifth Street to and from the I-80 ramps at Fifth Street. Travel lane capacity at this intersection has been maximized, and providing additional travel lanes would require substantial reduction in sidewalk widths, which would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but it would continue to operate at LOS E conditions during the PM peak hour. The Proposed Project's traffic impact at the study intersection of Fifth/Harrison/I-80 Westbound Off-Ramp would therefore remain significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-14: Implementation of the Proposed Project would contribute substantially to existing LOS E conditions at the signalized intersection of Second/Folsom, resulting in a significant project impact. ***(Significant and Unavoidable with Mitigation)***

With implementation of the Proposed Project, the intersection of Second/Folsom would continue to operate at LOS E conditions during the PM peak hour. The Proposed Project contribution to traffic volumes at the critical movements was examined and it was determined that the Proposed Project vehicle trips would contribute considerably at the critical movements that operate poorly. Specifically, the Proposed Project would contribute substantially to the critical southbound left-turn movement, and therefore, the Proposed Project's contribution to poor operating conditions at this intersection would be considered significant.

Providing additional travel lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment, encouraged by the City of San Francisco and proposed as part of the Transit Center District Plan currently under study. Implementation of the Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but the intersection would continue to operate at LOS E during the PM peak hour, resulting in a significant and unavoidable impact. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-15: Implementation of the Proposed Project would have less than significant impacts at three signalized study intersections that operate at LOS E or LOS F under Existing Conditions. ***(Less than Significant)***

With implementation of the Proposed Project, the intersections of First/Howard, Essex/Harrison/I-80 Eastbound On-ramp, and The Embarcadero/Harrison would continue to operate at LOS E or LOS F conditions. The Proposed Project contribution to traffic volumes at critical movements at these intersections was examined, and it was determined that Proposed Project vehicle trips would not add considerable traffic to these intersections, and therefore, impacts to these intersections would be less than significant. No mitigation measures would be required.

Impact TR-16: Implementation of the Proposed Project would have less than significant impacts at five signalized study intersections that would operate at LOS D or better under Existing plus Project Conditions. *(Less than Significant)*

With implementation of the Proposed Project, the intersections of Fremont/Howard, Fremont/Folsom, Fremont/I-80 Westbound Off-Ramp/Harrison, Second/Bryant, Avenue of the Palms/First Street would continue to operate at LOS D or better during the AM, PM and Saturday peak hours. Therefore, impacts to these intersections would be less than significant. No mitigation measures would be required.

Impact TR-17: Implementation of the Proposed Project would result in a significant project impact at the uncontrolled study intersection of Folsom/Essex. *(Significant and Unavoidable with Mitigation)*

The study intersection of Folsom/Essex is not currently controlled by either traffic signals or STOP signs, and both approaches to the intersection are uncontrolled. During the weekday PM peak hour, the intersection is affected by PM peak period traffic destined to the Bay Bridge eastbound on-ramps at Harrison Street and at Bryant Street. During the PM peak period, queues form on the approaches to the on-ramps that spill back into the intersection, resulting in queued operations within the travel lanes serving the on-ramps. Implementation of the Proposed Project would add vehicles to these existing queues, and contributions to the queued operations would be considered a significant impact.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce the number of Proposed Project vehicles that would travel through this intersection; however, it would continue to operate at queued conditions and the Proposed Project would continue to substantially contribute to these queues. The Proposed Project's traffic impacts at the uncontrolled intersection of Folsom/Essex would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-18: Implementation of the Proposed Project would result in a significant project impact at the uncontrolled study intersection of Bryant/Sterling. *(Significant and Unavoidable with Mitigation)*

The study intersection of Bryant/Sterling is not currently controlled by either traffic signals or STOP signs, and both approaches to this intersection are uncontrolled. During the weekday PM peak hour, both intersections are affected by PM peak period traffic destined to the Bay Bridge eastbound on-ramps at Harrison Street and at Bryant Street. During the PM peak period, queues form on the approaches to the on-ramps that spill back to the intersection, resulting in queued operations within the travel lanes serving the on-ramps. Implementation of the Proposed Project would add vehicles to these existing queues, and contributions to the queued operations would be considered a significant impact.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce the number of Proposed Project vehicles that would travel through this intersection; however, it would continue to operate at queued conditions and the Proposed Project would continue to substantially contribute to these queues. The Proposed Project's traffic impacts at the intersection of Bryant/Sterling would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Transit Impacts

Capacity Utilization Impacts

The Proposed Project would include improvements to transit service between the Islands and San Francisco, and between the Islands and Oakland, which would increase the transit capacity serving the Islands. Improvements would include:

- New ferry service from a new Transit Hub located on the western shore of Treasure Island. Ferries would operate with 50-minute headways to and from downtown San Francisco between 5 AM and 9 PM (corresponding to a single ferry operating between Treasure Island and one of the existing docks in San Francisco);
- Muni bus line 108-Treasure Island would operate at its current 15-minute peak headway, but would no longer circulate around most of Treasure Island. Instead, it would circulate only around the Transit Hub and Island Core neighborhood. The 108-Treasure Island would continue to operate 24-hours per day, including overnight owl service;
- New bus transit service operating between the Islands and downtown Oakland (operated by AC Transit) at approximately 10-minute headways during peak hours and less frequent service during off-peak hours; generally, bus service to Oakland would be provided between approximately 5 AM and 10 PM; and,
- A fleet of alternative fuel shuttle-buses that circulate throughout the Islands, with timed transfers at the Transit Hub offering fare-free rides to residents and visitors of the Islands.

Combined, the improvements would provide an overall transit capacity of 1,415 passengers per hour per direction (eastbound/westbound), including 839 passengers per hour by ferry and 576 passengers per hour by bus (including 324 passengers on AC Transit and 252 passengers on Muni). Table IV.E.16 shows the capacity by transit provider and by direction. Implementation of the Proposed Project would result in a total of 1,460 transit trips during the AM peak hour, 1,998 transit trips during the PM peak hour, and 1,290 transit trips during the Saturday peak hour.

Table IV.E.16: Existing and Existing plus Project Transit Ridership and Capacity Utilization

Route	Existing			Existing plus Project		
	Capacity	Rider-ship	% Utilization [1]	Capacity	Rider-ship	% Utilization[1]
AM Peak Hour						
AC Transit EB [2]	N/A	N/A	N/A	324	107	33%
AC Transit WB [2]	N/A	N/A	N/A	324	67	21%
Muni EB Bus Service from SF[3]	252	51	20%	**252**	**261**	**104%**
Muni WB Bus Service to SF[3]	252	145	58%	**252**	**384**	**152%**
Ferry EB [4]	N/A	N/A	N/A	839	238	28%
Ferry WB [4]	N/A	N/A	N/A	839	403	48%
PM Peak Hour						
AC Transit EB	N/A	N/A	N/A	324	96	30%
AC Transit WB	N/A	N/A	N/A	324	134	41%
Muni EB Bus Service from SF	252	121	48%	**252**	**515**	**204%**
Muni WB Bus Service to SF	252	153	61%	**252**	**431**	**171%**
Ferry EB	N/A	N/A	N/A	839	479	57%
Ferry WB	N/A	N/A	N/A	839	343	41%
Saturday Peak Hour						
AC Transit EB	N/A	N/A	N/A	324	79	24%
AC Transit WB	N/A	N/A	N/A	324	90	28%
Muni EB Bus Service from SF	189	86	46%	**189**	**328**	**174%**
Muni WB Bus Service to SF	189	133	70%	**189**	**320**	**169%**
Ferry EB	N/A	N/A	N/A	839	221	26%
Ferry WB	N/A	N/A	N/A	839	252	30%

Notes:

N/A = Not Applicable

[1] **Bold** indicates capacity utilization exceeds 85 percent capacity utilization standard for the Muni line 108-Treasure Island, and 100 percent capacity utilization standard for new ferry and AC Transit service. Exceedance of the capacity utilization standard is considered a significant impact.

[2] New AC Transit bus service between the Islands and downtown Oakland at 10-minute peak headways.

[3] Muni line 108-Treasure Island service at 15-minute headways during peak periods.

[4] New ferry service between Treasure Island and San Francisco at 50-minute peak headways.

Source: Fehr & Peers, 2010.

Impact TR-19: Implementation of the Proposed Project would exceed the available transit capacity of Muni's 108-Treasure Island bus line serving the Islands. *(Significant and Unavoidable with Mitigation)*

Table IV.E.16 summarizes the total ridership and capacity utilization for each transit provider serving the Islands (i.e., Muni line 108-Treasure Island, new ferry line, and new AC Transit line) for the weekday AM and PM peak hours, and for the Saturday peak hour. The total transit travel demand on Muni buses would not be accommodated during the three peak hours of analysis, and the 108-Treasure Island bus line would exceed Muni's capacity utilization standard of 85 percent. Since Muni bus service between the Islands and San Francisco would exceed Muni's standard of 85 percent capacity utilization during the AM, PM and Saturday peak hours, the Proposed Project's impact to transit capacity would be considered a significant impact. If the unserved demand for the 108-Treasure Island service shifted to the ferry, the combined bus and ferry demand would be 72 percent of the combined bus and ferry capacity between the Islands and San Francisco during the AM peak hour, and 91 percent of total capacity during the PM peak hour from San Francisco to the Islands. During the Saturday peak hour, the combined bus and ferry demand would be 53 percent of the combined bus and ferry capacity to the Islands from San Francisco, and would be 56 percent of capacity from the Islands to San Francisco.

With implementation of Mitigation Measure M-TR-2, the Proposed Project's transit demand would be accommodated within Muni because there would be more frequent Muni service and corresponding increases in capacity. Therefore, implementation of Mitigation Measure M-TR-2 described on pp. IV.E.74 would create sufficient capacity on Muni to accommodate all the riders generated by the Proposed Project, as shown in Table IV.E.17. However, because full funding for this Expanded Transit Service has not yet been identified, its implementation remains uncertain. Accordingly, Proposed Project impacts to transit capacity would remain significant and unavoidable.

Impact TR-20: Implementation of the Proposed Project would not exceed the transit capacity of the proposed new AC Transit bus line serving the Islands. *(Less than Significant)*

As indicated on Table IV.E.16, the capacity utilization for the proposed AC Transit service between downtown Oakland and the Islands would generally be between 20 and 40 percent during the peak hours. Proposed Project transit capacity utilization impacts on the proposed AC Transit bus service would therefore be less than significant.

Impact TR-21: Implementation of the Proposed Project would not exceed the transit capacity of the proposed new ferry line serving Treasure Island. *(Less than Significant)*

As indicated on Table IV.E.16, the capacity utilization for the proposed ferry service between downtown San Francisco and Treasure Island would generally be between 30 and 60 percent during the weekday AM and PM peak hours, and between 25 and 30 percent during the Saturday peak hour. Proposed Project transit capacity utilization impacts on the proposed ferry service would therefore be less than significant.

Table IV.E.17: Transit Ridership and Capacity Utilization – Existing plus Project and Existing plus Project with Mitigation Measure M-TR-2

Route	Existing plus Project			Existing plus Project with Mitigation Measure M-TR-2		
	Capacity	Rider-ship	% Utilization [1]	Capacity	Rider-ship	% Utilization
AM Peak Hour						
AC Transit EB [2]	324	107	33%	324	175	54%
AC Transit WB [2]	324	67	21%	324	110	34%
Muni EB Bus Service from SF[3]	**252**	**261**	**104%**	1,121	394	35%
Muni WB Bus Service to SF[3]	**252**	**384**	**152%**	1,121	595	53%
Ferry EB [4]	839	238	28%	2,796	359	13%
Ferry WB [4]	839	403	48%	2,796	599	21%
PM Peak Hour						
AC Transit EB	324	96	30%	324	163	50%
AC Transit WB	324	134	41%	324	228	70%
Muni EB Bus Service from SF[1]	**252**	**515**	**204%**	1,443	810	56%
Muni WB Bus Service to SF[1]	**252**	**431**	**171%**	1,443	642	44%
Ferry EB	839	479	57%	2,796	719	26%
Ferry WB	839	343	41%	2,796	516	18%
Saturday Peak Hour						
AC Transit EB	324	79	24%	324	132	41%
AC Transit WB	324	90	28%	324	151	47%
Muni EB Bus Service from SF[1]	**189**	**328**	**174%**	1,443	525	36%
Muni WB Bus Service to SF[1]	**189**	**320**	**169%**	1,443	489	34%
Ferry EB	839	221	26%	2,796	385	14%
Ferry WB	839	252	30%	2,796	334	12%

Notes:
[1] **Bold** indicates capacity utilization exceeds 85 percent capacity utilization standard for the Muni line 108-Treasure Island, and 100 percent capacity utilization standard for new ferry and AC Transit service.
[2] New AC Transit bus service between the Islands and downtown Oakland at 10-minute peak headways.
[3] 108-Treasure Island service at 15-minute headways during peak periods for Proposed Project, and 7-minute headways in AM peak and 5-minutes in PM peak under Expanded Transit Service mitigation measure.
[4] New ferry service between Treasure Island and San Francisco at 50-minute peak headways for the Proposed Project, and 15-minute headways in AM and PM peak for Expanded Transit Service mitigation measure.

Source: Fehr & Peers, 2010.

Impact TR-22: Implementation of the Proposed Project would add transit trips to the San Francisco downtown screenlines; however, this would not increase demand in excess of available capacity. *(Less than Significant)*

The Proposed Project would not adversely affect the capacity at the four downtown screenlines; however, a portion of the Proposed Project trips would cross the screenlines and contribute to total Muni ridership. Table IV.E.18 summarizes the capacity utilization for the downtown screenlines for the weekday AM and PM peak hours for the Existing plus Project and Cumulative plus Project conditions. Although the Proposed Project is expected to generate a substantial number of transit riders, Proposed Project-generated transit riders transferring to or from downtown lines would more likely be traveling in off-peak directions. For example, during the AM peak hour, the peak direction of transit riders generated by the Proposed Project would be from the Islands into downtown San Francisco, which would not adversely affect the screenlines. Those riders continuing on transit to other destinations from downtown San Francisco would travel in the “outbound” direction, away from downtown San Francisco. This would be in the off-peak direction for the downtown screenlines, when peak transit flows would be in the “inbound” direction during the AM peak hour. The reverse phenomenon occurs during the PM peak hour.

As shown in Table IV.E.18, the Proposed Project’s contribution to ridership in the peak direction to the downtown screenlines would be relatively small. With the addition of the Proposed Project trips, all downtown screenlines would continue to operate within Muni’s 85 percent utilization standard. Therefore, the Proposed Project impacts on transit capacity at the downtown screenlines would be less than significant, and no mitigation would be required.

Impact TR-23: Implementation of the Proposed Project would add transit trips to AC Transit, BART, Golden Gate Transit, SamTrans, Caltrain and other ferry lines; however, this would not increase demand in excess of available capacity. *(Less than Significant)*

A portion of the new transit trips generated by the Proposed Project would transfer from the 108-Treasure Island and new ferry line to other regional transit operators including AC Transit, BART, Golden Gate Transit, SamTrans, Caltrain, and other ferry lines. Similar to the impact assessment presented above in Impact TR-22 for the Muni downtown screenlines, Proposed Project-generated transit riders transferring to other regional operators would more likely be traveling in the off-peak direction, for which there is generally available capacity. Some transit riders traveling to and from the Islands may travel on regional transit lines in the peak direction, but the number of riders would be negligible and would not substantially affect screenlines for regional transit providers.

Table IV.E.18: Muni Downtown Screenlines Existing and 2030 Cumulative Conditions

	Existing			Existing plus Project			2030 Cumulative No Project			2030 Cumulative Plus Proposed Project		
	Riders	**Capacity**	**% Utilization**	**Project Trips**	**Total Riders**	**% Utilization**	**Total Riders**	**Capacity**	**% Utilization**	**Project Trips**	**Total Riders**	**% Utilization**
AM Peak Hour												
Northeast	1,882	3,781	50%	17	1,899	50%	2,986	3,857	77%	17	3,003	78%
Northwest	7,434	11,437	65%	44	7,478	65%	8,891	11,983	74%	44	8,935	75%
Southwest	4,248	6,301	67%	89	4,337	69%	7,420	10,197	73%	89	7,509	74%
Southeast	6,627	8,699	76%	10	6,637	76%	7,661	10,045	76%	10	7,671	76%
Total	**20,191**	**30,218**	**67%**	**160**	**20,351**	**67%**	**26,958**	**36,082**	**75%**	**160**	**27,118**	**75%**
PM Peak Hour												
Northeast	1,186	3,599	33%	25	1,211	34%	3,105	4,699	66%	25	3,130	67%
Northwest	6,621	10,123	65%	65	6,686	66%	8,064	11,612	69%	65	8,129	70%
Southwest	4,668	7,028	66%	130	4,798	68%	8,052	9,940	81%	130	8,182	82%
Southeast	7,434	9,623	77%	14	7,448	77%	8,809	10,703	82%	14	8,823	82%
Total	**19,909**	**30,373**	**66%**	**234**	**20,143**	**66%**	**28,030**	**36,954**	**76%**	**234**	**28,264**	**76%**

Source: Transit Center District Plan – Transit Network Analysis, AECOM, 2009, Fehr & Peers, 2010.

For example, during the AM peak hour, the majority of Proposed Project-generated transit trips would be traveling off of the Islands. Those traveling to the East Bay would take the new AC Transit bus line to downtown Oakland, and then transfer to BART to continue to destinations served by BART. These BART trips would be in the off-peak direction for BART in the AM peak hour. Similarly, trips destined for points served by BART in San Francisco and the Peninsula would take either the Muni line 108-Treasure Island bus or the new ferry line into downtown San Francisco. From there they would transfer to BART and travel away from downtown San Francisco, which is also the off-peak direction in the AM peak hour. The reverse would occur during the PM peak hour, when transit riders returning to the Islands would travel in the off-peak direction to access the Muni line 108-Treasure Island, the new AC Transit line, or the new ferry service. For example, transit riders returning to the Ferry Building from Peninsula destinations on BART would be traveling in the off-peak direction for BART in the PM peak hour.

Since Proposed Project-generated transit riders transferring to other lines would be dispersed over multiple operators and lines, and since these trips would primarily occur in the off-peak direction of transit demand, the additional trips would not substantially affect the peak direction capacity utilization of regional providers. Therefore, impacts to regional transit operator capacity, including AC Transit, BART, Golden Gate Transit, SamTrans, Caltrain and other ferry lines would be less than significant, and no mitigation measures would be required.

<u>Operational Impacts on Treasure Island/Yerba Buena Island</u>

Impact TR-24 Implementation of the Proposed Project without the Ramps Project would result in queues extending from the westbound Bay Bridge at Yerba Buena Island on-ramps which would impact Muni line 108-Treasure Island operations. ***(Less than Significant with Mitigation)***

Vehicle queues on the Bay Bridge on-ramp approaches from Yerba Buena Island would extend along Treasure Island Road potentially blocking bus circulation from Treasure Island toward the Bay Bridge, causing delays to bus service. Under conditions without the Ramps Project, the two existing westbound on-ramps would both remain open to mixed-flow traffic (i.e., autos, trucks and buses). It is likely that Muni would use the westernmost on-ramp on the west side of Yerba Buena Island. As illustrated on Figure IV.E.19, p. IV.E.79, and Table IV.E.13, p. IV.E.78, queues from this ramp would extend as far as approximately ½-mile from the on-ramp during weekday peak hours, resulting in delays of approximately two minutes per vehicle. During the Saturday peak hour, queues would extend just over 2/3 mile, with delays of approximately three minutes per vehicle. This would be considered a significant impact to Muni operations.

With implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) the Proposed Project's vehicle traffic generation would be reduced such that queues would be reduced (to between 0 and 400 feet) at each on-ramp during weekday peak hours, but would remain approximately 1/3 mile during Saturday peak hours. Since full funding for this Expanded Transit Service mitigation measure has not yet been identified, its implementation remains uncertain.

<u>Mitigation Measure M-TR-24: Provide Transit Only Lane between First Street on Treasure Island and the transit and emergency vehicle-only westbound Bay Bridge on-ramp.</u>

Implementation of Mitigation Measure M-TR-24 would only be triggered if the extent of actual vehicle queuing impacts the proposed Muni line 108-Treasure Island on Treasure Island Road and creates delays for Muni buses accessing the westbound transit-only on-ramp. As such, throughout the life of the project, the TITMA, in consultation with SFMTA and using SFMTA's methodology, shall monitor the length and duration of potential queues on Treasure Island Road and the associated delays to Muni service. If the queues between First Street and the westbound on-ramp on the west side of Yerba Buena Island result in an operational delay to Muni service equal to or greater than the prevailing headway during the AM, PM or Saturday peak periods, TITMA shall implement a southbound transit-only lane between First Street on Treasure Island and the transit and emergency vehicle-only westbound Bay Bridge on-ramp. The implementation of a transit-only lane would be triggered if impacts are observed over the course of six months at least 50 percent of the time during the AM, PM, or Saturday peak periods.

Implementation of Mitigation Measure M-TR-24 to provide a transit and emergency vehicle-only lane between First Street on Treasure Island and the westbound Bay Bridge on-ramp would allow Muni vehicles to bypass vehicle queues that may occur and therefore, the impact to Muni operations would be reduced to a less-than-significant level.

Implementation of this mitigation measure would entail the following:

- Elimination or reduction of the proposed median on Treasure Island Road between First Street and just south of Macalla Road; and
- Elimination of the proposed southbound bicycle lane on Treasure Island Road and a small portion of Hillcrest Road south of the intersection with Macalla Road. Bicyclists would still be able to use Class I bicycle paths and Class II bicycle lanes proposed on Macalla Road to connect between the Islands and the bicycle path on the new east span of the Bay Bridge.

As discussed above, implementation of Mitigation Measure M-TR-24 would reduce the impact to Muni operations to a less-than-significant level.

Impact TR-25: Implementation of the Proposed Project without the Ramps Project would impact AC Transit operations on Hillcrest Road between Treasure Island and the eastbound on-ramp to the Bay Bridge. *(Significant and Unavoidable with Mitigation)*

Although the new AC Transit bus service would not utilize the westbound on-ramps, queues from both westbound ramps would interfere with AC Transit bus travel between Treasure Island and the eastbound on-ramp to the Bay Bridge. This would be considered a significant impact on AC Transit operations.

With implementation of Mitigation Measure M-TR-2 (Expanded Transit Service), the Proposed Project's vehicle traffic generation would be reduced such that queues would be reduced to much smaller levels (between 0 and 400 feet) at each on-ramp during weekday peak hours, but would remain approximately 1/3 mile during Saturday peak hours. Since full funding for this Expanded Transit Service mitigation measure has not yet been identified, its implementation remains uncertain.

Implementation of Mitigation Measure M-TR-24 to provide a transit and emergency vehicle-only lane between First Street on Treasure Island and the westbound Bay Bridge on-ramp would allow AC Transit vehicles to bypass vehicle queues; however, since this improvement would extend the transit lane only to the westbound on-ramp (because there is not sufficient right-of-way to extend a lane on Hillcrest Road), AC Transit vehicles would continue to experience congestion between the transit only westbound on-ramp and the eastbound on-ramp, and impacts to AC Transit operations would remain significant and unavoidable.

Impact TR-26: Implementation of the Proposed Project with the Ramps Project would result in significant impacts to Muni line 108-Treasure Island operations. (*Less than Significant with Mitigation*)

Under conditions with the Ramps Project, the westbound on-ramp on the west side of Yerba Buena Island would be converted to transit and emergency vehicle access only, and all traffic destined for the westbound Bay Bridge would be routed to the westbound on-ramp on the east side of Yerba Buena Island.[30] In this scenario, queues would extend from the westbound on-ramp on the east side of Yerba Buena Island to more than one mile onto Treasure Island Road, just past Macalla Road. Muni line 108-Treasure Island buses leaving the Transit Hub would need to travel through this queue for approximately ½ mile before reaching the transit and emergency vehicle-only westbound on-ramp. This would be considered a significant impact to Muni operations.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce the travel time delays, but not to less-than-significant levels. In addition, funding for this service is

---

[30] The Ramps Project would implement both reconstruction of the east side ramps and restrict access on the west side westbound on-ramp for transit- and emergency-vehicle-access only.

uncertain. Implementation of Mitigation Measure M-TR-24 to provide a transit and emergency vehicle-only lane between First Street on Treasure Island and the westbound Bay Bridge on-ramp would allow Muni vehicles to bypass vehicle queues that may occur and therefore, the impact to Muni operations would be reduced to a less-than-significant level.

Impact TR-27: Implementation of the Proposed Project with the Ramps Project would impact AC Transit operations on Treasure Island Road and Hillcrest Road between Treasure Island and the eastbound on-ramp to the Bay Bridge. *(Significant and Unavoidable with Mitigation)*

While AC Transit vehicles would not be using the westbound Bay Bridge on-ramps, queues from the westbound on-ramp on the east side of Yerba Buena Island would impede AC Transit travel between Treasure Island and the eastbound on-ramp to the Bay Bridge. AC Transit vehicles would travel in this queue nearly for its entire length (from just north of Macalla Road to the eastbound on-ramp to the Bay Bridge), resulting in delays of approximately five minutes per vehicle. This would be considered a significant impact to AC Transit operations.

With implementation of Mitigation Measure M-TR-2 (Expanded Transit Service), the Proposed Project's vehicle traffic generation would be reduced such that queues would be reduced to smaller levels (from 1.25 miles to between ½ - ¾ miles) at each on-ramp during weekday peak hours. The Proposed Project's impacts on AC Transit operations would remain significant because AC Transit vehicles would still have to travel through queues on the west side of Yerba Buena Island to reach the eastbound on-ramp. Further, since full funding for this service has not yet been identified, its implementation remains uncertain.

Implementation of Mitigation Measure M-TR-24 would improve operations for AC Transit buses destined to the eastbound on-ramp. However, since this improvement would extend only to the transit and emergency vehicle-only westbound on-ramp on the west side of Yerba Buena Island and since sufficient right-of-way is not available to extend a transit-only lane beyond the transit and emergency vehicle-only westbound on-ramp, AC Transit vehicles would continue to experience congestion between the transit and emergency vehicle-only westbound on-ramp and the eastbound on-ramp. The impact to AC Transit operations would remain significant and unavoidable.

Impact TR-28: Implementation of the Proposed Project would not impact operations of the existing or proposed ferry services on San Francisco Bay *(Less than Significant)*

The Proposed Project includes a Ferry Terminal and intermodal Transit Hub located in the Island Center at the southwestern shore of Treasure Island. This facility would serve as the eastern terminus of ferry service between Treasure Island and the City. The impacts of constructing and operating the Ferry Terminal/Transit Hub are analyzed as appropriate in this EIR. (See, e.g., hydrological impacts associated with constructing ferry terminal, analysis of noise and air quality impacts associated with ferry operations).

The ferry service would be provided at approximately 50-minute intervals. WETA has sufficient capacity at the San Francisco Ferry Building to accommodate this ferry service without disrupting other, existing ferry service that uses the Ferry Building. Because existing ferry service would not be disrupted, this impact is considered less than significant.

As detailed in the Project Description (Chapter II), as development proceeds, ferry service may also expand. Ultimately, it is anticipated that ferry service would be provided to and from San Francisco at 15-minute intervals at peak periods, with the ferry operating between 5 AM and 9 PM. This increased service may require expanded facilities at the San Francisco terminal. WETA and the Port of San Francisco are currently analyzing options for expanding these facilities. Prior to approval of expansion of such service, analysis will be performed of the impacts of expanding these facilities. At this time, whether and how these facilities may expand is considered speculative.

Operational Impacts in downtown San Francisco

As described in Impact TR-8 through Impact TR-14 above, in downtown San Francisco the Proposed Project-generated vehicle trips would result in significant project impacts at six study intersections (Impact TR-8 through Impact TR-13) and would contribute considerably to one intersection currently operating at LOS E (Impact TR-14). The increases in vehicle delay due to the project-generated vehicle trips may also affect transit lines that travel through these intersections. Muni, Golden Gate Transit, and SamTrans bus lines travel through five of the seven intersections affected by the Proposed Project. Therefore, an assessment was conducted to determine whether the increase in delay would result in a significant impact to transit operations.[31] The assessment at the five impacted intersections below includes a discussion of Muni, Golden Gate Transit, and SamTrans impacts on transit identified in Impact TR-29 through Impact TR-32.

First/Market – During the PM peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of First/Market to deteriorate from LOS D to LOS F, resulting in a significant project impact (see Impact TR-8). A total of 13 Muni bus lines (2-Clement, 3-Jackson, 5-Fulton, 6-Parnassus, 9/9L-San Bruno, 21-Hayes, 30-Stockton, 30X-Marina Express, 31-Balboa, 38/38L/38X-Geary, 71/71L-Haight/Noriega, 76-Marin Headlands, 81X-Caltrain

[31] During the PM peak hour, no transit routes travel through the intersection of First/Folsom or First/Harrison/I-80 Eastbound On-Ramp, and therefore, discussion of these intersections is not provided.

Express) and one Muni streetcar line (F-Market & Wharves) travel through this intersection during the weekday PM peak hour.[32]

Under Existing plus Project PM peak hour conditions, the eastbound and westbound approaches on Market Street would operate at acceptable levels of service (LOS D or better), so the Proposed Project's contribution of traffic on Market Street approaches would not significantly impact transit lines on Market Street. However, the southbound movement would operate at LOS F. Only the 30X-Marina Express would be subject to increased delays due to congestion on the Bush Street and Battery Street approaches to the intersection of First/Market. Since the Proposed Project would have a considerable contribution to delay at the southbound approach to First/Market, the Proposed Project would have a significant impact on transit travel times on the 30X-Marina Express.

First/Mission – During the PM peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of First/Mission to deteriorate from LOS E to LOS F, resulting in a significant project impact (see Impact TR-9). During the PM peak hour, a total of six Muni bus lines (5-Fulton, 6-Parnassus, 14/14L-Mission, 38/38L-Geary, 71/71L-Haight-Noriega, 76-Marin Headlands), eight Golden Gate Transit lines (10, 54, 70, 72, 73, 76, 80, 101), and three SamTrans bus lines (292, 391, 397) travel through this intersection. However, all approaches to this intersection include dedicated transit-only lanes; therefore, transit lines traveling through this intersection would not be affected by Proposed Project-generated increases in intersection delay, and the Proposed Project's impacts on transit travel times for all lines traveling through this intersection would be less than significant.

Bryant/Fifth/I-80 Eastbound On-Ramp – The Proposed Project would contribute a significant amount of traffic to movements at this intersection that would operate at LOS E or LOS F during the PM peak hour, and would cause this intersection to deteriorate from LOS D to LOS E during the Saturday peak hour, thereby resulting in significant traffic impacts (see Impact TR-12). Three Muni bus lines travel through this intersection (9X/9AX/9BX-Bayshore Express lines, 27-Bryant, and 47-Van Ness).[33] Transit lines at this intersection share lanes with mixed-flow traffic along both Bryant Street and Fifth Street. The 9X/9AX/9BX-Bayshore Express lines and the 27-Bryant travel eastbound on Bryant Street, while the 47-Van Ness travels northbound on Fifth Street.

During the PM peak hour, the northbound right and eastbound through movements, and the southbound approach would operate at unacceptable levels of service, and a majority of the delay would be a result of congestion leading towards the Bay Bridge. The proposed project would add traffic to the northbound and southbound approaches and the eastbound left turn movement. The

[32] Golden Gate Transit bus routes 2, 4, 8, 24, 26, 27, 38, 44, 54, 56, 58, 72, 74 and 76 travel through the intersection of First/Market only during the AM peak period.
[33] In December 2009, SFMTA implemented service changes that included renumbering route 9-Bayshore Express to route 8-Bayshore Express.

9X/9AX/9BX-Bayshore Express lines operate in the southernmost through lane on Bryant Street and the project would not add new trips to the eastbound through movement; therefore, during the PM peak hour the Proposed Project would only cause a significant impact to transit travel times on the 27-Bryant (which turns left from Bryant Street to Fifth Street) and 47-Van Ness (which runs northbound on Fifth Street) during the PM peak hour.

During the Saturday peak hour, the northbound approach would operate at unacceptable levels of service. The project would add new trips to this approach; therefore, the Proposed Project would have a significant impact on the 47-Van Ness during the Saturday peak hour.

Harrison/Fifth/I-80 Westbound Off-Ramp – During the PM peak hour, vehicular traffic generated by the Proposed Project would cause the intersection of Harrison/Fifth/I-80 Westbound Off-Ramp to deteriorate from LOS D to LOS E, resulting in a significant traffic project impact (see Impact TR-13). Four Muni bus lines travel through this intersection (9X/9AX/9BX-Bayshore Express, 12-Folsom-Pacific, 27-Bryant, 47-Van Ness). Transit lines at this intersection share lanes with mixed-flow traffic along both Harrison Street and Fifth Street. During the PM peak hour, the westbound approach operates acceptably; therefore no impact was identified for the 12-Folsom-Pacific and the 9X/9AX/9BX-Bayshore Express lines that run westbound on Harrison Street. However, Fifth Street northbound and southbound approaches, and the I-80 westbound off-ramp approach would operate at unacceptable levels of service during the PM peak hour. The Proposed Project's contribution to increases in delay on the northbound and southbound approaches would be substantial; therefore, the Proposed Project's impacts on transit travel times for the 27-Bryant and 47-Van Ness lines, which travel on Fifth Street, would be considered significant impacts.

Second/Folsom – With implementation of the Proposed Project, the intersection of Second/Folsom would continue to operate at LOS E during the PM peak hour. The Proposed Project traffic volume increases were determined to contribute substantially to the poor operating conditions, thereby resulting in significant traffic project impacts (see Impact TR-14). Three Muni bus lines (10-Townsend, 12-Folsom-Pacific, 76-Marin Headlands) and 19 Golden Gate Transit bus lines (2, 4, 8, 18, 24, 27, 38, 44, 54, 56, 58, 72, 73, 74, 76, 10, 70, 80, 101) travel through this intersection. Transit lines at this intersection share lanes with mixed-flow traffic along both Folsom Street and Second Street. During the PM peak hour, the intersection would operate with substantial amounts of vehicle delay, primarily as a result of Bay Bridge-destined traffic. Folsom Street has four eastbound travel lanes at this intersection, and buses use the north-most lane, which does not lead to an on-ramp to the Bay Bridge and would be less congested than the southern lanes. Therefore, project contributions to congestion on Folsom Street would have a minimal effect to operations on the 12-Folsom-Pacific, 76-Marin Headlands, and Golden Gate Transit buses, which travel on Folsom Street, and would be considered less than significant.

The 10-Townsend would need to maneuver through northbound and southbound mixed-flow traffic on Second Street destined for the Bay Bridge; however, these approaches would continue to operate at acceptable levels of service. Thus, the Proposed Project's contribution to travel time to the 10-Townsend at this intersection would also be considered less than significant.

Impact TR-29: The Proposed Project would increase congestion in downtown San Francisco, which would increase travel times and would impact operations of the Muni 27-Bryant bus line. ***(Significant and Unavoidable)***

As discussed above, the Proposed Project contributions to adverse traffic conditions at the intersections of Bryant/Fifth/I-80 Eastbound On-Ramp and Harrison/Fifth/I-80 Westbound Off-Ramp would affect the travel times of the 27-Bryant therefore, the Proposed Project impacts on the 27-Bryant operations would be a significant impact. At the intersections of Fifth/Bryant/I-80 Eastbound On-Ramp and Fifth/Harrison/I-80 Westbound Off-Ramp no feasible mitigation measures have been identified. Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at these intersections, but the intersections would continue to operate poorly. Since no feasible mitigation measures have been identified, the Proposed Project's impacts on transit delay on the 27-Bryant would remain significant and unavoidable.

Impact TR-30: The Proposed Project would increase congestion in downtown San Francisco, which would increase travel times and would impact operations of the Muni 30X-Marina Express bus line. ***(Significant and Unavoidable)***

As described above, the 30X-Marina Express bus operations would be affected by Proposed Project-related traffic delays at the intersection of First/Market, which would be considered a significant impact on transit travel times on the 30X-Marina Express. Potential mitigation measures for the intersection of First/Market are limited, as traffic signals at this intersection are timed to prioritize transit movements on Market Street. Modifications to signal timing to provide more capacity to the southbound movement which would operate poorly would likely in turn impact transit operations on Market Street and be inconsistent with the City's Transit First policy. Providing additional travel lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment on Market Street. Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at these intersections, but the intersections would continue to operate poorly. Since no feasible mitigation measures have been identified, the Proposed Project's impacts on transit delay on the 30X-Marina Express would remain significant and unavoidable.

Impact TR-31: The Proposed Project would increase congestion in downtown San Francisco, which would increase travel times and would impact operations of the Muni 47-Van Ness bus line. ***(Significant and Unavoidable)***

As described above, the 47-Van Ness bus operations would be affected by Proposed Project-related traffic delays at the intersection of Bryant/Fifth/I-80 Eastbound On-Ramp and Harrison/Fifth/I-80 Westbound Off-Ramp, which would be considered a significant impact on transit travel times on the 47-Van Ness.

At the intersections of Fifth/Bryant/I-80 Eastbound On-Ramp and Fifth/Harrison/I-80 Westbound Off-Ramp no feasible mitigation measures have been identified. Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at these intersections, but the intersections would continue to operate poorly. Since no feasible mitigation measures have been identified, the Proposed Project's impacts on transit delay on the 47-Van Ness would remain significant and unavoidable.

Impact TR-32: The Proposed Project would increase congestion in downtown San Francisco during the PM peak hour; however, it would not impact operations of Golden Gate Transit or SamTrans bus lines. ***(Less than Significant)***

As described above, during the PM peak hour the Proposed Project-generated vehicle trips would result in significant impacts at the intersections of First/Mission and Second/Folsom through which Golden Gate Transit and SamTrans buses travel.

During the AM and Saturday peak hours, the Proposed Project would not adversely affect any of the study intersections through which Golden Gate Transit or SamTrans routes travel. During the PM peak hour, Golden Gate Transit buses travel through the intersections of First/Mission and Second/Folsom, while SamTrans buses travel through the intersection of First/Mission. At the intersection of First/Mission, transit operates within dedicated transit-only lanes and therefore, Proposed Project impacts on transit due to increased traffic congestion would be less than significant. At the intersection of Second/Folsom, Golden Gate Transit buses use the northern-most travel lane which is not subject to the queued conditions associated with Bay Bridge-destined traffic and therefore, Proposed Project impacts on Golden Gate Transit due to increased traffic congestion would be less than significant.

In summary, the Proposed Project would exceed the capacity utilization of the Muni line 108-Treasure Island. Implementation of Mitigation Measure M-TR-2 would provide the additional capacity needed to accommodate the transit demand without exceeding the Muni capacity utilization threshold of 85 percent. However, since the funding for implementation of Mitigation Measure M-TR-2 is uncertain, this impact would remain significant and unavoidable. Further, the Proposed Project would result in Muni and AC Transit operational delays associated with the potential queues between Macalla Road and the westbound on-ramp on the east side of Yerba Buena Island. These operational delays would be considered significant whether or not the Ramps Project is implemented. Implementation of Mitigation Measure M-TR-24 would reduce the Muni line 108-Treasure Island transit delay impacts to a less-than-significant level by providing a transit-only lane. Impacts to AC Transit would be reduced with implementation of Mitigation Measure M-TR-24 but not to a less-than-significant level and therefore, would be considered significant and unavoidable. Finally, the Proposed Project would result in significant and unavoidable impacts to Muni lines 27-Bryant, 30X-Marina Express and 47-Van Ness as a result of project-generated vehicle trips contributing to the congestion levels in downtown San Francisco.

Bicycles

Impact TR-33: The Proposed Project would not create potentially hazardous conditions for bicyclists on the Islands and would provide more bicycle accessibility to the site than currently exists. ***(Less than Significant)***

The Proposed Project includes bicycle facilities in the form of bicycle paths (Class I facilities) and bicycle lanes (Class II facilities) that would facilitate bicycling within the site. Class I bicycle paths would be placed around the perimeter of Treasure Island and within the open space areas to connect residential areas with open space and retail areas on Treasure Island. Class II bicycle lanes would be provided on Treasure Island Road and Avenue of the Palms, California Avenue, and Avenue C. A one-way (westbound) Class II bicycle lane would also be provided on First Street, parallel to California Avenue. No designated Class III bicycle routes would be provided on the island, although all other streets are proposed to be designed to encourage shared use by bicycles and autos through the use of various traffic calming features designed to lower auto travel speeds. Figure IV.E.11 presents the proposed bicycle circulation plan for the Islands.

On Yerba Buena Island, a one-way Class II bicycle lane would be provided on Treasure Island Road and Hillcrest Road, which would continue as a loop around South Gate Road and Macalla Road, back to Treasure Island Road. Although Macalla Road is one-way northbound for vehicles, a contra-flow Class II bicycle lane would also be provided from Treasure Island Road to South Gate Road, separated from traffic by a two-foot buffer with painted chevrons. As a result, Macalla Road would provide Class II bicycle lanes in each direction connecting Treasure Island Road and the Bay Bridge.

There would be one primary bicycle route from the Bay Bridge to Treasure Island, on Macalla Road. There would be two primary routes from Treasure Island to the Bay Bridge. Macalla Road would be the most direct (although steeper) route to the Bay Bridge from Treasure Island. Bicyclists who opt for a longer, but less steep route from Treasure Island to the Bay Bridge would use the one-way Class II bicycle lane on Treasure Island Road and Hillcrest Road. At the intersection of Hillcrest Road and South Gate Road, bicyclists would be able to enter the Bay Bridge bicycle/pedestrian path providing access to the East Bay. Bicyclists traveling on Macalla Road to access the Bay Bridge bicycle path would use the Class II bicycle lanes on Macalla Road between Treasure Island and the Bay Bridge westbound ramps intersection. Between that intersection and the Bay Bridge bicycle path, which begins at the intersection of Hillcrest Road and South Gate Road, bicycles and pedestrians would use a 10-foot shared pathway on the west side of the street, which would continue along South Gate Road and loop around onto the bridge.

In addition to the bicycle routes, the Proposed Project includes enhanced bicycle treatments at four intersections on the Islands – at Hillcrest Road at South Gate Road, Macalla Road at the Bay Bridge Westbound Ramps, Treasure Island Road at Macalla Road, and Treasure Island Road at Hillcrest Road/Westbound transit and emergency vehicle-only On-Ramp (these treatments are described in "Transportation Improvements Assumed in the Analysis," pp. IV.E.30 – IV.E.47 and illustrated on Figures IV.E.8 through IV.E.15). At the intersection of Hillcrest Road at South Gate Road, bicycle treatments would allow for an uncontrolled crossing of South Gate Road for bicyclists destined to the Bay Bridge bicycle path. At Macalla Road and the Bay Bridge westbound ramps, treatments would include bicycle-only lanes in each direction between the Bay Bridge westbound ramps and Treasure Island Road. At the intersection of Treasure Island Road and Macalla Road, a new bicycle-only left turn lane from Treasure Island Road onto Macalla Road would be provided to facilitate the left-turn maneuver, while at Treasure Island Road and the Bay Bridge westbound on-ramp, treatments such as shared-use arrows and signage would be provided to facilitate bicycle travel. These improvements would facilitate safe bicycle travel through these intersections while accommodating autos and transit vehicles.

Minimum bicycle parking standards would be required for residential and commercial uses. Bicycle parking would be required in all residential buildings with four or more residential units. In buildings with up to 50 residential units, 1 bicycle parking space would be provided for each 2 residential units. In buildings with more than 50 units, 25 bicycle parking spaces would be required for the first 50 units and 1 space for every 4 units over 50 units. Office buildings would be required to provide bicycle parking at a rate of 3 spaces for buildings between 10,001 and 20,000 gsf, 6 bicycle spaces for buildings between 20,001 and 50,000 gsf, and 12 bicycle spaces for larger buildings. Retail buildings between 25,001 and 50,000 gsf would be required to have 3 bicycle parking spaces; those between 50,001 and 100,000 gsf would be required to have 6 bicycle parking spaces; and those over 100,000 gsf would be required to have 12 bicycle parking spaces.

Overall, the Proposed Project would provide a roadway network on Treasure Island and Yerba Buena Island and improvements that would encourage bicycling and enhance bicycle access. The facilities would be adequate to meet the bicycling demand associated with the Proposed Project, and no mitigation would be required.

The adoption of Mitigation Measure M-TR-24 would result in the removal of the proposed bike lane on Treasure Island and Hillcrest Roads after the intersection of Treasure Island Road and Macalla Road to accommodate a transit-only lane (Mitigation Measure M-TR-24 would only be implemented if queues on Treasure Island Road materialize and substantially affect transit operations). Cyclists would continue to have a Class II contra flow facility connecting Treasure Island and the Bay Bridge, via Macalla Road. Since Macalla Road is steeper than Treasure Island and Hillcrest Roads, riding uphill could be challenging even for experienced bicyclists. Nevertheless, the bicycle facilities would remain adequate to meet the bicycling demand associated with the Proposed Project and Mitigation Measure M-TR-24 would not result in a significant impact on bicycle travel.

Impact TR-34: Implementation of the Proposed Project would not create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility on mainland San Francisco. (*Less than Significant*)

Primary bicycle access between the Islands and the rest of San Francisco would be via ferries traveling between the San Francisco Ferry Building and the proposed new Transit Hub on Treasure Island. Secondary bicycle access would be via buses between the Islands and downtown San Francisco. The Bay Bridge East Span project includes a bicycle/pedestrian path that would connect the East Bay to Yerba Buena Island, and the Proposed Project would provide a connection to this facility with the pedestrian and bicycle facilities on Yerba Buena Island and to the proposed Bay Trail around the perimeter of Treasure Island. As indicated in "Transportation Improvements Assumed in the Analysis," pp. IV.E.30-IV.E.47, BATA has initiated a study to design a new bicycle/pedestrian path on the west span of the Bay Bridge. If this project is approved, funded and ultimately constructed, there would be a continuous bicycle connection between the East Bay, the Islands and San Francisco. However, that improvement is not assumed to be in place in this analysis.

The San Francisco Bicycle Plan includes a number of near-term projects in the South of Market area that would improve bicycle circulation. The City plans to stripe new bicycle lanes along Fifth Street, Second Street, Fremont Street, Beale Street and Howard Street. These new bicycle lanes would improve north and south bicycle circulation by connecting the existing bicycle lanes on Folsom Street, Howard Street, and King Street, and Market Street.

The Proposed Project would generate new bicycle trips within San Francisco; however, these new trips would be relatively small in number compared to existing bicycle ridership and would be accommodated on the existing and planned bicycle network. Within mainland San Francisco, the Proposed Project would not create any potentially hazardous conditions for bicyclists, nor would it otherwise substantially interfere with bicycle accessibility. Therefore, the Proposed Project's impact to the bicycle network and bicycle accessibility on mainland San Francisco would be less than significant, and no mitigation would be required.

In summary, the Proposed Project would not create potentially hazardous conditions for bicyclists or substantially interfere with bicycle accessibility on the Islands or mainland San Francisco.

Implementation of Mitigation Measure M-TR-24 would result in the removal of a Class II bicycle lane on Treasure Island Road, but bicycle facilities on the Islands would remain adequate to meet the demand associated with the Proposed Project.

Pedestrians

Impact TR-35: The Proposed Project would not create potentially hazardous conditions for pedestrians and would provide better pedestrian accessibility to the site than currently exists. ***(Less than Significant)***

The Proposed Project's circulation plan is designed to encourage walking and bicycling as primary on-island travel modes. To accommodate the pedestrian demand, the street system on the Islands would be designed with special attention to sidewalks, pedestrian paths, and shared public ways.[34]

Sidewalks would be constructed along all streets on Treasure Island, except on the pedestrian priority shared public ways, where pedestrians would have use of the full right of way (discussed below). Intersections would include crosswalks and a number of corner bulbouts to shorten pedestrian crossing distances and improve pedestrian visibility. Sidewalk widths would vary throughout the area, but would adhere to Americans with Disabilities ("ADA") requirements and/or Title 24 of the California Code of Regulations (California Physical Access Laws), as applicable.

Pedestrian facilities in addition to sidewalks that are proposed for Treasure Island include:

- A mixed-use path around the perimeter of Treasure Island;
- A mixed-use promenade along the Marina;
- An 80-foot wide pedestrian-only linear park along Third Street between California Avenue and Eastside Avenue; and
- Walkways through proposed Buildings 1, 2 and 3.

The Shared Public Way is a new City street type proposed for Treasure Island. The shared public ways would be narrow, low-speed facilities without separate pedestrian and auto accommodations. Instead, pedestrians and autos would be permitted to use and share the entire space. While autos would be permitted to use shared public ways, vehicular volumes would be relatively low because these streets would be narrow and less direct than the Secondary Arterials and Collector Streets. Generally, vehicles are expected to use shared public ways to access some parking and/or make short trips. Since vehicle trips on these streets would be at low-speed, conflicts with pedestrians and bicycles sharing the facility are expected to be minimal.

[34] Shared public ways are described in "Transportation Improvements Assumed in the Analysis ," p. IV.E.30-IV.E.32, and would be subject to design criteria set forth in the draft *Design for Development* for the Proposed Project.

On Yerba Buena Island, sidewalks would be built on public streets, except on Treasure Island Road, south of Macalla Road, where grading constrains the width of the right-of-way along roadways. In addition to sidewalks, several trails through the open spaces and development areas would be constructed on Yerba Buena Island.

The proposed sidewalk system on Treasure Island would facilitate direct, convenient travel between proposed uses. The proposed sidewalk and pedestrian path system on Yerba Buena Island would be less direct due to the topography of the Island, but would nonetheless provide adequate pedestrian connections to all uses on the Island. Since the new pedestrian trips generated by the Proposed Project would not result in substantial overcrowding on the proposed pedestrian facilities, or result in hazardous conditions, the Proposed Project impacts on pedestrians would be less than significant. No mitigation measures would be required.

In summary, the Proposed Project would not create potentially hazardous conditions for pedestrians or result in substantial overcrowding of public crosswalks near the Ferry Building.

Impact TR-36: Implementation of the Proposed Project would not result in substantial overcrowding of public crosswalks near the Ferry Building, and pedestrian facilities would continue to operate at acceptable levels. ***(Less than Significant)***

Proposed Project pedestrian trips associated with the new ferry service to the Islands would travel through the San Francisco Ferry Building, and would be accommodated on the sidewalks and crosswalks in the vicinity of the Ferry Building. The additional pedestrians would primarily affect conditions during peak AM and PM commute periods, when ferries arrive and depart from other cities in the Bay Area. The Proposed Project would generate 641 pedestrian trips in the AM peak hour, 818 pedestrian trips in the PM peak hour, and 473 pedestrian trips during the Saturday peak hour at the Ferry Building (corresponding to the number of ferry passengers generated by the Proposed Project). Assuming that the new pedestrian trips would be distributed to crosswalks around the Ferry Building similar to existing pedestrian travel patterns, a majority of pedestrians would cross The Embarcadero at Market Street. Table IV.E.19 summarizes the distribution of pedestrian trips across Market Street at crosswalks near the Ferry Building, and the resulting LOS for the AM, PM and Saturday peak hours. The Proposed Project would result in increased densities at each of the study crosswalks. However, all crosswalks would continue to operate at acceptable LOS D or better; therefore, the Proposed Project's impacts on pedestrian facilities in San Francisco would be less than significant, and no mitigation would be required.

Table IV.E.19: Pedestrian Crosswalk Levels of Service, Existing and Existing plus Project Conditions

Crosswalk[1]	Existing			Existing plus Project		
	Pedestrian Volumes[2]	Density[4]	LOS	Project Trips	Density[4]	LOS
AM Peak Hour						
Washington Street[1]	120	33.3	A	25	27.6	A
Ferry Bldg (North)	400	8.0	C	82	6.6	C
Market Street	1,964	8.2	C	403	6.8	C
Don Chee Way	133	21.1	A	27	17.5	A
Mission Street[1]	333	12.0	B	68	10.0	C
PM Peak Hour						
Washington Street[1]	261	15.3	A	44	13.1	A
Ferry Bldg (North)	378	8.5	C	64	7.2	C
Market Street	3,452	4.6	D	588	4.0	D
Don Chee Way	184	15.2	A	31	13.0	A
Mission Street[1]	345	11.6	B	59	9.9	C
Saturday Peak Hour[3]						
Market Street	3,718	4.3	D	334	4.0	D
Don Chee Way	380	7.4	C	28	6.9	C

Notes:
1 Since the intersections of The Embarcadero with Washington Street and Mission Street each have two crosswalks, the north and south legs of each intersection were averaged.
2 Pedestrian counts provided by the City of San Francisco, taken from the Regional Signal Timing Program study conducted by Katz, Okitsu & Associates in 2006 and 2007.
3 The Ferry Building hosts a farmers market on Saturdays.
4 Density measured in square feet per pedestrian.

Source: Fehr & Peers, 2010.

Loading

Impact TR-37: The Proposed Project would not result in a loading demand during the peak hour of loading activities that could not be accommodated within the proposed on-site loading supply or within on-street loading zones. *(Less than Significant)*

The loading impacts assessment includes the comparison of the demand for the loading spaces to the minimum number of loading spaces that would be required per the loading supply ratios provided in the *Treasure Island and Yerba Buena Island Design for Development* for the Proposed Project. As indicated in “Approach to Analysis, p. IV.E.55, the demand for loading spaces was estimated based on the development program and the daily truck trip generation rates for 1,000 gross square feet of use for each of the land uses in the Proposed Project, then converted to an hourly demand for spaces. The freight loading spaces would be provided based on the ratios provided in Table IV.E.20.

Table IV.E.20: Freight Loading Space Requirement Ratios

Use or Activity	Gross Floor Area of Structure or Use (square feet)	Minimum Number of Freight Loading Spaces Required
Retail stores, wholesaling, manufacturing, and all other uses primarily engaged in the handling of goods.	0-10,000	0
	10,001-60,000	1
	60,001-100,000	2
	over 100,000	3, plus 1 for each additional 80,000 square feet
Offices, hotels, apartments, and all other uses not included above.	0-100,000	0
	100,001-200,000	1
	200,001-500,000	2
	Over 500,000	3, plus 1 for each additional 400,000 square feet

Source: *Treasure Island and Yerba Buena Island Design for Development* – Public Review Draft 3/5/10.

Although the precise location and orientation of development parcels is currently unknown, some guidelines would be included in the *Treasure Island and Yerba Buena Island Design for Development* to minimize the impacts of loading operations on autos, transit, bicyclists and pedestrians, and to ensure that loading activities do not result in hazardous conditions. Specifically:

- The standards for on-street loading require the TIDA Executive Director to review the design of all on-street loading facilities to ensure that they are designed to minimize conflicts with transit, bicycle and pedestrians; possible conditions include requiring a dedicated loading zone located outside of the path of travel of vehicular, bicycle, pedestrian and transit routes, or limiting hours of operation for freight loading zones located within vehicular, bicycle, pedestrian and transit routes to avoid conflicts.
- Guidelines that must be considered in reviewing loading include the following:
  - In the selection between an off-street location and an on-street location for loading, on-street loading is recommended, in order to reduce the number of curb cuts.
  - Off-street loading zone driveways, where provided, should be located away from major pedestrian routes and intersections and shared with parking entrances, where possible.

- A loading zone(s) should be located in the same development block as the use served and, where located off-street, should provide adequate means of ingress/egress to a street or alley.

- Entrances to off-street loading facilities should be minimized in size and designed with visual buffers from pedestrian areas, where feasible.

- Garage and service entries should include either opaque or translucent garage door panels. Portions of the garage visible from the public realm should reflect the same architectural character employed throughout the rest of the building.

- Exit door alcoves on the sidewalk are discouraged, unless they share space with any active surveillance such as primary entrances or active community uses.

- Where off-street loading is provided, adequate reservoir space should be provided on private property for entrance of vehicles to off-street parking and loading zones, except with respect to spaces independently accessible directly from the street.

- Trash/recycling facilities and other utility services should be provided for all buildings in a location that balances residential access, convenient pick-up, maintenance, and screening from the active pedestrian zones of the street.

- On-street loading would be prohibited in the Treasure Island transit loop adjacent to the Ferry Terminal and Buildings 1 and 2, unless the loading space(s) can be located outside of the travel path of buses and shuttles or loading hours are restricted to times that would not interfere with transit operations.

Table IV.E.21 summarizes the estimate of daily truck trips generated by the proposed land uses and the associated demand for loading dock spaces during the peak hour of loading activities (which generally occurs between 10 AM and 1 PM) and the estimated supply based on the draft *Design for Development*.

Overall, the Proposed Project would provide an adequate number of loading spaces to accommodate peak hour loading demand within the off-street or on-street loading supply that is required by the Proposed Project's *Design for Development*. However, Table IV.E.21 also indicates that specific uses within the Proposed Project, such as restaurant and office may not have adequate supply. The supply calculations assume the entire square footage as a single use, when it is possible that individual buildings may provide a greater number of loading spaces that would serve the demand, or that loading spaces provided for retail or other uses would be available for shared use by restaurants and offices in mixed-use buildings. TIDA, in coordination with TITMA, would monitor whether the number of available loading spaces for any restaurant or office user would meet the peak loading space demand for that user. If a shortfall is observed, TIDA and the TITMA would work together to designate additional on-street loading zones (typically converting an on-street parking space into a flexible loading space by painting the curb yellow and restricting meter hours to allow for loading in particular time frames).

Table IV.E.21: Summary of Proposed Project Loading Demand and Supply

Land Use	Daily Truck Trip Generation Rates	Proposed Project			
		Size (Sq. Ft.)	Daily Truck Generation	Peak Loading Space Demand[7]	Minimum Supply
Office	0.21	130,000[1]	27	2	1
Retail	0.22	320,000[2]	70	5	6
Restaurant	3.60	37,000	133	8	1
Hotel	0.09	450,000[3]	41	2	2
Institutional	0.10	138,500[4]	14	1	1
Manufacturing	0.51	22,000[5]	11	1	1
Residential	0.03	9,577,150[6]	287	17	26
Total			**583 Trucks**	**36 Spaces**	**38 Spaces**

Notes:

[1] Proposed Project includes 100,000 square feet of new office plus 30,000 square feet of community uses/offices planned in adaptive reuse of Building 1.
[2] Includes all non-restaurant retail (170,000 square feet) and 150,000 square feet of entertainment uses proposed for adaptive reuse of Building 3.
[3] 500 hotel rooms.
[4] Includes 13,500 square feet of community facilities, 35,000 square feet for Pier 1 Community Center, 15,000 square foot sailing center, and 75,000 square foot museum. Similar to parking analysis, loading demand for elementary school and police/fire facility would be provided separately within their facilities. Neither demand nor supply for elementary school and police/fire facility is included in this analysis.
[5] Includes 22,000 square feet of food production space proposed in adaptive reuse of Building 2.
[6] Proposed Project includes 8,000 dwelling units.
[7] Typical peak hour of truck loading space demand occurs between 10 AM to 1 PM. Peak hour generation assumes deliveries occur between 8 AM and 5 PM, average park time of 25 minutes per vehicle, and that the peak hour deliveries occur at a 25 percent higher rate than other hours.

Source: SF Guidelines, 2002 and Fehr & Peers, 2010.

Freight loading ratios and design standards and guidelines included in the Proposed Project's *Treasure Island and Yerba Buena Island Design for Development* would ensure that adequate loading supply is provided, and that loading operations do not create hazardous conditions or substantially affect autos, transit, bicycles and pedestrians. Therefore, the Proposed Project impacts related to loading operations would be less than significant. No mitigation is required.

<u>Emergency Access</u>

Impact TR-38: Implementation of the Proposed Project would not result in significant emergency access impacts. *(Less than Significant)*

The Proposed Project would include local police and fire facilities that would provide emergency first response to incidents on the Islands. The Proposed Project includes the maintenance or reconstruction of the existing roadway network on Treasure Island and Yerba Buena Island and therefore, existing emergency response routes would be maintained in their existing locations or rerouted as necessary. Further, all development would be designed in accordance with City standards, which include provisions that address emergency access (e.g., minimum street widths, minimum turning radii, etc.).

Congestion associated with queuing approaching the Bay Bridge westbound on-ramps would not interfere with emergency vehicle access to the Islands from either San Francisco or the East Bay. If emergency vehicles were required to exit the Islands during periods when there was congestion approaching the Bay Bridge, similar to other congested roadway facilities in San Francisco and the region, emergency vehicles would be able to maneuver into other traffic lanes, depending on the specific traffic conditions at the time. The California Vehicle Code requires drivers to make way for the emergency vehicles, and drivers would likely pull out of the way of approaching emergency vehicles by using available roadway shoulders or pulling closer to other vehicles. Avenue of the Palms and Treasure Island Boulevard would be multi-lane roadways, and emergency vehicles could choose to bypass queued vehicles by traveling in the opposite travel lane, which is permitted when sirens are used. Under conditions with implementation of the Ramps Project, after bypassing queued vehicles on Treasure Island Boulevard, emergency vehicles could use the dedicated transit-only and emergency vehicle-only westbound on-ramp on the west side of Yerba Buena Island to access the Bay Bridge. If this is not feasible or the desired route, the emergency vehicle could proceed to the westbound on-ramp on the east side of Yerba Buena Island and use the HOV bypass lane, or the eastbound on-ramp towards the East Bay. Under conditions without the Ramps Project, the vehicle queues on the westbound on-ramps are expected to be shorter, and emergency vehicles would be required to maneuver through a shorter queue on the westbound on-ramp on the west side of Yerba Buena Island, as vehicles would be able to pull over onto the shoulder of the roadway. The existing westbound on-ramp on the west side of Yerba Buena Island is approximately 24 feet wide and could accommodate both queued vehicles and emergency vehicles. Therefore, the Proposed Project's impacts to emergency access would be considered less than significant.

CUMULATIVE IMPACTS

The geographic context for the analysis of cumulative transportation impacts is the Bay Bridge and its approaches and the local roadway network in downtown San Francisco, and transit operations between the Islands and San Francisco and the East Bay.

Proposed Project impacts related to bicycle and pedestrian circulation, parking and loading supply and demand, and construction would be localized and site-specific and would not contribute to impacts from other developments within San Francisco. The Proposed Project would make no significant contribution to cumulative pedestrian and bicycle conditions related to travel within San Francisco.

Construction Impacts

Impact TR-39: Construction of the Proposed Project would occur over a long period of time and would contribute to cumulative construction impacts in the Project vicinity. ***(Significant and Unavoidable with Mitigation)***

The construction activities for the early phases of development may partially overlap with construction activities associated with the final phases of construction of the new Bay Bridge east span, which is expected to be completed by late 2013. In addition, if the Ramps Project is approved for construction, construction of the new ramps would likely start in early 2012 and overlap with the Proposed Project for a period of two years. The Proposed Project's largest construction activity would be the preparations for infrastructure and stabilization, which would occur in the first few years.

Given the magnitude of development, the Project's prolonged construction period, and the lack of certainty of timing of the projects in the area, significant project contributions to cumulative traffic and circulation impacts could occur on the Bay Bridge, and on the Yerba Buena Island and Treasure Island access roads. Cumulative impacts would also include construction detours and increased travel times, although the extent and duration would vary, depending on each individual project's schedule and construction activities. Typically, movement of construction vehicles and equipment is timed to avoid peak commute hours, which could reduce the potential for cumulative construction period traffic impacts. Implementation of a separate Transportation Management Plan (TMP) under Caltrans Deputy Directive 60 (DD-60) would be required by Caltrans for construction affecting the Bay Bridge and would be expected to minimize impacts associated with each project and reduce each project's contribution to cumulative impacts in overlapping areas. However, some disruption and increased delays could still occur even with implementation of traffic control plans, and it is possible that significant construction-related traffic impacts on the Islands roadways and the Bay Bridge would still occur.

Implementation of Mitigation Measure M-TR-1, a Construction Traffic Management Plan, would help minimize the Proposed Project's contribution to cumulative construction-related traffic impacts. However, some disruption and increased delays could still occur even with implementation of M-TR-1, and it is possible that significant construction-related traffic impacts could still occur in the project vicinity. Construction-related transportation impacts would therefore, remain significant and unavoidable.

Operational Impacts

Bay Bridge Operations – Ramp Junction Merge/Diverge

Impact TR-40: Implementation of the Proposed Project would contribute to significant cumulative traffic impacts at the eastbound off-ramp (west side of Yerba Buena Island). ***(Significant and Unavoidable with Mitigation)***

The operational characteristics of the Yerba Buena Island ramps were analyzed to determine project impacts. Table IV.E.11, p. IV.E.72, summarizes the ramp merge and diverge levels of service for 2030 Cumulative plus Project conditions. Based on the merge/diverge analysis, under 2030 Cumulative plus Project conditions, the Proposed Project would contribute traffic to the eastbound off-ramp diverge section on the west side of Yerba Buena Island. Project traffic would comprise a majority of the traffic using the off-ramp during the PM and Saturday peak hours and the project's contribution would therefore, be considered substantial. This means that during the weekday PM and Saturday peak hours, the roadway area on the Bay Bridge approaching the off-ramp would be operating near its capacity with virtually no usable gaps in the traffic stream and little room to maneuver, with notable congestion and/or queuing extending onto the Bay Bridge.

Implementation of Mitigation Measure M-TR-2 would reduce vehicle trip generation such that the project's cumulative impacts to the eastbound off-ramp diverge section would be reduced. However, as illustrated in Table IV.E.12 on p. IV.E.77, this would have only a slight benefit to congestion around the off-ramp diverge section and the Proposed Project's cumulative impacts on this ramp diverge section would remain significant and unavoidable. This impact would occur irrespective of whether the Ramps Project was implemented.

Bay Bridge Operations – Ramp Delays without and with the Ramps Project

Impact TR-41: Under conditions without the Ramps Project, implementation of the Proposed Project would contribute to significant cumulative impacts at the two westbound on-ramps. ***(Significant and Unavoidable with Mitigation)***

Similar to Existing plus Project conditions, under 2030 Cumulative plus Project conditions, traffic volumes destined for the westbound Bay Bridge would exceed the capacity of the westbound on-ramps to the Bay Bridge, resulting in queues. Queues and associated delays would be the same under 2030 Cumulative plus Project conditions as Existing plus Project conditions, as presented in Table IV.E.11, p. IV.E.72. Delays would be considered a significant impact to both westbound on-ramps in the AM, PM, and Saturday peak hours under 2030 Cumulative plus Project conditions.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that cumulative impacts to ramp delays at the two stop controlled westbound on-ramps would be reduced. However, as presented in Table IV.E.12, p. IV.E.77**,** for the weekday AM and PM and Saturday peak hours, autos would still experience delay consistent with LOS F and the project's impacts on delay approaching the on-ramps would remain significant and unavoidable.

Impact TR-42: Under conditions with the Ramps Project, implementation of the Proposed Project would result in significant cumulative impacts during the AM and PM peak hours at the ramp meter at the westbound on-ramp (east side of Yerba Buena Island). ***(Significant and Unavoidable with Mitigation)***

If the Ramps Project were constructed and the west side westbound on-ramp was converted to transit and emergency vehicle-only, stop control devices would be eliminated and all westbound traffic (except transit vehicles destined for San Francisco) would be consolidated to the westbound on-ramp on the east side of Yerba Buena Island. This consolidation would simply relocate the source of vehicular delay from stop signs at the two ramp merges to a ramp meter upstream of the single remaining merge on the east side of Yerba Buena Island. The delay associated with the ramp meter is shown in Table IV.E.13, p. IV.E.78. Although the delays are technically caused by a ramp meter signal, the LOS criteria for unsignalized intersections were applied because the ramp meter signal functions more similarly to a stop sign than a traditional traffic signal.

Under 2030 Cumulative plus Project conditions, vehicular traffic delay under conditions with the reconstructed westbound ramps would be the same as Existing plus Project conditions. This would be a significant impact. Traffic would experience minimal delays in the Saturday peak hour since ramp meters were assumed not to be in operation during that time.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the project's impacts to ramp delays at the ramp meter at the reconstructed westbound on-ramp would be reduced by nearly one-half. However, autos would still experience delay consistent with LOS F and the Project's cumulative impacts to delay approaching the on-ramps would remain significant and unavoidable.

Impact TR-43: Under 2030 Cumulative plus Project conditions without and with the Ramps Project, implementation of the Proposed Project would result in less than significant impacts at three ramp locations. ***(Less than Significant)***

Under 2030 Cumulative plus Project conditions without and with the Ramps Project, the eastbound on-ramp and the eastbound off-ramp on the east side of Yerba Buena Island, and the westbound off-ramp on the east side of Yerba Buena Island would operate at acceptable levels (see Table IV.E.11). Therefore, under 2030 Cumulative plus Project conditions, the Proposed Project would result in less-than-significant impacts at these three ramps.

Bay Bridge Operations – Queuing of Toll Plaza Approaches

Impact TR-44: Implementation of the Proposed Project would contribute to significant cumulative queuing impacts at the Bay Bridge toll plaza during the AM and PM peak hours, whether or not the Ramps Project is implemented. *(Significant and Unavoidable with Mitigation)*

Under 2030 Cumulative plus Project conditions, the Proposed Project would add 471 vehicle trips in the AM peak hour and 465 vehicle trips in the PM peak hour to the approaches to the Bay Bridge in the East Bay (no queues on the westbound approach to the Bay Bridge are projected for Saturday peak hour conditions). The extent to which the Proposed Project would exacerbate westbound queues at the East Bay toll plaza is depicted on Figure IV.E.16, p. IV.E.66. Similar to Existing plus Project conditions, the Proposed Project's contribution to cumulative increases to queuing on Bay Bridge approaches in the East Bay would be considered a significant impact.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the project's impacts to queues approaching the Bay Bridge from the East Bay would be reduced. However, the Proposed Project would continue to contribute to significant cumulative impacts during the AM and PM peak hours, which would be a significant and unavoidable impact.

Bay Bridge Operations – Queuing on San Francisco Streets Approaching the Bay Bridge

Impact TR-45: Implementation of the Proposed Project would contribute to significant cumulative queuing impacts on San Francisco streets approaching the Bay Bridge during the weekday AM and PM and Saturday peak hours, whether or not the Ramps Project is implemented. *(Significant and Unavoidable with Mitigation)*

Under 2030 Cumulative plus Project conditions, the Proposed Project would add between 230 and 523 vehicle trips to congested downtown San Francisco streets during the weekday AM and PM and Saturday peak hours. The additional vehicles would increase on-street queues. The Proposed Project's contribution to cumulative increases in peak hour queuing on Bay Bridge approaches in downtown San Francisco would be significant.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce vehicle trip generation such that the Proposed Project's contributions of vehicles approaching the Bay Bridge from downtown San Francisco during the peak hours would be reduced. However, the Proposed Project would continue to contribute to significant cumulative impacts during the peak hours, which would be a significant and unavoidable impact.

Intersection Traffic Impacts

Under 2030 Cumulative plus Project conditions, Proposed Project impacts were assessed by comparing conditions with the Proposed Project, to 2030 Cumulative No Project conditions. The Proposed Project was determined to have a significant cumulative traffic impact at an intersection if Proposed Project-generated trips would cause an intersection operating at LOS D or better under 2030 Cumulative No Project conditions to operate at LOS E or LOS F, or intersections operating at LOS E to deteriorate to LOS F conditions. At intersections that operate at LOS E or LOS F under 2030 Cumulative No Project conditions, and would continue to operate at LOS E or LOS F under 2030 Cumulative plus Project conditions, the increase in Proposed Project vehicle trips was reviewed to determine whether the increase would contribute considerably to critical movements operating at LOS E or LOS F. Finally, at intersections where project-specific impacts were identified for Existing plus Project conditions, the Proposed Project would also be considered to result in a cumulative impact under 2030 Cumulative plus Project conditions.

Table IV.E.15 presents the comparison of intersection LOS for 2030 Cumulative No Project and 2030 Cumulative plus Project conditions. The results indicate that under 2030 Cumulative conditions all 14 signalized study intersections in downtown San Francisco would operate at unacceptable levels under conditions with the Proposed Project during at least one peak hour.[35]

- The Proposed Project would result in project-specific impacts at six of the ten study intersections that would operate at LOS D and deteriorate to LOS E or LOS F, or that would operate at LOS E and deteriorate to LOS F under Existing plus Project conditions (Impact TR-8 through Impact TR-13). Because the Proposed Project results in significant project-specific impacts at these intersections, it would also result in cumulative impacts at these intersections (Impact TR-46 through Impact TR-51).
- The Proposed Project would contribute considerably to critical movements at one study intersection that operates at LOS E or LOS F under 2030 Cumulative No Project conditions, resulting in a project impact (Impact TR-52).
- The Proposed Project would have less than significant contributions at seven intersections that would operate at LOS E or LOS F under 2030 Cumulative No Project conditions (Impact TR-53).
- The Proposed project would result in project-specific impacts at two uncontrolled intersections (Impact TR-17 and Impact TR-18). Because the Proposed Project would result in significant project-specific impacts, it would also result in cumulative impacts at these intersections (Impact TR-54 and Impact TR-55).

[35] Analysis includes 14 signalized intersections in downtown San Francisco, two uncontrolled intersections in downtown San Francisco, and the intersection of Avenue of the Palms/First Street on Treasure Island. Under Existing plus Project conditions, the intersection of Avenue of the Palms/First Street would operate at LOS D or better during the AM, PM and Saturday peak hours.

Impact TR-46: Implementation of the Proposed Project would result in significant project and cumulative impacts at the intersection of First/Market. ***(Significant and Unavoidable with Mitigation)***

As described in Impact TR-8, the Proposed Project would result in significant project impacts at the intersection of First/Market under Existing plus Project conditions. Under 2030 Cumulative plus Project conditions, the intersection of First/Market would operate at LOS E or LOS F conditions during all three peak hours. During the Saturday peak hour, vehicular traffic generated by the Proposed Project would cause the intersection to deteriorate from LOS C to LOS E, resulting in a significant cumulative impact. In addition, the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F during the PM peak hour, resulting in significant cumulative impacts. During the AM peak hour, the Proposed Project contributions to critical movements were determined to be less than significant.

Impacts could be minimized by providing additional capacity at this intersection. However, modifications to signal timing to provide more capacity for southbound traffic would likely impact transit operations on Market Street, which would be inconsistent with the City's Transit First policy. Further, providing additional traffic lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment provided on Market Street.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but not to LOS D or better. Further, while implementation of M-TR-2 would reduce the number of vehicles traveling through this intersection, the Proposed Project's contribution would remain considerable. The Proposed Project's traffic impacts at the study intersection of First/Market would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Impact TR-47: Implementation of the Proposed Project would result in significant project and cumulative impacts at the intersection of First/Mission. ***(Significant and Unavoidable with Mitigation)***

As described in Impact TR-9, the Proposed Project would result in significant project impacts at the intersection of First/Mission during the PM peak hour under Existing plus Project conditions. Under 2030 Cumulative plus Project conditions, the intersection of First/Mission would operate at LOS F conditions during the PM peak hour, and the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F, resulting in significant project and cumulative impacts.

Impacts could be minimized by providing additional capacity at this intersection. However, providing additional traffic lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment encouraged by the City of San Francisco and proposed as part of the Transit Center District Plan currently under study.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection during the PM peak hour, but not to LOS D or better. Further, while implementation of M-TR-2 would reduce the number of vehicles traveling through this intersection, the Proposed Project's contribution would remain considerable. The Proposed Project's traffic impacts at the study intersection of First/Mission would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Impact TR-48: Implementation of the Proposed Project would result in significant project and cumulative impacts at the intersection of First/Folsom. *(Significant and Unavoidable with Mitigation)*

As described in Impact TR-10, the Proposed Project would result in a significant project impact at the intersection of First/Folsom under Existing plus Project conditions. Under 2030 Cumulative plus Project conditions, the intersection of First/Folsom would operate at LOS F conditions during the PM peak hour, although the Proposed Project contributions to critical movements were determined to be less than significant. As noted above, at intersections where project-specific impacts were identified for Existing plus Project conditions, the Proposed Project would also be considered to result in a project and cumulative impact under 2030 Cumulative plus Project conditions, and therefore the Proposed Project would result in a significant cumulative impact at the intersection of First/Folsom.

Impacts could be minimized by providing additional capacity at this intersection. However, travel lane capacity at this intersection has been maximized, and providing additional travel lanes would require substantial reduction in sidewalk widths, which would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco and proposed as part of the Transit Center District Plan currently under study.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but not to LOS D or better. Further, while implementation of M-TR-2 would reduce the number of vehicles traveling through this intersection, the Proposed Project's impact would remain considerable. The Proposed Project's traffic impacts at the study intersection of First/Folsom would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Impact TR-49: Implementation of the Proposed Project would result in significant project and cumulative impacts at the intersection of First/Harrison/I-80 Eastbound On-Ramp. ***(Significant and Unavoidable with Mitigation)***

As described in Impact TR-11, the Proposed Project would result in significant project impacts at the intersection of First/Harrison/I-80 Eastbound On-Ramp under Existing plus Project conditions. Under 2030 Cumulative plus Project conditions, the intersection of First/Harrison/I-80 Eastbound On-Ramp would operate at LOS F conditions during the PM peak hour, and the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F, resulting in significant project and cumulative impacts.

Impacts could be minimized by providing additional capacity at this intersection. However, travel lane capacity at this intersection has been maximized, and providing additional travel lanes would require substantial reduction in sidewalk widths, which would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco and proposed as part of the Transit Center District Plan currently under study.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection during the PM peak hour, but not to LOS D or better. Further, while implementation of M-TR-2 would reduce the number of vehicles traveling through this intersection, the Proposed Project's contribution would remain considerable. The Proposed Project's traffic impacts at the study intersection of First/Harrison/I-80 Eastbound On-Ramp would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Impact TR-50: Implementation of the Proposed Project would result in significant project and cumulative impacts at the intersection of Bryant/Fifth/I-80 Eastbound On-Ramp. ***(Significant and Unavoidable with Mitigation)***

As described in Impact TR-12, the Proposed Project would result in significant project impacts at the intersection of Bryant/Fifth/I-80 Eastbound On-Ramp under Existing plus Project conditions. Under 2030 Cumulative plus Project conditions, the intersection of Bryant/Fifth/I-80 Eastbound On-Ramp would operate at LOS E or LOS F conditions during all three peak hours. During the Saturday peak hour, vehicular traffic generated by the Proposed Project would cause the intersection to deteriorate from LOS D to LOS E, resulting in a significant project and cumulative impact. During the AM and PM peak hours, the Proposed Project contributions to critical movements were determined to be less than significant.

Impacts could be minimized by providing additional capacity at this intersection. However, travel lane capacity at this intersection has been maximized, and providing additional travel lanes would require substantial reduction in sidewalk widths, which would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but not to LOS D or better. Further, while implementation of M-TR-2 would reduce the number of vehicles traveling through this intersection, the Proposed Project's contribution would remain considerable. The Proposed Project's traffic impacts at the study intersection of Bryant/Fifth/I-80 Eastbound On-Ramp would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Impact TR-51: Implementation of the Proposed Project would result in significant project and cumulative impacts at the intersection of Harrison/Fifth/I-80 Westbound Off-Ramp. ***(Significant and Unavoidable with Mitigation)***

As described in Impact TR-13, the Proposed Project would result in significant project impacts at the intersection of Fifth/Harrison/I-80 Westbound Off-Ramp under Existing plus Project conditions. Under 2030 Cumulative plus Project conditions, the intersection of Fifth/Harrison/I-80 Westbound Off-Ramp would operate at LOS F conditions during the PM peak hour, and the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F, resulting in significant project and cumulative impacts.

Impacts could be minimized by providing additional capacity at this intersection. However, travel lane capacity at this intersection has been maximized, and providing additional travel lanes would require substantial reduction in sidewalk widths, which would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection during the PM peak hour, but not to LOS D or better. Further, while implementation of M-TR-2 would reduce the number of vehicles traveling through this intersection, the Proposed Project's contribution would remain considerable. The Proposed Project's traffic impacts at the study intersection of Fifth/Harrison/I-80 Westbound Off-Ramp would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Impact TR-52: Implementation of the Proposed Project would result in significant project and cumulative impacts at the intersection of Second/Folsom. ***(Significant and Unavoidable with Mitigation)***

Under both 2030 Cumulative No Project and 2030 Cumulative plus Project conditions, the intersection of Second/Folsom would operate at LOS F conditions during the AM and PM peak hours. Based on the assessment of the project-generated vehicle trips, the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F during both peak hours, resulting in significant project and cumulative impacts.

Impacts could be minimized by providing additional capacity at this intersection. However, travel lane capacity at this intersection has been maximized, and providing additional travel lanes would require substantial reduction in sidewalk widths, which would be inconsistent with the transit and pedestrian environment encouraged by the City of San Francisco.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection during the PM peak hour, but not to LOS D or better. Further, while implementation of M-TR-2 would reduce the number of vehicles traveling through this intersection, the Proposed Project's contribution would remain considerable. The Proposed Project's traffic impacts at the study intersection of Second/Folsom would therefore be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Impact TR-53: Implementation of the Project would have less than significant impacts at seven study intersections that would operate at LOS E or LOS F under 2030 Cumulative plus Project conditions. ***(Less than Significant)***

At 7 of 14 signalized study intersections that would operate at LOS E or LOS F under 2030 Cumulative No Project conditions, and would continue to operate at LOS E or LOS F under 2030 Cumulative plus Project conditions, the Proposed Project contributions to traffic volumes at the critical movements was examined. Based on this assessment, it was determined that Proposed Project vehicle trips would represent a less than cumulatively considerable contribution to LOS E or LOS F operating conditions and therefore, traffic impacts would be less than significant at the following intersections:

- Fremont/Howard
- Fremont/Folsom
- Fremont/I-80 Westbound Off-Ramp/Harrison
- First/Howard
- Essex/Harrison/I-80 Eastbound On-Ramp
- Second/Bryant
- The Embarcadero/Harrison

The poor operating conditions at these study intersections would be due to traffic volume increases associated with other developments in the Proposed Project vicinity. Since the

Proposed Project would not result in a considerable contribution to the poor operating conditions, Proposed Project impacts at these intersections would be less than significant.

Impact TR-54: Implementation of the Proposed Project would contribute to significant cumulative impacts at the uncontrolled study intersection of Folsom/Essex. *(Significant and Unavoidable with Mitigation)*

As indicated in Impact TR-17, the study intersection of Folsom/Essex is not currently controlled by either traffic signals or stop signs, and both approaches to the intersection are uncontrolled. Under 2030 Cumulative conditions, the existing queues that form on the approaches to the I-80 eastbound on-ramp and that spill back into the intersection would increase due to background traffic growth. Implementation of the Proposed Project would add vehicles to these existing queues, and contributions to the queued operations would be considered a significant cumulative impact.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce the number of Proposed Project vehicles that would travel through this intersection; however, it would continue to operate at queued conditions and the Proposed Project would continue to substantially contribute to these queues. Further, while implementation of Mitigation Measure M-TR-2 would reduce the number of vehicles going through this intersection, the Proposed Project's contribution to queued conditions would remain considerable. The Proposed Project's traffic impacts at the uncontrolled study intersection of Folsom/Essex would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Impact TR-55: Implementation of the Proposed Project would contribute to significant cumulative impacts at the uncontrolled study intersection of Bryant/Sterling. *(Significant and Unavoidable with Mitigation)*

As indicated in Impact TR-18, the study intersection of Bryant/Sterling is not currently controlled by either traffic signals or stop signs, and both approaches to the intersection are uncontrolled. Under 2030 Cumulative conditions, the existing queues that form on the approaches to the I-80 eastbound on-ramp and that spill back into the intersection would increase due to background traffic growth. Implementation of the Proposed Project would add vehicles to these existing queues, and contributions to the queued operations would be considered a significant cumulative impact.

Implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce the number of Proposed Project vehicles that would travel through this intersection; however, it would continue to operate at queued conditions and the Proposed Project would continue to substantially contribute to these queues. Further, while implementation of Mitigation Measure

M-TR-2 would reduce the number of vehicles going through this intersection, the Proposed Project's contribution to queued conditions would remain considerable. The Proposed Project's traffic impacts at the uncontrolled study intersection of Bryant/Sterling would therefore, be significant and unavoidable. The Proposed Project's traffic impact at this intersection would also be significant and unavoidable because funding for implementation of Mitigation Measure TR-2 is uncertain.

Transit Impacts

Capacity Utilization Impacts

Under the 2030 Cumulative plus Project conditions, the capacity utilization impacts on the Muni, AC Transit and ferry service to and from Treasure Island would be the same as under the Existing plus Project conditions (Impact TR-19 through Impact TR-21) because transit would only serve the proposed development, which is analyzed at full buildout. Additional ridership generated by other projects in San Francisco or other Bay Area locations would not be expected to combine with ridership generated by the Proposed Project such that impacts beyond those already identified would occur. As discussed earlier in this chapter, the Proposed Project would result in significant capacity utilization impact on Muni. Implementation of Mitigation Measure M-TR-2 would reduce this impact to a less-than-significant level. However, the impact on Muni would remain significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain. The Proposed Project would result in less-than-significant impacts to AC Transit and the ferry because they would have sufficient capacity to accommodate all the transit riders generated by the development.

Impact TR-56: The Proposed Project's contribution to cumulative transit trips to the downtown screenlines would not increase demands in excess of available capacity. *(Less than Significant)*

Proposed Project transit improvements would not affect the capacity at the four downtown screenlines; however, a portion of the Proposed Project trips would cross the screenlines and contribute to total ridership at the maximum load points. Table IV.E.18, p. IV.E.98, summarizes the capacity utilization for the downtown screenlines for the AM and PM peak hours for the 2030 Cumulative plus Project conditions. As shown in Table IV.E.18, the Proposed Project's contribution to ridership in the peak direction for any of the downtown screenlines would be relatively small, and with the addition of Project trips all downtown screenlines would continue to operate within Muni's 85 percent utilization standard. Therefore, Project impacts on transit capacity at the downtown screenlines under 2030 Cumulative plus Project conditions would be less than significant.

Impact TR-57: The Proposed Project's contributions to cumulative transit trips on AC Transit, BART, Golden Gate Transit, SamTrans, Caltrain and other ferry lines would not increase demands in excess of available capacity. *(Less than Significant)*

As discussed in Impact TR-23, a portion of the new transit trips generated by the Proposed Project would transfer from the 108-Treasure Island and new ferry line to other regional transit operators including AC Transit, BART, Golden Gate Transit, SamTrans, Caltrain, and other ferry lines. Similar to the impact assessment presented above in Impact TR-56 for the Muni downtown screenlines under 2030 Cumulative plus Project conditions, Proposed Project-generated transit riders transferring to other regional operators would more likely be traveling in the off-peak direction, for which there is generally available capacity. Some transit riders traveling to and from the Islands may travel on regional transit lines in the peak direction, but the number of riders would be negligible and would not substantially affect screenlines for regional transit providers.

Since Proposed Project-generated transit riders transferring to other lines would be dispersed over multiple operators and lines, and since these trips would primarily occur in the off-peak direction of transit demand, the additional trips would not substantially affect the peak direction capacity utilization of regional providers. Therefore, under 2030 Cumulative plus Project conditions, impacts to regional transit operator capacity, including AC Transit, BART, Golden Gate Transit, SamTrans, Caltrain and other ferry lines would be less than significant, and no mitigation measures would be required.

<u>Operational Impacts on Treasure Island/Yerba Buena Island</u>

Under the 2030 Cumulative plus Project conditions, the operational transit impacts on Muni, AC Transit and ferry service would be the same as under the Existing plus Project conditions (Impact TR-24 through Impact TR-28) because the roadway system would only serve the proposed development, which is analyzed at full buildout. Additional vehicles generated by other projects in San Francisco or other Bay Area locations would not be expected to combine with the project-generated vehicles that would use Treasure Island and Hillcrest Roads such that impacts beyond those already identified would occur. As discussed earlier in this chapter, the Proposed Project would result in significant operational impact on Muni (with and without the Ramps Project) due to vehicular queues that could form on Treasure Island Road. Implementation of Mitigation Measure M-TR-24 would reduce this impact to a less-than-significant level. The Proposed Project would also result in a significant operational impact on AC Transit (with and without the Ramps Project) for the same reason. However, the impact on AC Transit would be significant and unavoidable because there is insufficient right-of-way between the westbound on-ramp (on the west side of YBI) and the eastbound on-ramp (on the east side of YBI) to provide a transit-only lane. The Proposed Project would result in less-than-significant impact to ferry operations.

Operational Impacts in downtown San Francisco

As described in Impact TR-46 through Impact TR-52 above, in downtown San Francisco the Proposed Project-generated vehicle trips would result in significant project and cumulative impacts at seven study intersections (Impact TR-46 through Impact TR-52). The increases in vehicle delay due to the project-generated vehicle trips may also affect transit lines that travel through these intersections. Muni, Golden Gate Transit, and SamTrans bus lines travel through five of the seven intersections and therefore, an assessment was conducted to determine whether the increase in delay would result in a significant impact to transit operations.[36] The assessment at the five impacted intersections below includes a discussion of Muni, Golden Gate Transit and SamTrans impacts on transit identified in Impact TR-58 through Impact TR-62.

First/Market – Under 2030 Cumulative plus Project conditions, the intersection of First/Market would operate at LOS E or LOS F conditions during all three peak hours. During the Saturday peak hour, vehicular traffic generated by the Proposed Project would cause the intersection to deteriorate from LOS C to LOS E, resulting in a significant cumulative impact. In addition, the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F during the PM peak hour, resulting in significant project and cumulative impacts. During the AM peak hour, the Proposed Project contributions to critical movements were determined to be less than significant.

A total of 13 Muni bus lines (2-Clement, 3-Jackson, 5-Fulton, 6-Parnassus, 9/9L-San Bruno, 21-Hayes, 30-Stockton, 30X-Marina Express, 31-Balboa, 38/38L/38X-Geary, 71/71L-Haight/Noriega, 76-Marin Headlands, 81X-Caltrain Express) and one Muni streetcar line (F-Market & Wharves) travel through this intersection during the weekday PM and Saturday peak hours.

Under 2030 Cumulative plus Project conditions, the eastbound and westbound approaches on Market Street would operate at acceptable levels of service (LOS D or better), so the Proposed Project's contribution of traffic on Market Street approaches would not significantly impact transit lines on Market Street. During the weekday PM and Saturday peak hours, the southbound movement would operate at LOS F. Transit lines that would be affected (i.e., those that approach the intersection traveling southbound) include the 30X-Marina Express. These lines would experience increases in delay due to congestion on Bush Street, Battery Street and First Street. Since the Proposed Project would result in a significant contribution to delay at this approach, the Proposed Project would have a significant cumulative impact on transit travel times on the 30X-Marina Express.

[36] During the PM peak hour, no transit routes travel through the intersection of First/Folsom or First/Harrison/I-80 Eastbound On-Ramp and therefore, discussion of these intersections is not provided.

First/Mission – Under 2030 Cumulative plus Project conditions, the intersection of First/Mission would operate at LOS F conditions during the PM peak hour, and the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F, resulting in significant project and cumulative impacts. During the PM peak hour, a total of six Muni bus lines (5-Fulton, 6-Parnassus, 14/14L-Mission, 38/38L-Geary, 71/71L-Haight-Noriega, 76-Marin Headlands), eight Golden Gate Transit lines (10, 54, 70, 72, 73, 76, 80, 101), and three SamTrans bus lines (292, 391, 397) travel through this intersection. However, all approaches to this intersection include dedicated transit-only lanes; therefore, transit lines traveling through this intersection would not be affected by Proposed Project-generated increases in cumulative intersection delay, and the Proposed Project's contribution to cumulative transit impacts at this intersection would be less than significant.

Bryant/Fifth/I-80 Eastbound On-Ramp – Under 2030 Cumulative plus Project conditions, the intersection of Bryant/Fifth/I-80 Eastbound On-Ramp would operate at LOS E or LOS F conditions during all three peak hours. During the Saturday peak hour, vehicular traffic generated by the Proposed Project would cause the intersection to deteriorate from LOS D to LOS E, resulting in a significant project and cumulative impact. During the AM and PM peak hours, the Proposed Project contributions to critical movements were determined to be less than significant. Three Muni bus lines travel through this intersection (9X/9AX/9BX-Bayshore Express lines, 27- Bryant, 47-Van Ness). Transit lines at this intersection share lanes with mixed-flow traffic along both Bryant Street and Fifth Street. The 9X/9AX/9BX-Bayshore Express lines and the 27-Bryant travel eastbound on Bryant Street, while the 47-Van Ness travels northbound on Fifth Street.

During the PM peak hour, the northbound right and eastbound through movements, and the southbound approach would operate at unacceptable levels of service, and a majority of the delay would be a result of congestion leading towards the Bay Bridge. The proposed project would only add traffic to the northbound and southbound approaches and the eastbound left turn movement. The 9X/9AX/9BX-Bayshore Express lines operate in the southernmost through lane on Bryant Street and the project would not add new trips to the eastbound through movement; therefore, during the PM peak hour the Proposed Project would only cause a significant cumulative impact to transit travel times on the 27-Bryant (which turns left from Bryant Street to Fifth Street) and 47-Van Ness (which runs northbound on Fifth Street) during the PM peak hour.

During the Saturday peak hour, the northbound approach would operate at unacceptable levels of service. The project would add new trips to this approach; therefore, the Proposed Project would have a significant cumulative impact on the 47-Van Ness during the Saturday peak hour.

Harrison/Fifth/I-80 Westbound Off-Ramp – Under 2030 Cumulative plus Project conditions, the intersection of Harrison/Fifth/I-80 Westbound Off-Ramp would operate at LOS F conditions during the PM peak hour, and the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F, resulting in significant project and cumulative impacts. Four Muni bus lines travel through this intersection (9X/9AX/9BX-Bayshore Express, 12-Folsom-Pacific, 27-Bryant, 47-Van Ness). Transit lines at this intersection share lanes with mixed-flow traffic along both Harrison Street and Fifth Street. During the PM peak hour, the westbound approach operates acceptably; therefore no impact was identified for the 12-Folsom-Pacific and the 9X/9AX/9BX-Bayshore Express lines that run westbound on Harrison Street. However, Fifth Street northbound and southbound approaches, and the I-80 westbound off-ramp approach would operate at unacceptable levels of service during the PM peak hour. The Proposed Project's contribution to increases in delay on the northbound and southbound approaches would be substantial; therefore, the Proposed Project's cumulative impacts on transit travel times for the 27-Bryant and 47-Van Ness lines, which travel on Fifth Street, would be considered a significant impact.

Second/Folsom – Under both 2030 Cumulative No Project and 2030 Cumulative plus Project conditions, the intersection of Second/Folsom would operate at LOS F during the AM and PM peak hours. Based on the assessment of the project-generated vehicle trips, the Proposed Project would contribute considerably to critical movements operating at LOS E or LOS F during both peak hours, resulting in significant project and cumulative impacts. Three Muni bus lines (10-Townsend, 12-Folsom-Pacific, 76-Marin Headlands) and 19 Golden Gate Transit bus lines (2, 4, 8, 18, 24, 27, 38, 44, 54, 56, 58, 72, 73, 74, 76, 10, 70, 80, 101) travel through this intersection. Transit lines at this intersection share lanes with mixed-flow traffic along both Folsom Street and Second Street. During the AM and PM peak hour, the intersection would operate with substantial amounts of vehicle delay, primarily as a result of Bay Bridge-destined traffic. Folsom Street has four eastbound travel lanes at this intersection, and buses use the north-most lane, which does not lead to an on-ramp to the Bay Bridge and would be less congested than the southern lanes. Therefore, project contributions to congestion on Folsom Street would have a minimal effect to operations on the 12-Folsom-Pacific, 76-Marin Headlands, and Golden Gate Transit buses, which travel on Folsom Street. However, the 10-Townsend would need to maneuver though Second Street northbound and southbound mixed-flow traffic destined for the Bay Bridge, which as noted above would operate with substantial amounts of vehicle delay. Since the Proposed Project would result in a significant contribution to the southbound movement at the intersection of Second/Folsom, the Proposed Project's contribution to cumulative travel time impacts to the 10-Townsend would be considered significant.

Impact TR-58: The Proposed Project would contribute to cumulative congestion in downtown San Francisco, which would increase travel time and would impact operations of the Muni 27-Bryant bus line. ***(Significant and Unavoidable with Mitigation)***

The Proposed Project contributions to adverse traffic conditions at the intersections of Bryant/Fifth/I-80 Eastbound On-Ramp and Harrison/Fifth/I-80 Westbound Off-Ramp would affect the travel times of the 27-Bryant. Therefore the Proposed Project's cumulative impact on the 27-Bryant operations would be a significant impact.

At the intersections of Fifth/Bryant/I-80 Eastbound On-Ramp and Fifth/Harrison/I-80 Westbound Off-Ramp no feasible mitigation measures have been identified. Implementation of the Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at these intersections, but the intersections would continue to operate poorly during the PM peak hour. Since no feasible mitigation measures have been identified, the Proposed Project's cumulative impacts on transit travel times on the 27-Bryant would remain significant and unavoidable. The Proposed Project's cumulative transit impact would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-59: The Proposed Project would contribute to cumulative congestion in downtown San Francisco, which would increase travel time and would impact operations of the Muni 30X-Marina Express bus line. ***(Significant and Unavoidable with Mitigation)***

As described above, the 30X-Marina Express bus operations would be affected by Proposed Project-related traffic delays at the intersection of First/Market, which would be considered a significant cumulative impact on transit travel times on the 30X-Marina Express. Potential mitigation measures for the intersection of First/Market are limited, as traffic signals at this intersection are timed to prioritize transit movements on Market Street. Modifications to signal timing to provide more capacity to the southbound movement which would operates poorly would likely in turn impact transit operations on Market Street and be inconsistent with the City's Transit First policy. Providing additional travel lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment on Market Street. Implementation of the Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at the intersection of First/Market, but the intersection would continue to operate poorly during the PM peak hour. Since no feasible mitigation measures have been identified, the Proposed Project's cumulative impacts on transit travel times on the 30X-Marina Express would be significant and unavoidable. The Proposed Project's cumulative transit impact would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-60: The Proposed Project would contribute to cumulative congestion in downtown San Francisco, which would increase travel time and would impact operations of the Muni 47-Van Ness bus line. *(Significant and Unavoidable with Mitigation)*

As described above, the 47-Van Ness bus operations would be affected by Proposed Project-related traffic delays at the intersection of Bryant/Fifth/I-80 Eastbound On-Ramp and Harrison/Fifth/I-80 Westbound Off-Ramp, which would be considered a significant cumulative impact on transit travel times on the 47-Van Ness.

At the intersections of Fifth/Bryant/I-80 Eastbound On-Ramp and Fifth/Harrison/I-80 Westbound Off-Ramp no feasible mitigation measures have been identified. Implementation of the Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at these intersections, but the intersections would continue to operate poorly during the PM peak hour. Since no feasible mitigation measures have been identified, the Proposed Project's cumulative impact on transit travel times on the 47-Van Ness would remain significant and unavoidable. The Proposed Project's cumulative transit impact would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-61: The Proposed Project would contribute to cumulative congestion in downtown San Francisco, which would increase travel time and would impact operations of the Muni 10-Townsend bus line. *(Significant and Unavoidable with Mitigation)*

As described above, the 10-Townsend would need to maneuver though Second Street northbound and southbound mixed-flow traffic destined for the Bay Bridge, and under 2030 Cumulative plus Project conditions the Proposed Project would have a significant contribution to the southbound movement; therefore, the Proposed Project's contribution to cumulative impacts on the 10-Townsend at this intersection would be considered significant.

Providing additional travel lanes at this intersection would require substantial reduction in sidewalk widths, which would be inconsistent with the pedestrian environment, encouraged by the City of San Francisco and proposed as part of the Transit Center District Plan currently under study. Implementation of the Mitigation Measure M-TR-2 (Expanded Transit Service) would improve operations at this intersection, but the intersection would continue to operate poorly during the PM peak hour. Since no feasible mitigation measures have been identified; the Proposed Project's cumulative impacts on transit travel times on the 10-Townsend would remain significant and unavoidable. The Proposed Project's cumulative transit impact would also be significant and unavoidable because funding for implementation of Mitigation Measure M-TR-2 is uncertain.

Impact TR-62: The Proposed Project would contribute to cumulative congestion in downtown San Francisco during the PM peak hour, however would not impact operations of Golden Gate Transit or SamTrans bus lines. *(Less than Significant)*

As described above, during the PM peak hour the Proposed Project-generated vehicle trips would result in significant impacts at the intersections of First/Mission and Second/Folsom through which Golden Gate Transit and SamTrans buses travel.

During the PM peak hour, Golden Gate Transit buses travel through the intersections of First/Mission and Second/Folsom, while SamTrans buses travel through the intersection of First/Mission. At the intersection of First/Mission, transit operates within dedicated transit-only lanes and therefore, Proposed Project impacts on transit due to increased traffic congestion would be less than significant. At the intersection of Second/Folsom, Golden Gate Transit buses use the north-most travel lane which is not subject to the queued conditions associated with Bay Bridge-destined traffic and therefore, Proposed Project impacts on transit due to Proposed Project contributions to cumulative traffic impacts would be less than significant.

PARKING INFORMATION

San Francisco does not consider parking supply as part of the permanent physical environment and therefore does not consider changes in parking conditions to be environmental impacts as defined by CEQA. The San Francisco Planning Department acknowledges, however, that parking conditions may be of interest to the public and the decision-makers. Therefore, a parking analysis for the Proposed Project is presented for information purposes.

Parking conditions are not static, as parking supply and demand varies from day to day, from day to night, from month to month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel.

In and of themselves, parking deficits are considered to be social effects, rather than impacts on the physical environment as defined by CEQA. Under CEQA, a project’s social impacts need not be treated as significant impacts on the environment. Environmental documents should, however, address the secondary physical impacts that could be triggered by a social impact (CEQA Guidelines Section 15131(a)). The social inconvenience of parking deficits, such as having to hunt for scarce parking spaces, is not an environmental impact, but there may be secondary physical environmental impacts, such as increased traffic congestion at intersections, air quality impacts, safety impacts, noise impacts caused by congestion, or transit impacts associated with a shift in mode. In the experience of San Francisco transportation planners, however, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, induces many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service in particular would be in keeping with the City's "Transit First" policy. The City's Transit First Policy, established in the City's Charter Article 8A, Section 8A.115, provides that "parking policies for areas well served by public transit shall be designed to encourage travel by public transportation and alternative transportation."

In summary, changes in parking conditions are considered to be social impacts rather than impacts on the physical environment. Since the secondary impacts associated with a parking shortfall could affect the physical environment, they are analyzed within the context of CEQA. Accordingly, the following parking analysis, as it relates to parking shortfalls, is presented for informational purposes only. A potential secondary impact of a parking shortfall on transit, related to the Proposed Project's impact on Muni's 108-Treasure Island bus line, has been identified and is also presented.

Off-street parking would not be required for any proposed land use on Treasure Island or Yerba Buena Island, and instead the *Draft Treasure Island and Yerba Buena Island Design for Development* includes maximum permitted parking ratios, with a specific limit on the total number of off-street parking spaces that may be provided. Table IV.E.22 presents the parking ratios and maximum supply by land use. Car-share parking spaces would be provided at a rate of 1 car-share space for residential buildings with 50 to 200 units, and 2 car-share spaces plus 1 more space for every 200 additional units in buildings with 201 or more units. Car-share parking spaces would not count against the maximum parking allowed. Car-share spaces would be required in commercial buildings at a rate of 1 space for each 50 parking spaces for all buildings with more than 25 parking spaces.

The parking impact assessment associated with the Proposed Project includes the comparison of the parking demand to the maximum off-street parking ratios for the Proposed Project as provided in the Draft *Design for Development* document for the Proposed Project, plus the number of new on-street parking spaces that would be provided on streets in the Project site.

Table IV.E.23 summarizes the aggregate of the parking demand calculated for the Proposed Project land uses, and also presents the maximum permitted off-street parking and new on-street parking spaces that would be provided. There would be no free parking on the Islands for either on-street or off-street spaces. Overall, the project proposes 11,153 parking spaces, including 1,035 on-street spaces.

Table IV.E.22: Permitted Parking Ratios and Maximum Off-Street Car Parking Spaces[1]

Use or Activity	Maximum Number of Off-Street Car Parking Spaces
Residential	1 for each dwelling unit calculated on an aggregate basis for all dwelling units constructed within the Development Plan Area, but in no event more than 8,000 residential accessory parking spaces within the Development Plan Area
Office/Commercial	2 for every 1,000 square feet of gross floor area calculated on an aggregate basis for all office/commercial uses (other than retail, hotel and marina) but in no event more than 604 office/commercial accessory spaces within the Development Plan Area
Retail	2 for every 1,000 square feet of gross floor area calculated on an aggregate basis for all retail uses, but in no event more than 414 retail accessory spaces within the Development Plan Area
Hotel	0.8 for every hotel room calculated on an aggregate basis for all hotel uses on Treasure Island and Yerba Buena Island, but in no event more than 360 hotel accessory spaces on Treasure Island and 40 hotel accessory spaces on Yerba Buena Island
Marina	0.6 spaces for every slip constructed within the Development Plan Area calculated on an aggregate basis, but in no event more than 236 Marina accessory spaces within the Development Plan Area

Note:
1 Final maximum allocation of parking spaces within the Development Plan Area would be pursuant to the DDA.

Source: Treasure Island and Yerba Buena Island Design for Development – Public Review Draft 3/5/10.

Overall, during the peak hour of parking demand for all of Treasure Island, the Proposed Project would result in a deficit of 1,071 parking spaces, including a deficit of 2,103 residential spaces and a surplus of 1,032 non-residential spaces. Yerba Buena Island would experience a shortfall of 76 spaces during its peak hour of parking demand, comprised of 59 residential spaces and 17 non-residential spaces. For non-residential uses, each neighborhood would provide a surplus of non-residential parking spaces; conversely, each neighborhood would experience a deficit of residential spaces compared to peak demand.

As noted above, the Proposed Project includes maximum permitted parking controls, rather than imposing minimum amounts of parking to be constructed with each use. Since developers would not be required to provide parking, theoretically, these requirements could result in no off-street parking on the Islands, resulting in a substantially greater parking deficit. However, this is not a reasonably likely scenario, as most developments projects in San Francisco develop the

Table IV.E.23: Summary of Proposed Project Peak Hour Parking Demand and Maximum Permitted Supply

Neighborhood	Residential			Non-Residential			Total		
	Demand[1]	Supply[2]	Surplus/ (Deficit)[3]	Demand	Supply[4]	Surplus/ (Deficit)[3]	Demand	Supply	Surplus/ (Deficit)
Cityside	4,134	3,255	(879)	92	541	449	4,226	3,796	(430)
Eastside	2,032	1,601	(431)	48	334	286	2,080	1,935	(145)
Island Core	3,737	2,944	(793)	1,546	1,774	228	5,283	4,718	(565)
Open Space	0	0	0	395	464	69	395	464	69
Total Treasure Island	9,903	7,800	(2,103)	2,081	3,113	1,032	11,984	10,913	(1,071)
Yerba Buena Island	259	200	(59)	57	40	(17)	316	240	(76)
Total	10,162	8,000	(2,162)	2,138	3,153	1,015	12,300	11,153	(1,147)

Notes:

[1] Residential parking demand includes a limited amount of visitor parking demand that would be accommodated on-street.
[2] Residential parking supply includes the maximum number of off-street parking spaces permitted per standards identified in Table IV.E.22.
[3] Since residential visitor demand would be accommodated on-street, rather than in the off-street residential parking supply, the residential parking deficit and non-residential parking surplus may both be overstated.
[4] A total of 1,035 on-street parking spaces would be provided. Supply allocation by neighborhood obtained from TICD and includes 495 on-street spaces in the Cityside neighborhood, 310 on-street spaces in the Eastside neighborhood, and 230 on-street spaces in the Island Core neighborhood.

Source: Fehr & Peers, 2010

maximum permitted supply. Some centralized off-street parking is proposed as part of the Project and is likely to be built even if individual buildings do not provide parking.[37] Market analysis conducted for TIDC indicated that providing less than one parking space per residential unit could affect the financeability of the development program, the marketability of the homes, and livability of the Islands, and make the project economically infeasible. In addition, parking fees would be a substantial portion of the funding supporting transit facilities and other features of the Proposed Project's TDM Plan. With no off-street parking, there would not be sufficient funds to support the entire TDM Plan and transit services, and the Proposed Project would be infeasible.

The Proposed Project would not eliminate any parking specifically reserved for employees and visitors of the existing uses on Treasure Island (Job Corps) and Yerba Buena Island (U.S. Coast Guard) that would remain in use after implementation of the Proposed Project. However, U.S.

[37] *Treasure Island Parking Analysis*, S L State & Associates, June 2010. Also refer to Section VII. Alternatives, p.VII.77, which provides additional information regarding infeasibility of a reduced parking alternative.

Coast Guard employees currently park in the approximately 15 parking spaces near the Yerba Buena Island hilltop parking lot outside of Coast Guard property. The Proposed Project would eliminate these 15 parking spaces. Thus, with construction of the Proposed Project, U.S. Coast Guard employees accustomed to finding relatively easy free parking on the Islands would no longer be able to do so. With implementation of the Proposed Project, U.S. Coast Guard and Job Corps staff would either have to park within their respective campuses or within the paid parking lots constructed as part of the Proposed Project (similar to other visitors and employees on the Islands). Visitors to the Proposed Project would not be able to park in the Job Corps or U.S. Coast Guard areas.

As part of its "Transit First" policy, the City and County of San Francisco does not require that the supply of parking spaces equals the demand. Consequently, even though it is anticipated that the Project would provide the maximum number of parking spaces permitted by the *Design for Development*, they may not be sufficient to accommodate the actual demand for residential uses. If fewer spaces than the maximum permitted were to be constructed, the projected shortfall for residential uses would increase, or a shortfall for non-residential uses may occur. Therefore, individuals who would prefer to drive may use transit because the perceived convenience of driving is lessened by a shortage of parking. This shortage is not considered a significant environmental effect because it is considered a social impact. Even with a shortage of off-street parking, measures often are implemented that result in more efficient use of the parking spaces provided. By promoting carpooling and implementing pricing strategies designed to encourage short-term parking, the spaces provided for non-residential use would likely be used by more individuals, be vacant for shorter periods of time, and attract drivers needing short-term parking.

The effects of the restricted parking supply, may result in individuals shifting mode from vehicles to transit. If this were to occur, it would exacerbate the impacts on the Muni line 108-Treasure Island identified in Impact TR-24, and would therefore, result in a secondary indirect physical environmental impact on transit operations.

Impact TR-63: Implementation of the Proposed Project parking supply maximums would exacerbate the exceedance of the capacity utilization standard on Muni's 108-Treasure Island bus line serving the Islands. ***(Significant and Unavoidable with Mitigation)***

As described above, if the maximum permitted parking supply is provided, there would be an overall shortfall of parking spaces on the Islands, primarily related to the residential uses. In general, in San Francisco, parking deficits are considered to be social impacts. The social inconvenience of parking deficits, such as having to hunt for scarce parking spaces, is not an environmental impact, but there may be secondary physical environmental impacts, such as increased traffic congestion at intersections, air quality impacts, safety impacts, noise impacts caused by congestion, or transit impacts associated with a shift in mode. The lack of readily available parking supply may result in some drivers seeking and finding alternative parking facilities, shifting to other modes of travel, or changing their overall travel habits. The conditions on the Islands are unique from the rest of San Francisco in that the isolated nature of the Islands does not allow for drivers to seek alternative parking facilities, and instead drivers would need to shift to other modes of travel or change their travel habits. Unlike the rest of San Francisco where alternate available modes include transit, walking, bicycling and taxis, alternate travel modes for off-Islands travel are limited to transit. Therefore, it is anticipated that the parking shortfall on the Islands could result in a shift from auto to transit modes, resulting in an increase in transit travel demand during the peak hours. Depending on the direction of travel, the shift would affect the Muni line 108-Treasure Island bus line, the new AC Transit bus line, and the new ferry service between Treasure Island and downtown San Francisco.

Impacts TR-19 through Impact TR-21 presented the transit impact analysis comparing the projected peak hour transit demand to the capacity that would be available. Implementation of the Proposed Project would not exceed the transit capacity of the new AC Transit bus line (Impact TR-20) or the new ferry service (Impact TR-21) and therefore, an increase in transit demand on these lines due to a mode shift would be accommodated without substantially affecting the lines' capacity utilization standard.

Impact TR-19 identified a significant and unavoidable impact for capacity utilization of the Muni line 108-Treasure Island bus line. During the three peak hours of analysis, the total transit demand for the 108-Treasure Island would not be accommodated within the 85 percent capacity utilization standard, and an increase in transit demand due to a mode shift would exacerbate the exceedance of the capacity utilization standard. Therefore, a shift in mode from auto to transit would result in a worsening of the identified significant impact on Muni line 108-Treasure Island transit operations.

As with Impact TR-20, implementation of Mitigation Measure M-TR-2 (Expanded Transit Service) would reduce the secondary impact on transit to a less than significant level. However, because full funding for Expanded Transit Service has not yet been identified its implementation remains uncertain and therefore, the secondary parking impacts on transit would remain significant and unavoidable.

F. NOISE

SETTING

BACKGROUND

Sound is characterized by various parameters that describe the rate of oscillation (frequency) of sound waves, the distance between successive troughs or crests in the wave, the speed that it travels, and the pressure level or energy content of a given sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound, and the decibel ("dB") scale is used to quantify sound intensity. Because sound can vary in intensity by over one million times within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level. Since the human ear is not equally sensitive to all sound frequencies within the entire spectrum, human response is factored into sound descriptions in a process called "A-weighting," expressed as "dBA." The dBA, or A-weighted decibel, refers to a scale of noise measurement that approximates the range of sensitivity of the human ear to sounds of different frequencies. On this scale, the normal range of human hearing extends from about 0 dBA to about 140 dBA. A 10-dBA increase in the level of a continuous noise represents a perceived doubling of loudness. The noise levels presented herein are expressed in terms of dBA, unless otherwise indicated. Table IV.F.1 shows some representative noise sources and their corresponding noise levels in dBA.[1]

Planning for acceptable noise exposure must take into account the types of activities and corresponding noise sensitivity in a specified location for a generalized land use type. Some general guidelines are as follows: sleep disturbance can occur at levels above 35 dBA; interference with human speech begins at about 60 dBA; and hearing damage can result from prolonged exposure to noise levels in excess of 85 to 90 dBA.[2]

Attenuation of Noise

Line sources of noise, such as roadway traffic, attenuate (lessen) at a rate of 3.0 dBA to 4.5 dBA per doubling of distance from the source, based on the inverse square law and the equation for cylindrical spreading of noise waves over hard and soft surfaces.

---

[1] U.S. Department of Housing and Urban Development (HUD), 1985. *The Noise Guidebook*. http://www.hud.gov/offices/cpd/environment/training/guidebooks/noise/; divided into chapters with Chapter 1 at http://www.hud.gov/offices/cpd/environment/training/guidebooks/noise/chapter1.pdf, accessed June 19, 2010.

[2] U.S. Environmental Protection Agency, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March. 1974. http://nonoise.org/library/levels74/levels74.htm, accessed June 19, 2010.

Table IV.F.1: Typical Sound Levels Measured in the Environment

Examples of Common, Easily Recognized Sounds	Decibels (dBA) at 50 feet	Subjective Evaluations
Near Jet Engine	140	Deafening
Threshold of Pain (Discomfort)	130	
Threshold of Feeling – Hard Rock Band	120	
Accelerating Motorcycle (at a few feet away)	110	
Loud Horn (at 10 feet away)	100	Very Loud
Noisy Urban Street	90	
Noisy Factory	85	
School Cafeteria with Untreated Surfaces	80	Loud
Near Freeway Auto Traffic	60	Moderate
Average Office	50	
Soft Radio Music in Apartment	40	Faint
Average Residence Without Stereo Playing	30	
Average Whisper	20	Very Faint
Rustle of Leaves in Wind	10	
Human Breathing	5	
Threshold of Audibility	0	

Note:
Continuous exposure above 85 dBA is likely to degrade the hearing of most people. Range of speech is 50 to 70 dBA.

Source: U.S. Department of Housing and Urban Development, *The Noise Guidebook*, 1985.

Point sources of noise,[3] including stationary mobile sources such as idling vehicles or onsite construction equipment, attenuate at a rate of 6.0 dBA to 7.5 dBA per doubling of distance from the source, based on the inverse square law and the equations for spherical spreading of noise waves over hard and soft surfaces. For the purposes of this analysis, it is assumed that noise from line and point sources to a distance of 200 feet attenuates at rates of between 3.0 dBA and 6.0 dBA per doubling of distance, and the noise from line and point sources to a distance longer than 200 feet attenuates at a rate of 4.5 dBA to 7.5 dBA per doubling of distance, to account for the

[3] Point sources and line sources are further defined by the California Department of Transportation (Caltrans) as follows:

> Sound from a small localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates or drops off at a rate of 6 dBA for each doubling of the distance (6 dBA/DD). This decrease, due to the geometric spreading of the energy over an ever increasing area, is referred to as the inverse square law. However, highway traffic noise is not a single, stationary point source of sound. The movement of the vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. This results in cylindrical spreading rather than the spherical spreading of a point source. (Source: Caltrans, 1998. Technical Noise Supplement, 1998.)

absorption of noise waves due to ground surfaces such as soft dirt, grass, bushes, and intervening structures.[4]

L_{eq}, L_{dn}, and L_{max}

Time variations in noise exposure are typically expressed in terms of a steady-state energy level (."L_{eq}") that represents the acoustical energy of a given measurement. L_{eq} is used to describe noise over a specified period of time, in terms of a single numerical value. The L_{eq} is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period). Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dBA increment be added to "quiet time" noise levels to form a 24-hour noise descriptor called the day-night noise level ("L_{dn}"). L_{dn} adds a 10-dBA penalty during the night hours (10:00 p.m. to 7:00 a.m.). The maximum noise level ("L_{max}") is the maximum instantaneous noise level measured during the measurement period of interest.

Health Effects of Environmental Noise

The World Health Organization ("WHO") is perhaps the best source of current knowledge regarding the health effects of noise impacts because European nations have continued to study noise and its health effects, while the U.S. Environmental Protection Agency all but eliminated its noise investigation and control program in the 1970s.[5] According to WHO, sleep disturbance can occur when continuous indoor noise levels exceed 30 dBA or when intermittent interior noise levels reach 45 dBA, particularly if background noise is low. With a bedroom window slightly open (a reduction from outside to inside of 15 dB), the WHO criteria suggest that exterior continuous (ambient) nighttime noise levels should be 45 dBA or below, and short-term events should not generate noise in excess of 60 dBA. WHO also notes that maintaining noise levels within the recommended levels during the first part of the night is believed to be effective for the ability of people to initially fall asleep.[6]

Other potential health effects of noise identified by WHO include decreased performance for complex cognitive tasks, such as reading, attention span, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise levels); and hearing impairment (again, generally after

---

[4] California Department of Transportation (Caltrans), *Technical Noise Supplement*, 1998, http://www.dot.ca.gov/hq/env/noise/pub/Technical%20Noise%20Supplement.pdf, accessed on June 20, 2010.

[5] The *San Francisco General Plan* Land Use Compatibility Guidelines for Community Noise, presented below in Table IV.F.3, were created during the same era.

[6] World Health Organization, Guidelines for Community Noise. Geneva, 1999. . http://www.who.int/docstore/peh/noise/guidelines2.html, accessed on June 19, 2010. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

long-term occupational exposure, although shorter-term exposure to very high noise levels, for example, exposure several times a year to concert noise at 100 dBA, can also damage hearing). Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that, during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA or moderately annoyed with noise levels below 50 dBA.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as truck back-up beepers, the crashing of material being loaded or unloaded, car doors slamming, and engines revving outside a nightclub, contribute very little to 24-hour noise levels but are capable of causing sleep disturbance and severe annoyance. The importance of noise to receptors depends on both time and context. For example, long-term high noise levels from large traffic volumes can make conversation at a normal voice level difficult or impossible, while short-term peak noise levels, if they occur at night, can disturb sleep.

EXISTING NOISE ENVIRONMENT

Long-term environmental noise is primarily dependent on vehicle traffic volumes and the mix of vehicle types. The existing ambient noise environment within the Redevelopment Plan Project Area, typical of most urban areas, is dominated by vehicular traffic on the Bay Bridge as well as traffic on local roadways (autos, trucks, and buses). Bay Area Rapid Transit ("BART") trains operate through the Trans-Bay tube that is located underneath the Bay south of the Development Plan Area, but their noise is not apparent within the Redevelopment Plan Project Area. Ship and boat noises, such as horns and engine noise, can also be audible in the Redevelopment Plan Project Area.

The San Francisco Department of Public Health ("DPH") has mapped transportation noise throughout the City and County of San Francisco, based on modeled baseline traffic volumes derived from the San Francisco County Transportation Authority travel demand model. DPH maps indicate the areas subject to noise levels over 60 dBA (L_{dn}) and the range of L_{dn} noise levels that occur on every street in San Francisco. The only portions of these maps that cover the Redevelopment Plan Project Area indicate that the Bay Bridge portion of I-80 experiences roadway noise levels in excess of 70 dBA (L_{dn}). As indicated by the DPH maps, transportation noise levels from the Bay Bridge in the Development Plan Area exceed 70 dBA (L_{dn}) at distances of up to approximately 1,000 feet from the bridge centerline.

Ambient Noise Measurements

Ambient 24-hour noise measurement data were collected in the Development Plan Area to further characterize noise conditions in the vicinity. Measurements were taken at six locations. Figure IV.F.1: Noise Measurement Locations, illustrates the noise measurement locations.

SOURCE: ESA

FIGURE IV.F.1: NOISE MEASUREMENT LOCATIONS

Measurements at locations 1 through 3 were collected starting at 4:00 p.m. on December 14, 2009, and ending at 4:00 p.m. on December 15, 2009. Measurements at locations 4 through 6 were collected starting at 2:00 p.m. on December 17, 2009, and ending at 2:00 p.m. on December 18, 2009.

Table IV.F.2 presents the measured ambient noise levels, in terms of the hourly L_{eq} range and the L_{max}, as well as the calculated L_{dn} noise level for each monitoring location site. The low end of the hourly L_{eq} noise level for the sites was measured to be in the range of 45 to 49 dBA, with the exception of location 6 near the top of Yerba Buena Island, where the low end of the hourly L_{eq} noise level was measured to be 54.0 dBA. This noise level for the low end of the hourly L_{eq} range is directly attributable to the measurement location's close proximity to the Bay Bridge. The high end of the hourly L_{eq} noise level for the sites was generally in the high 50s to low 60s dBA range, with the exceptions of at locations 3 and 5, where the high end of the hourly L_{eq} range was measured to be in the low 70s dBA range and upper 60s dBA range, respectively.

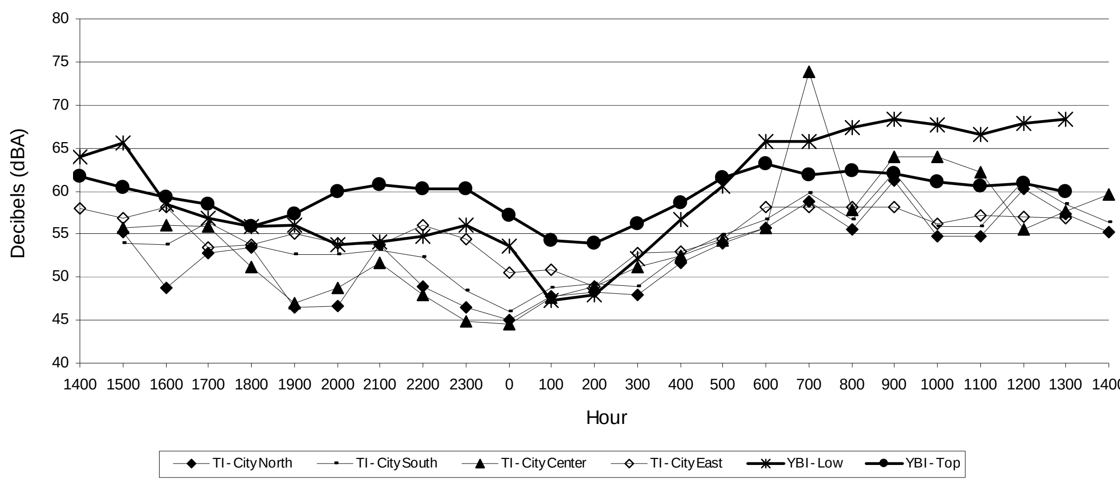
Table IV.F.2: 24-Hour Ambient Noise Level Data in the Study Area

		Noise Levels in dBA		
Measurement Location	**Time**	**Hourly L_{eq} Range**	**L_{max}**	**L_{dn}**
1. Treasure Island - City North Fence line of existing residences on Gateview.	4:00 p.m. - 4:00 p.m.	45.0 – 61.2	85.5	58.2
2. Treasure Island - City South Picnic ground behind existing church.	4:00 p.m. - 4:00 p.m.	46.0 – 62.2	85.5	59.3
3. Treasure Island - City Center Adjacent to building occupied by catering company.	4:00 p.m. - 4:00 p.m.	44.6 – 73.4	90.7	62.7
4. Treasure Island - City East Eastern end of island largely undeveloped.	2:00 p.m. - 2:00 p.m.	48.9 – 58.2	75.6	61.0
5. Yerba Buena Island - Low Roadside location adjacent to Macalla Road. Residences on opposite side of road.	2:00 p.m. - 2:00 p.m.	47.3 – 68.3	88.4	66.8
6. Yerba Buena Island - Top A park on the highest point of the island. Occasional vehicle traffic. Residences 300 feet to the north.	2:00 p.m. - 2:00 p.m.	54.0 – 63.2	77.5	66.0

Note:
See Figure IV.F.1, p. **IV.F.5**, for measurement locations. Measurements at locations 1 through 3 were collected on December 14 and 15, 2009, and measurements at locations 4 through 6 were collected on December 17 and 18, 2009.

Source: Environmental Science Associates, 2009.

Noise levels at location 5 were noted to be elevated due to a high degree of truck traffic related to the Bay Bridge East Span project construction activity. For a graphical illustration of the 24-hourly L_{eq} noise measurements recorded at each of the noise monitoring locations, refer to Figure IV.F.2: Hourly L_{eq} Noise Levels in the Study Area.



Treasure Island / Yerba Buena Island Redevelopment Project EIR

Hourly L_{eq} Noise Levels in the Study Area **Figure IV.F.2**

VIBRATION BACKGROUND

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods are used to quantify vibration. The peak particle velocity ("PPV") is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe physical vibration impacts to buildings. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors to vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick people), and vibration-sensitive equipment.

SENSITIVE RECEPTORS

Sensitive noise receptors are generally considered to include hospitals, nursing homes, senior citizen centers, schools, churches, libraries, and residences. Land uses within the Redevelopment Plan Project Area are described in detail in Section IV.A, Land Use and Land Use Planning. The nearest residential buildings to the Development Plan Areas are the 725 existing occupiable housing units on Treasure Island, dormitories on the Job Corps site, the existing 80 occupiable housing units on Yerba Buena Island, and residential units on the Coast Guard property. There is a former .school on Treasure Island that currently serves the Glide YouthBuild Program for young adults, the San Francisco Sheriff's Five Keys Charter School, the Boys and Girls Clubs of San Francisco, and the San Francisco Police Department's motorcycle training unit. In addition, the charter school known as the Life Learning Academy and a child development center operated by Catholic Charities are located on Treasure Island. Of these sensitive receptors, only the Job Corps site, the Coast Guard residences, and the Life Learning Academy are expected to remain on Treasure Island after Project buildout is complete. There are no hospitals or convalescent homes in the project vicinity.

REGULATORY FRAMEWORK

California Noise Insulation Standards

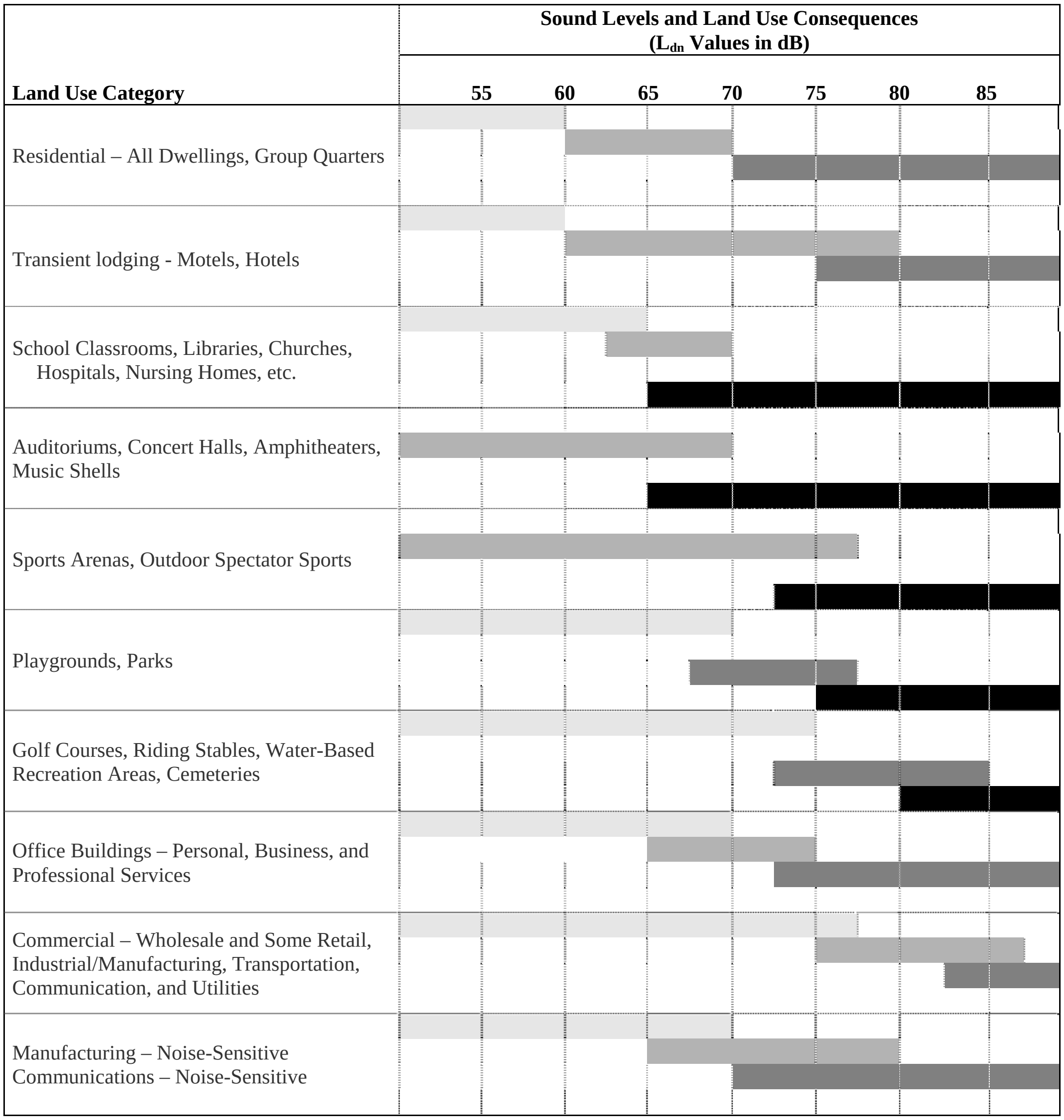
State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards and are found in Title 24 of the California Code of Regulations. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor-ceiling assemblies must block or absorb sound. For limiting noise from exterior sources, the noise insulation standards set forth an interior standard of 45 dBA (L_{dn}) in any habitable room and, where such units are proposed in areas subject to noise levels greater than 60 dBA (L_{dn}), a demonstration of how dwelling units have been designed to meet this interior standard is required. If the interior noise level depends upon windows being closed, the design for the structure must also specify a ventilation or air-conditioning system that provides a habitable interior environment.

San Francisco General Plan

The Environmental Protection Element of the *San Francisco General Plan* contains Land Use Compatibility Guidelines for Community Noise.[7] These guidelines, which are similar to but differ somewhat from State guidelines promulgated by the Governor's Office of Planning and Research, indicate maximum acceptable exterior noise levels for various newly developed land uses. These guidelines are presented in Figure IV.F.3: San Francisco Land Use Compatibility Chart for Community Noise, and indicate exterior noise levels that might be inappropriate for sensitive

[7] San Francisco, 1996. *San Francisco General Plan*, adopted on June 27, 1996. http://www.sf-planning.org/ftp/General_Plan/index.htm, accessed on June 19, 2010.

Figure IV.F.3: San Francisco Land Use Compatibility Chart for Community Noise



Satisfactory, with no special noise insulation requirements.

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

New construction or development should generally not be undertaken.

Source: San Francisco, 1996. *San Francisco General Plan*, adopted on June 27, 1996, http://www.sf-planning.org/ftp/General_Plan/index.htm, accessed June 19, 2010.

land uses and would therefore require additional noise insulation considerations beyond standard practices. Though this figure presents a range of noise levels that are considered compatible or incompatible with various land uses, the maximum "satisfactory" noise level is 60 dBA (L_{dn}) for residential and hotel uses; 65 dBA (L_{dn}) for school classrooms, libraries, churches, and hospitals; 70 dBA (L_{dn}) for playgrounds, parks, office buildings, retail commercial uses, and noise-sensitive manufacturing/communications uses; and 77 dBA for other commercial uses such as wholesale, some retail, industrial/manufacturing, transportation, communications, and utilities.

If these uses are proposed to be located in areas with noise levels that exceed these guidelines, a detailed analysis of noise reduction requirements will normally be necessary prior to final review and approval.

The following policies of the *San Francisco General Plan* Environmental Protection Element that relate to noise issues are relevant to the Proposed Project:

Policy 9.6: Discourage changes in streets which will result in greater traffic noise in noise-sensitive areas. Widening streets for additional traffic lanes or converting streets to one-way direction can induce higher traffic volume and faster speeds. Other techniques such as tow-away lanes and traffic light synchronization also facilitate heavier traffic flows. Such changes should not be undertaken on residential streets if they will produce an excessive rise in the noise level of those streets.

Policy 10.1: Promote site planning, building orientation and design and interior layout that will lessen noise intrusion. Because sound levels drop as distance from the source increases, building setbacks can play an important role in reducing noise for the building occupants…Buildings sited with their narrower dimensions facing the noise source and sited to shield or be shielded by other buildings also help reduce noise intrusion. Although walls with no windows or small windows cut down on noise from exterior sources, in most cases it would not be feasible or desirable to eliminate wall openings. However, interior layout can achieve similar results by locating rooms whose use require more quiet, such as bedrooms, away from the street noise.

Policy 10.2: Promote the incorporation of noise insulation materials in new construction. State-imposed noise insulation standards apply to all new residential structures except detached single-family dwellings. Protection against exterior noise and noise within a building is also important in many nonresidential structures. Builders should be encouraged to take into account prevailing noise levels and to include noise insulation materials as needed to provide adequate insulation.

Policy 10.3: Construct physical barriers to reduce noise transmission from heavy traffic carriers. If designed properly, physical barriers such as walls and berms along transportation routes can in some instances effectively cut down on the noise that reaches the areas beyond. There are opportunities for a certain amount of barrier construction, especially along limited access thoroughfares and transit rights-of-way (such as BART), but it is unlikely that such barriers can be erected along existing arterial streets in the city. Barriers are least effective for those hillside areas above the noise source. Where feasible, appropriate noise barriers should be constructed.

Policy 11.1: Discourage new uses in areas in which the noise level exceeds the noise compatibility guidelines for that use. New development should be examined to determine whether background and/or thoroughfare noise level of the site is consistent with the guidelines for the proposed use. If the noise levels for the development site…exceed the sound level guidelines established for that use, as shown in the accompanying land use compatibility chart, then either needed noise insulation features should be incorporated in the design or else the construction or development should not be undertaken.

Policy 11.3: Locate new noise-generating development so that the noise impact is reduced. Developments which will bring appreciable traffic into or through noise-sensitive areas should be discouraged, if there are appropriate alternative locations where the noise impact would be less. For those activities—such as a hospital—that need a quiet environment, yet themselves generate considerable traffic, the proper location presents a dilemma. In those cases, the new development should locate where this traffic will not present a problem and, if necessary, incorporate the proper noise insulation.

San Francisco Noise Ordinance

In San Francisco, regulation of noise is stipulated in Article 29 of the Police Code (Regulation of Noise), which states that the City's policy is to prohibit unnecessary, excessive, and offensive noises from all sources subject to police power. Sections 2907 and 2908 of Article 29 regulate construction equipment and construction work at night, while Section 2909 provides for limits on stationary-source noise from machinery and equipment. Sections 2907 and 2908 are enforced by the Department of Building Inspection, and Section 2909 is enforced by the Department of Public Health. Summaries of these and other relevant sections are presented below.

Sections 2907(a) and (b) of the Police Code state that it shall be unlawful for any person, including the City and County of San Francisco, to operate any powered construction equipment, regardless of age or date of acquisition, if the operation of such equipment emits noise at a level in excess of 80 dBA when measured at a distance of 100 feet from such equipment, or an equivalent sound level at some other convenient distance. Exemptions to this requirement include:

- Impact tools and equipment with intake and exhaust mufflers recommended by the manufacturers and approved by the Director of Public Works as best accomplishing maximum noise attenuation; and
- Pavement breakers and jackhammers equipped with acoustically attenuating shields or shrouds recommended by the manufacturers and approved by the Director of Public Works as best accomplishing maximum noise attenuation.

Section 2908 prohibits any person, between the hours of 8:00 p.m. of any day and 7:00 a.m. of the following day, to erect, construct, demolish, excavate for, alter, or repair any building or structure if the noise level created is in excess of the ambient noise level by 5 dBA at the nearest property line unless a special permit has been applied for and granted by the Director of Public Works.

Section 2909 establishes a not-to-exceed noise standard for fixed sources of noise, such as building mechanical equipment and industrial or commercial processing machinery. Unlike the State building code (Title 24) standard, which is applicable to interior living space only, the standards in Section 2909(a), (b), and (c) are applicable outdoors, at the property line of the affected use, and vary based on the residential or commercial nature of the noise generator's use. For example, the noise limits for commercial and industrial properties provide that no person shall produce or allow to be produced a noise level more than 8 dBA above the local ambient level at the property plane. For residential properties the noise limits are 5 dBA above the ambient level at any point outside of the property plane of a residential use. The noise limits for public property provide that no person shall produce a noise level more than 10 dBA above the local ambient level at a distance of 25 feet or more on public property.

As is common for noise standards, the permitted noise level for fixed residential interior noise limits identified in Section 2909(d) is lower at night than during the day. For example, maximum noise levels at any sleeping or living room in any dwelling unit located on residential property must not exceed 45 dBA between 10:00 p.m. and 7:00 a.m., and 50 dBA between 7:00 a.m. and 10:00 p.m.

IMPACTS

SIGNIFICANCE CRITERIA

The City and County of San Francisco has not formally adopted significance thresholds for impacts related to noise. The Planning Department's Initial Study Checklist form provides a framework of topics to be considered in evaluating impacts under CEQA. Implementation of a project could have potentially significant impacts related to noise if it were to:

- Expose people to or generate noise levels in excess of standards established in the San Francisco General Plan or the San Francisco Noise Ordinance (Article 29 of the Police Code);
- Expose people to or generate excessive groundborne vibration or groundborne noise levels;
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an area covered by an airport land use plan (or, where such a plan has not been adopted, within two miles of a public airport or public use airport), expose people residing or working in the project area to excessive noise levels;

- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels; or
- Be substantially affected by existing noise levels.

The proposed Redevelopment Plan Project Area is not located within an area covered by an airport land use plan or within 2 miles of a public airport or public use airport; nor is it within the vicinity of a private airstrip. The proposed Redevelopment Plan Project Area is not located within the 65 dBA noise contour for any regional or international airport in the San Francisco Bay Area. Therefore, the proposed *Redevelopment Plan* would not expose people residing or working in the Development Plan Area to excessive airport or airstrip noise. This issue is not addressed further in this EIR.

This EIR section, consistent with the *San Francisco General Plan*'s Environmental Protection Element, addresses noise effects on people. Noise effects on wildlife as a sensitive receptor are dependent on species and a number of biological factors, and are addressed in Section IV.M, Biological Resources.

APPROACH TO ANALYSIS

Temporary, construction-related noise impacts associated with the proposed *Redevelopment Plan* are analyzed in this EIR in a manner consistent with all development projects within San Francisco. Generally, compliance with the San Francisco Noise Ordinance, which is required by law, and implementation of project-specific mitigation measures would reduce construction noise effects from any development phase to a less-than-significant level.

This analysis identifies potential noise impacts associated with future development that could result from the proposed *Redevelopment Plan*. Operational noise issues evaluated in this section include (1) noise generated by automobile, bus, and ferry traffic that would occur under future growth associated with the proposed *Redevelopment Plan*; and (2) compatibility of potential future uses with San Francisco Land Use Compatibility Guidelines for Community Noise. Traffic noise modeling was completed using the Federal Highway Administration Traffic Noise Model Version 2.5 Lookup roadway noise model.

Traffic noise level significance is determined by comparing the noise levels to the Land Use Compatibility Guidelines for Community Noise and by comparing the increased traffic noise levels to the Federal Interagency Committee on Noise ("FICON") significance recommendations, which assess the annoyance effects of changes in ambient noise levels resulting from aircraft operations. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the L_{dn}. FICON significance recommendations are provided in Table IV.F.3. As indicated in the table, an increase in traffic noise of 3 dBA or more would be significant where the ambient noise level is between 60 and 65 dBA L_{dn}, and an increase of 1.5 dBA or more would be significant where the ambient noise level is more than 65 dBA L_{dn}.

Table IV.F.3: Measures of Substantial Increase for Transportation Noise Exposure

Ambient Noise Level Without Project (L_{dn})	Significant Impact Assumed to Occur If the Project Increased Ambient Noise Levels By:
60-65 dB	+ 3.0 dB or more
>65 dB	+ 1.5 dB or more

Source: Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992.

PROJECT IMPACTS

Construction Impacts

Impact NO-1: Project-related construction activities would increase noise levels above existing ambient conditions. (*Significant and Unavoidable with Mitigation*)

Construction activities that would be associated with the Proposed Project are anticipated to occur continuously for approximately 20 years. Construction activities would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation, and construction activities would require the use of heavy trucks, excavating and grading equipment, material loaders, cranes, concrete breakers, and other mobile and stationary construction equipment.

Future noise levels related to construction within and adjacent to the various project sites would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment. Construction activities could generate significant amounts of noise at the project sites, corresponding to the particular phase of building construction and the noise-generating equipment used during construction. In addition, construction-related material haul trips would raise ambient noise levels along haul routes, and material barge trips would raise ambient noise levels on the Bay, depending on the number of truck and barge haul trips made and types of vehicles used. Table IV.F.4 provides typical noise levels produced by various types of construction equipment that would be used at the construction sites.

Average noise levels at sensitive receptor locations would vary by construction phase and depend on the equipment used, the duration of the construction phase, and the proximity of construction activity to the noise sensitive receptors. Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance from the noise source. Proposed construction activities would involve pile driving and geotechnical stabilization techniques, including deep

Table IV.F.4: Typical Noise Levels from Construction Equipment

Construction Equipment	Noise Level (dBA, L_{eq} at 50 feet)
Truck	88
Air Compressor	81
Concrete Mixer	85
Scraper	89
Jackhammer	88
Dozer	85
Paver	89
Generator	81
Pile Driver	101
Backhoe	80
Suction Dredge	85

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, 2006; Bolinas Lagoon Ecosystem Restoration Feasibility Study, DEIR/EIE June 2002.

dynamic compaction ("DDC") (i.e., repeatedly dropping a large weight onto the soil) and vibro-compaction (i.e., using a vibrating probe). Exterior pile driving noise levels at nearby residences could be as high as 95 dBA at 100 feet. Non-pile driving construction activities, including geotechnical stabilization activities, would be capable of generating average noise levels of approximately 80 dBA at 100 feet.

Construction noise would be substantially greater than existing noise levels at the nearby receptor locations and would have the potential to result in significant impacts to existing sensitive receptors. Although proposed construction activities would occur over a period of approximately 20 years, the construction activities that would impact nearby sensitive receptors would be temporary. The loudest construction activities, such as pile driving, grading, excavation, etc., would occur over a fraction of the total construction period for the given plan component, and once the particular construction activity was completed, the associated noise would no longer be experienced by the affected receptors. However, given the phased sequence of construction, pile driving and DDC are expected to occur intermittently over the 20-year project construction period. Intermittent noise from pile driving and DDC over this period would affect not only the nearby existing sensitive receptors to remain on the island but also those residents who would occupy buildings constructed during the initial phases of development.

Proposed construction would be required to comply with the San Francisco Noise Ordinance, which prohibits construction activities between 8:00 p.m. and 7:00 a.m., and limits noise from any individual piece of construction equipment, except impact tools approved by the Department of Public Works, to 80 dBA at 100 feet. As long as construction activities that would occur under the proposed *Redevelopment Plan* comply with the noise ordinance and feasible mitigation measures to reduce noise levels at receptor locations are implemented, construction noise impacts from non-impact equipment would be considered less than significant.

Mitigation Measures M-NO-1a and M-NO-1b would decrease construction noise levels by requiring construction contractors to implement noise reduction measures for construction activities, including pile-driving activities. The San Francisco Noise Ordinance does not identify any quantitative standard for impact equipment. With implementation of mitigation measures, impact noise would still exceed existing monitored values by over 30 dBA at the closest locations and represent a potential significant and unavoidable noise impact to existing sensitive receptors, representing a substantial temporary increase in ambient noise levels.

<u>Mitigation Measure M-NO-1a:</u> <u>Reduce Noise Levels During Construction</u>

The following practices shall be incorporated into the construction contract agreement documents to be implemented by the construction contractor:

- Provide enclosures and mufflers for stationary equipment, shroud or shield impact tools, and install barriers around particularly noisy activities at the construction sites so that the line of sight between the construction activities and nearby sensitive receptor locations is blocked;
- Use construction equipment with lower noise emission ratings whenever possible, particularly for air compressors;
- Provide sound-control devices on equipment no less effective than those provided by the manufacturer;
- Locate stationary equipment, material stockpiles, and vehicle staging areas as far as practicable from sensitive receptor locations;
- Prohibit unnecessary idling of internal combustion engines;
- Require applicable construction-related vehicles and equipment to use designated truck routes to access the project sites;
- Implement noise attenuation measures to the extent feasible, which may include, but are not limited to, noise barriers or noise blankets. The placement of such attenuation measures shall be reviewed and approved by the Director of Public Works prior to issuance of development permits for construction activities; and
- Designate a Noise Disturbance Coordinator who shall be responsible for responding to complaints about noise during construction. The telephone number of the Noise Disturbance Coordinator shall be conspicuously posted at the construction site and shall be provided to the City. Copies of the construction schedule shall also be posted at nearby noise-sensitive areas.

Mitigation Measure M-NO-1b: Pile Driving Noise-Reducing Techniques and Muffling Devices

The project sponsors and developers of each structure (project applicant) shall require the construction contractor to use noise-reducing pile driving techniques if nearby structures are subject to pile driving noise and vibration. These techniques shall include pre-drilling pile holes (if feasible, based on soils; see Mitigation Measure M-NO-2) to the maximum feasible depth, installing intake and exhaust mufflers on pile driving equipment, vibrating piles into place when feasible, and installing shrouds around the pile driving hammer where feasible.

Construction contractors shall be required to use construction equipment with state-of-the-art noise shielding and muffling devices. In addition, at least 48 hours prior to pile-driving activities, the Project Applicant shall notify building owners and occupants within 500 feet of the project site of the dates, hours, and expected duration of such activities.

Impact NO-2: Construction activities could expose persons and structures to excessive ground-borne vibration or ground-borne noise levels. *(Significant and Unavoidable with Mitigation*)

There are no adopted State or local policies or standards for ground-borne vibration. The average person is quite sensitive to ground motion, and levels as low as 0.50 mm/s (0.02 inch per second) can be detected by the human body when background noise and vibration levels are low. Vibration intensity is expressed as peak particle velocity, (the maximum speed that the ground moves while it temporarily shakes). Since ground-shaking speeds are very small, PPV is measured in inches per second. The Federal Railway Administration and the Federal Transit Administration have published guidance relative to vibration impacts. According to the Federal Rail Administration, fragile buildings can be exposed to ground-borne vibration PPV levels of 0.5 inch per second without experiencing structural damage.[8] Caltrans does recommend that extreme care be taken when sustained pile driving occurs within 25 feet of any building, or within 50 to 100 feet of a historic building or a building in poor condition.[9]

Ground-borne vibration from construction activities that involve "impact activities" (especially pile driving and deep dynamic compaction) and vibro-compaction could produce detectable vibration at nearby sensitive buildings and sensitive receptors unless proper mitigation is followed.

Vibration from Pile Driving and Compaction Activities

Building Damage

Pile driving activities are proposed to occur intermittently from 2012 to about 2030. The magnitude of vibration caused from pile driving is a function of distance from the receptor or

---

8 Federal Rail Administration, *High Speed Ground Transportation Noise and Vibration Impact Assessment, Final*, 2005.

9 Caltrans *Transportation Related Earthborne Vibrations (Caltrans Experiences).* Technical Advisory, Vibration TAV-02-01-R9601, February 20, 2002.

structure of concern, the type and size of pile driving equipment, the nature of surrounding soils, and the density of underlying bedrock into which the pile is being driven. Offshore pile driving would be restricted by Mitigation Measure M-BI-1e, which requires the use of vibratory hammers and cushion blocks between hammer and pile, and restricts pile-driving activity to a five-month period from June 1 to November 30 for offshore pile driving to reduce impacts on biological resources. Mitigation Measure M-BI-1e would not apply to onshore pile driving.

Ground-borne vibration from activities that involve "impact tools," especially pile driving, could produce significant vibration. Pile driving can result in PPV of up to 1.5 inches per second at a distance of 25 feet. Construction vibration damage criteria published by the U.S. Department of Transportation ("DOT") range from 0.5 inch per second for reinforced structures to 0.2 inch per second for the protection of "fragile" buildings.

Vibro-compaction activities to consolidate soils on Treasure Island are proposed to occur intermittently between 2011 and 2025. Densification of the island's sandy soils is proposed to create a stable "platform" in the approximately 100-acre area proposed to be developed with new buildings and roads. Vibrations from this activity are reported to be less than those of a vibratory pile driver.[10] Vibro-compaction activities would exceed the DOT 0.2 inch per second criterion for fragile structures at distances closer than 50 feet. Deep dynamic compaction is proposed to occur intermittently between 2011 and 2025. Vibrations from this activity can exceed those of a pile driver. DDC activities would exceed the DOT 0.2 inch per second criterion for fragile structures at a distance of 300 feet or closer. To protect existing buildings from damage related to vibration, Mitigation Measure M-NO-2 (see p. IV.F.20) requires a pre-construction assessment of subsurface conditions and nearby building integrity before a building permit is issued.

Human Annoyance

Vibration levels can also result in interference or annoyance impacts at residences or other land uses where people sleep, such as hotels and hospitals. Vibration impact criteria published by U.S. DOT relative to these land uses are established in terms of vibration decibels ("VdB"). For frequent events such as rapid transit rail activities, a criterion of 72 VdB has been established, while for infrequent events a criterion of 80 VdB has been established. Construction-related activity, which is temporary in nature and would be restricted to daytime hours when most people are not sleeping, is generally assessed by applying the 80 VdB criterion.

Pile driving can result in typical vibrations of 104 VdB at a distance of 25 feet, although upper range vibrations of up to 112 VdB have been reported, depending on soil conditions. Table IV.F.5

---

[10] Engeo, Human Perception of Vibrations, e-mail submittal to Turnstone Consulting, December 2009. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

presents vibration levels that may be experienced from various construction equipment and activities.

Table IV.F.5: Vibration Levels Generated by Construction Equipment and Activity

Equipment	Estimated VdB			
	25 Feet	**50 Feet**	**100 Feet**	**200 Feet**
Jackhammer	79	70	61	52
Large Bulldozer	87	78	69	60
Loaded Truck	86	80	68	59
Pile Driving	112	103	94	85
Vibratory Pile Driving	105	96	87	78
Vibro-compaction	102	93	84	75
Deep Dynamic Compaction	119	110	101	92

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment*, 2006 and ENGEO.

Pile driving vibrations would exceed the 80 VdB criterion for residential receptors at distances of 400 feet or closer. These vibrations would be reduced by the use of cushion blocks. Existing sensitive receptors such as residents of the Job Corps site would potentially be located within this distance of pile driving activities. Residents of the initial phases of development who occupy structures prior to construction of an adjacent phase of development could also be exposed to these vibration levels at distances closer than 400 feet. This would represent a significant vibration disturbance impact based on the criteria of the DOT.

Vibrations from vibratory pile driving and vibro-compaction activities would be less than standard pile driving and could occur at distances of up to 200 feet without exceeding the annoyance criterion. Vibrations from DDC activities, however, can exceed those of pile driving and can reasonably be expected to exceed 80 VdB at distances as much as 500 feet away.

Mitigation Measures M-NO-1b and M-NO-2 would decrease the vibration impacts associated with impact and vibro-compaction construction activities through implementation of such techniques as pre-drilling for piles and the development of a comprehensive monitoring program to detect ground settlement or lateral movement of structures. With these measures, and judicious use of mitigation techniques, damage impacts to existing and proposed buildings could be avoided. However, potential annoyance vibration impacts could still result. While pile driving and DDC activities would be limited to daytime hours when most people would be awake, vibration annoyance may affect day sleepers, students studying at the Job Corps campus or Life Learning Academy, or other receptors engaged in quiet daytime activities, including residents of buildings constructed during the early phases of the Proposed Project development. Given the number of years over which these activities would occur, annoyance-related vibration impacts are considered to be significant and unavoidable. Implementation of Mitigation Measure M-NO-2 would reduce this impact, but not to less-than-significant levels.

Therefore, with implementation of Mitigation Measures M-NO-1b and M-NO-2 potential impacts to the integrity of existing and proposed buildings in the area of impact could be avoided. However, the noise impacts on nearby sensitive receptors would remain significant and unavoidable and would occur at different times throughout the multiple phases of construction.

Mitigation Measure M-NO-2: Pre-Construction Assessment to Minimize Impact Activity and Vibro-compaction Vibration Levels

The project sponsors shall engage a qualified geotechnical engineer to conduct a pre-construction assessment of existing subsurface conditions and the structural integrity of nearby buildings subject to impact or vibrocompaction activity impacts before a building permit is issued. If recommended by the geotechnical engineer, for structures or facilities within 50 feet of impact or vibro-compaction activities, the Project Applicant shall require ground-borne vibration monitoring of nearby structures. Such methods and technologies shall be based on the specific conditions at the construction site such as, but not limited to, the pre-construction surveying of potentially affected structures and underpinning of foundations of potentially affected structures, as necessary.

The pre-construction assessment shall include a monitoring program to detect ground settlement or lateral movement of structures in the vicinity of impact or vibro-compaction activities. Monitoring results shall be submitted to the Department of Building Inspection. In the event of unacceptable ground movement, as determined by the Department of Building Inspection, all impact and/or vibro-compaction work shall cease and corrective measures shall be implemented. The impact and vibro-compaction program and ground stabilization measures shall be reevaluated and approved by the Department of Building Inspection.

Operation Impacts

Impact NO-3: Project-related traffic would result in a substantial permanent increase in ambient noise levels in the project vicinity above existing ambient noise levels. (*Significant and Unavoidable)*

The Proposed Project and the Proposed Project under Expanded Transit Service (see Mitigation Measure M-TR-2 in Section IV.E, Transportation, pp. IV.E.74**)** would both increase noise levels along existing and proposed roadways due to increased vehicle traffic. Increases in noise from traffic on existing roadways is assessed by modeling existing and future roadway noise levels and comparing the resulting increase to standards published by FICON. Impacts related to noise environment compatibility with respect to City compatibility standards are assessed later in this section, in Impact NO-6.

The Proposed Project would result in a net increase of 30,330 standard vehicle trips per day. Transit trips under the Proposed Project include 392 bus trips. Expanded Transit Service would result in a net increase of 25,466 standard vehicle trips per day. The transit trips under Expanded Transit Service would include 636 daily bus trips.

Based on baseline and future traffic projections developed as part of the transportation analysis for the Proposed Project, baseline and future noise levels were estimated for representative major roadway segments within the Development Plan Area shown in Figure IV.F.4: Location of Roadway Segments Modeled for Future Noise Levels with the Proposed Project, including Avenue of the Palms, south of 1st Street; Avenue of the Palms, north of 1st Street; and 1st Street, east of Avenue of the Palms. Modeled weekday and Saturday L_{dn} traffic noise level estimates for the three roadway segments are presented in Table IV.F.6. As shown in the table, significant weekday traffic noise level increases would be associated with both the Proposed Project and Expanded Transit Service along each of the roadway segments, and significant traffic noise level increases would occur on Saturday associated with both the Proposed Project and Expanded Transit Service along each of the modeled roadway segments with the exception of Avenue of the Palms, north of 1st Street.

Although these traffic noise level increases would not expose existing or future residents to noise levels in excess of compatibility standards (discussed in Impact NO-6), they would affect future residential receptors in the Cityside District, the Island Center District, and the Yerba Buena Island District, particularly future residents of early phases that would not have been exposed to the full extent of the operational noise environment prior to full buildout. The traffic noise level increases would also affect students at the Job Corps campus and Life Learning Academy, and residents on the Coast Guard property who would have been exposed to the pre-operational noise environment. Therefore, permanent increases in ambient noise levels are considered to be potentially significant due to noise created by project-generated traffic.

Measures available to address significant traffic noise increases in the Job Corps campus, Life Learning Academy, and Coast Guard areas or the future residential areas are limited. For example, the construction of continuous noise barriers at curbside along the entire length of the identified roadways would not be feasible because such a barrier would block vehicle access to properties and conflict with the aesthetic character of the neighborhoods. All proposed new dwelling units would be multi-family structures. Multi-family structures and hotels proposed as part of the Project would be required to design interior dwelling spaces to achieve an interior noise standard of 45 dBA as required by Title 24. Noise-reducing building techniques to attain these standards could include use of increased insulation and installation of building materials and windows with a high sound transmission class. Consequently, this impact would primarily result in a significant noise increase to exterior areas only (e.g., balconies, and public gathering areas).

SOURCE: ESA

FIGURE IV.F.4: LOCATION OF ROADWAY SEGMENTS MODELED FOR FUTURE NOISE LEVELS WITH THE PROPOSED PROJECT

Table IV.F.6: Modeled Project Traffic L_{dn} Noise Levels

Roadway Segment	Existing	Existing plus Proposed Project	dBA Difference	Significant Increase?	Existing plus Expanded Transit Service	dBA Difference	Significant Increase?
Weekday L_{dn} Noise Levels							
Avenue of the Palms, north of 1st Street	61.9	67.6	5.7	**Yes**	67.2	5.3	**Yes**
Avenue of the Palms, south of 1st Street	62.2	68.3	6.1	**Yes**	68.2	6.0	**Yes**
1st Street, east of Avenue of the Palms	56.8	65.9	9.1	**Yes**	66.3	9.5	**Yes**
Saturday L_{dn} Noise Levels							
Avenue of the Palms, north of 1st Street	69.3	69.3	0.0	**No**	69.0	-0.3	**No**
Avenue of the Palms, south of 1st Street	60.8	70.2	9.4	**Yes**	70.1	9.3	**Yes**
1st Street, east of Avenue of the Palms	56.7	66.3	9.6	**Yes**	66.4	9.7	**Yes**

Notes:
Road center to receptor distance is assumed to be 50 feet for values shown in this table. Noise levels were determined using FHWA Traffic Noise Model Version 2.5 Look-Up Tables. The average speed on these segments is assumed to be 25 miles per hour. For all other assumptions, refer to Appendix D. The incremental increase is considered significant if the increase is more than or equal to 5 dBA, or if it is equal to or greater than 3 dBA with an ambient noise environment between 60 and 65 dBA, or if the noise increase is equal to or greater than 1.5 dBA with an ambient noise environment greater than 65 dBA.

No feasible mitigation measures are available that would reduce this exterior noise impact to a level that would be less than significant. Therefore, traffic noise impacts associated with the Proposed Project would be significant and unavoidable.

Impact NO-4: Project-related ferry noise levels would result in a substantial permanent increase in ambient noise levels in the project vicinity above existing ambient conditions. (*Less than Significant with Mitigation; Significant and Unavoidable if Mitigation Not Implemented by WETA*)

As discussed in Chapter II, Project Description, the Proposed Project would include ferry service that would operate between 5:00 a.m. and 9:00 p.m. from the proposed Ferry Terminal on Treasure Island to one of the existing docks at the San Francisco Ferry Building. The Proposed Project would include ferry service every 50 minutes during peak periods (corresponding to a single ferry operating at one of the existing docks in San Francisco) and Expanded Transit Service would include new ferry service to San Francisco every 15 minutes during peak periods (corresponding to three ferries operating at one of the existing docks in San Francisco).

Major sources of noise that would be associated with the proposed ferry operations include engine exhaust, main propulsion engines, and water noise. Other noise sources associated with ferry operations include gearboxes, ventilation fans and cabin heating, and ventilation and air conditioning systems. Noise measurements of typical fast ferries that operate on San Francisco Bay were taken in April 2003 for the Water Emergency Transit Authority's Program EIR for their proposed plan to expand Bay Area commuter ferry service. These measurements demonstrated L_{max} noise levels at 100 meters (approximately 330 feet) that ranged between 72 dBA and 87 dBA and L_{eq} noise levels at 100 meters that ranged between 64 dBA and 72 dBA. These L_{eq} noise levels are roughly equivalent to those of a heavy duty haul truck. In addition, ferry whistles or horns create impulsive noise levels between 77 and 90 dBA (90 dBA in front of the horn and 77 dBA behind it) at 1,000 feet. Horns would typically be blown twice, lasting 2 to 5 seconds per event.[11]

It is estimated that the ferries associated with the proposed Treasure Island Ferry Terminal would operate as close as 500 feet from the nearest sensitive receptor (i.e., a hotel) location and as close as 700 feet from the nearest residential sensitive receptor location when the ferries would be at the proposed terminal. At distances of 500 feet and 700 feet, it is estimated that ferry L_{eq} noise levels would range from approximately 60 dBA to 68 dBA, and 57 dBA to 65 dBA, respectively. It is assumed that these noise levels at the receptor locations would last for less than 1 minute for each arriving and departing ferry.

The Water Emergency Transit Authority's Program EIR reported measurements of exterior noise from fast ferries operating at full service speed to generate a single event noise level ("SEL") of 70 dBA at a distance of 1,000 feet. This level is representative of the existing class of 350-passenger high-speed vessels operating at between 34 and 36 knots, which are in excess of the speeds reached for the relatively short trips proposed for the Project. Therefore, SELs in the vicinity of the commute route for the trip between Treasure Island and the San Francisco Ferry Building can be assumed to be less than 70 dBA at 1,000 feet. Because ferries would travel a direct route between the Islands and San Francisco, and not travel along the shoreline, sensitive receptors would not generally be exposed to these SELs from commute-speed travel.

The Proposed Project would generate about 19 round trips per day, while Expanded Transit Service would generate about 45 round trips per day. Four of these round trips would occur during the relatively sensitive "nighttime" hours of 5:00 a.m. to 7:00 a.m. The remainder of all trips would occur between 7:00 a.m. and 9:00 p.m. which, for the purposes of determining an L_{dn}, are considered to be less sensitive.

A study of noise from ferry terminals in the state of Washington yielded anecdotal daytime hourly equivalent sound level ($L_{eq)}$ values of 55 to 60 dBA at residential locations varying from

---

[11] Water Emergency Transit Authority, 2003. *Final Program Environmental Impact Report – Expansion of Ferry Transit Service in the San Francisco Bay Area*, Section 3.11 Noise, pp. 3.11-6–3.11-7, June 2003. http://www.watertransit.org/files/pubs/IOP%20or%20Programmatic%20EIR/EIR/Section3.11_Noise. pdf, accessed June 19, 2010..

approximately 500 feet to 2,500 feet from terminal operations.[12] Using the upper end of this data to correlate with the distance of the sensitive receptors nearest the proposed Ferry Terminal (500 feet for hotel and residential towers of the Cityside District), Table IV.F.7 presents the existing and predicted noise level at the nearest sensitive receptor to the proposed terminal. Using these predicted hourly noise levels and applying a 10 dBA "penalty" to nighttime hourly noise results in a predicted future day-night noise level of 63.6 L_{dn},, this falls within the "conditionally acceptable" noise exposure category for proposed residents and hotel occupants of the Proposed Project. These residential and lodging elements of the Proposed Project would need to conform to the requirements of Title 24 to construct and verify interior living spaces with an interior noise level of 45 dBA or less. However, Ferry Terminal operations would have a significant operational noise impact on exterior locations at these proposed sensitive receptors.

Ferry operations would not result in significant noise increases at existing receptors such as the Jobs Corps campus or childcare center, although the sound would be noticeable.

Ferry noise would have the potential to result in a significant noise impact from an increase in ambient noise conditions at the nearest existing and proposed sensitive receptor locations. However, implementation of Mitigation Measure M-NO-4, to prepare and implement a noise reduction plan, would ensure that the ferry terminal and its operations would be designed in a manner that would reduce the potentially significant noise impact to a level that would be less than significant. Because operation of the ferry service would be implemented by the Water Emergency Transit Authority ("WETA") and would not be within the control of TIDA or the City, if WETA elects not to implement this measure, the impact would be considered significant and unavoidable.

<u>Mitigation Measure M-NO-4: Ferry Terminal Noise Reduction Plan</u>

To ensure that the noise levels from the proposed Ferry Terminal and its operations do not exceed the San Francisco Land Use Compatibility Guidelines for Community Noise standards, the developer of the Ferry Terminal shall be required to engage a qualified acoustical consultant to prepare a Ferry Terminal Noise Reduction Plan to be approved by TIDA. The operator would be required to follow the recommendations of the Plan to ensure compliance with the City's community noise guidelines, including but not limited to requiring ferry operators to reduce propulsion engine power to low when approaching and departing the terminal.

[12] Water Emergency Transit Authority, 2003, Section 3.11 Noise, p. 3.11-14. http://www.watertransit.org/files/pubs/IOP%20or%20Programmatic%20EIR/EIR/Section3.11_ Noise.pdf, accessed June 19, 2010..

Table IV.F.7: Predicted Noise Levels from Operation of Ferry Terminal at Nearest Sensitive Receptor

Time	Existing Noise Level (Southern Treasure Island) in Hourly L_{eq}	Ferry Terminal Noise Level Contribution in Hourly L_{eq}	Resultant[1] Noise level in Hourly L_{eq}
24:00 (midnight)	48.5	0.0	48.5
01:00	46.0	0.0	46.0
02:00	48.7	0.0	48.7
03:00	49.2	0.0	49.2
04:00	48.9	0.0	48.9
05:00	52.6	60.0	60.7
06:00	54.9	60.0	61.2
07:00	56.7	60.0	61.7
08:00	59.8	60.0	62.9
09:00	56.6	60.0	61.6
10:00	62.2	60.0	64.2
11:00	55.8	60.0	61.4
12:00	55.8	60.0	61.4
13:00	61.2	60.0	63.7
14:00	58.4	60.0	62.3
15:00	56.3	60.0	61.5
16:00	55.3	60.0	61.3
17:00	53.8	60.0	60.9
18:00	56.3	60.0	61.5
19:00	53.7	60.0	60.9
20:00	52.6	60.0	60.7
21:00	52.7	60.0	60.7
22:00	53.1	0.0	53.1
23:00	52.3	0.0	52.3

Notes:
[1] Because decibels are logarithmic, addition of two or more sound levels must also be done logarithmically. For example 60 dBA + 60 dBA does not equal 120 dBA but 63 dBA.

Source: Environmental Science Associates, 2010

Impact NO-5: Proposed residences and other sensitive uses would be located in incompatible noise environments. (*Less than Significant with Mitigation*)

Existing L_{dn} noise levels in the Development Plan Area have been measured to range from approximately 58 dBA in the northern area of Treasure Island to approximately 67 dBA in the Yerba Buena Island area adjacent to Macalla Road (see Table IV.F.2, p. IV.F.6). In addition, existing traffic L_{dn} noise levels have been modeled in the Development Plan Area to range between 57 dBA and 69 dBA at distances of 50 feet from the road centerlines, and existing plus project traffic L_{dn} noise levels have been modeled in the Development Plan Area to range between 66 dBA and 70 dBA at distances of 50 feet from the road centerlines (see Table IV.F.5, p. IV.F.19).

The San Francisco Land Use Compatibility Guidelines for Community Noise (see Figure IV.F.3, p. IV.F.9) indicate that any new residential construction or development in areas with L_{dn} noise levels above 60 dBA should be undertaken only after a detailed analysis of noise reduction requirements is made and needed noise insulation features are included in the design. In areas where L_{dn} noise levels exceed 65 dBA, new residential construction or development is generally discouraged, but if it does proceed, a detailed analysis of noise reduction requirements must be undertaken and needed noise insulation features included in the design. Therefore, a detailed analysis of noise reduction requirements should be completed for all future residential uses proposed in areas subject to L_{dn} noise levels above 60 dBA. Since the noise measurements and modeled traffic noise levels indicate that the majority of the noise levels in the Development Plan Area exceed 60 dBA (L_{dn}) where most of the proposed new residential development would occur, noise compatibility impacts would be potentially significant and detailed noise analyses and installation of any needed insulation features would be required for residential development proposed in the Development Plan Area to reduce these impacts to levels that would be less than significant.

Because the new residential development that would be allowed within the Development Plan Area would be attached (i.e., multi-family residential) units, these new residential development units would be subject to Title 24 Noise Insulation requirements. The proposed hotels would also be subject to Title 24 requirements. This State regulation requires meeting an interior standard of 45 dBA (L_{dn}) in any habitable room and, where such units are proposed in areas subject to noise levels greater than 60 dBA (L_{dn}), demonstrating how dwelling units have been designed to meet this interior standard. Therefore, compliance with the State noise standards would ensure consistency with the *General Plan* noise standards for the new residential development in the Development Plan Area.

Other noise-sensitive land uses, such as schools, day care centers, etc., where the Land Use Compatibility Guidelines for Community Noise threshold for detailed noise reduction analysis is 65 dBA (L_{dn}), would also be subject to this noise recommendation at many locations in the proposed Development Plan Area. Because such special-purpose uses are frequently subject to particular design and construction standards, it is similarly anticipated that consistency with the *General Plan* recommendations would occur as a matter of course, in many instances. However, without adequate design, such uses could be subject to potentially significant impacts due to traffic-generated noise. To avoid the potential significant impact of exposure of such uses to noise levels in excess of the *General Plan* Land Use Compatibility Guidelines threshold recommendations, Mitigation Measure M-NO-5 is identified to ensure that such uses would undergo appropriate noise analysis prior to approval and construction. Implementation of Mitigation Measure M-NO-5 would avoid potentially significant noise impacts to proposed residential and other sensitive use development in the Development Plan Area by ensuring appropriate noise analyses and implementation of appropriate necessary measures, so that noise levels would be consistent with the Land Use Compatibility Guidelines for Community Noise thresholds. Through this mechanism, noise impacts on residents and other sensitive land uses would be mitigated to less-than-significant levels.

Mitigation Measure M-NO-5: Residential, School, and Transient Lodging Land Use Plan Review by Qualified Acoustical Consultant

To ensure that automobile and ferry traffic induced interior L_{max} noise levels at nearby uses do not exceed an interior noise level standard of 45 dBA (L_{dn}), the developer of each new residential, scholastic, or hotel land uses planned for the Development Plan Area shall be required to engage a qualified acoustical consultant to prepare plans for the applicable development project, and to follow their recommendations to provide acoustical insulation or other equivalent measures to ensure that interior peak noise events would not exceed 45 dBA (L_{dn}). Similar to requirements of Title 24, this Plan shall include post-construction monitoring to verify adequacy of noise attenuation measures.

Impact NO-6: Operation of stationary sources at the proposed public utility facilities (e.g., water distribution systems, wastewater collection and treatment facilities, electric substation facilities, etc.) would increase existing noise levels, potentially exceeding noise level standards. (*Less than Significant with Mitigation*)

The proposed Development Plan would result in the development of a number of utility facilities, including water distribution and storage systems, wastewater collection and treatment facilities, water recycling facilities, electric facilities, etc. The details of these facilities are still in development, and would ultimately be presented in plans to be prepared in the future that address the facility designs, layouts, performance requirements, etc. These plans would include the Water System Master Plan, Master Wastewater System Plan, Master Recycled Water Plan, Master Storm Drainage Plan, Storm Water Control Plan, and master utility plans for the natural gas and electricity service systems.

Although specific information regarding these utility facilities is currently not available, many of them would require the operation of stationary noise sources, such as pump stations. Stationary sources such as pump stations can generate noise levels in excess of Land Use Compatibility Guidelines threshold recommendations, depending on the types and location of nearby land uses. However, pursuant to Mitigation Measure M-NO-6, utility and industrial stationary noise sources (e.g., pump stations, electric substation equipment, etc.) would be designed with adequate noise attenuating features to achieve acceptable regulatory noise standards for industrial uses as well as to achieve acceptable levels at the property lines of nearby residences or other noise sensitive uses, as determined by the San Francisco Land Use Compatibility Guidelines for Community Noise standards. To ensure that adequate performance of the attenuating features would be achieved, operational noise levels of the utility facilities would be monitored, and if stationary noise sources were found to exceed the applicable noise standards, additional noise attenuation measures would be applied in order to meet the applicable noise standards. With implementation of these measures, impacts of stationary noise sources would be mitigated to less-than-significant levels.

<u>Mitigation Measure M-NO-6: Stationary Operational Noise Sources</u>

All utility and industrial stationary noise sources (e.g., pump stations, electric substation equipment, etc.) shall be located away from noise sensitive receptors, be enclosed within structures with adequate setback and screening, be installed adjacent to noise reducing shields or constructed with some other adequate noise attenuating features to achieve acceptable regulatory noise standards for industrial uses as well as to achieve acceptable levels at the property lines of nearby residences or other sensitive uses, as determined by the San Francisco Land Use Compatibility Guidelines for Community Noise standards. Once the stationary noise sources have been installed, noise levels shall be monitored to ensure compliance with local noise standards. If project stationary noise sources exceed the applicable noise standards, an acoustical engineer shall by retained by the applicant to install additional noise attenuation measures in order to meet the applicable noise standards.

CUMULATIVE IMPACTS

Impact NO-7: Project-related construction activities in combination with construction activities of other cumulative development would increase noise levels above existing ambient conditions. (*Significant and Unavoidable with Mitigation*)

As discussed under Impact NO-1, Project-related construction noise would result in a significant noise impact to existing and future sensitive receptors. Other cumulative development in the area, including the Clipper Cove Marina and the Yerba Buena Island Ramps Improvement Project, could have construction activities that occur simultaneously with those of the Proposed Project. Consequently, the Proposed Project would be considered to result in a considerable contribution to a significant cumulative construction-related noise impact. Mitigation Measures M-NO-1a and

M-NO-1b represent available mitigation to reduce this significant and unavoidable noise impact, although the impact would not be reduced to less-than-significant levels.

Impact NO-8: Increases in traffic from the project in combination with other development would result in cumulative noise increases. (*Significant and Unavoidable*)

Based on baseline and future traffic projections developed as part of the transportation analysis for the Proposed Project, the Proposed Project would contribute to significant cumulative roadside noise levels. To assess the cumulative impact of project traffic on roadside noise levels, cumulative noise level projections for year 2030 were made using the FHWA Traffic Noise Model Look-Up Tables and are shown below in Table IV.F.8. Similar to the project-only traffic impact, estimates associated with the cumulative scenario indicate that the contribution to cumulative traffic noise increases associated with both the Proposed Project and Expanded Transit Service along each of the roadway segments would be considerable, and significant traffic noise level increases would occur on Saturday associated with both the Proposed Project and Expanded Transit Service along each of the modeled roadway segments with the exception of Avenue of the Palms, north of 1st Street.

Table IV.F.8: Modeled Cumulative Traffic L_{dn} Noise Levels

Roadway Segment	Existing	2030 plus Proposed Project	dBA Difference	Significant Increase?	2030 plus Expanded Transit Service	dBA Difference	Significant Increase?
Weekday L_{dn} Noise Levels							
Avenue of the Palms, north of 1st Street	61.9	67.6	5.7	**Yes**	66.6	4.7	**Yes**
Avenue of the Palms, south of 1st Street	62.2	68.6	6.4	**Yes**	67.6	5.4	**Yes**
1st Street, east of Avenue of the Palms	56.8	65.9	9.1	**Yes**	66.0	9.2	**Yes**
Saturday L_{dn} Noise Levels							
Avenue of the Palms, north of 1st Street	69.3	69.3	0.0	**No**	68.7	-0.6	**No**
Avenue of the Palms, south of 1st Street	60.8	70.5	9.7	**Yes**	69.7	8.9	**Yes**
1st Street, east of Avenue of the Palms	56.7	66.3	9.6	**Yes**	66.0	9.3	**Yes**

Notes:
Road center to receptor distance is assumed to be 50 feet for values shown in this table. Noise levels were determined using FHWA Traffic Noise Model Version 2.5 Look-Up Tables. The average speed on these segments is assumed to be 25 miles per hour. For all other assumptions, refer to **Appendix D**. The incremental increase is considered significant if the increase is more than or equal to 5 dBA, or if it is equal to or greater than 3 dBA with an ambient noise environment between 60 and 65 dBA, or if the noise increase is equal to or greater than 1.5 dBA with an ambient noise environment greater than 65 dBA.

Source: Environmental Science Associates, 2010

If the separate project to reconstruct the westbound ramps on the east side of Yerba Buena Island were constructed and the west side westbound on-ramp were converted to transit-only, stop control devices would be eliminated and all westbound traffic (except transit vehicles destined for San Francisco) would be consolidated to the westbound on-ramp on the east side of Yerba Buena Island. This improvement, consequently, would simply relocate the source of vehicular delay from stop signs at the two ramp merges to a ramp meter upstream of the single remaining merge on the east side of Yerba Buena Island. Because these ramps are distant from sensitive receptors, this relocation of queuing vehicles would not be expected to result in additional cumulative noise impacts.

Measures available to address significant traffic noise increases in these residential areas are limited. For example, the construction of continuous noise barriers at curbside along the entire length of the identified roadways would not be feasible because it would necessitate a continuous barrier which would block vehicle access to properties and conflict with the aesthetic character of the neighborhoods. All multi-family structures and hotels proposed by the project would be required to design interior dwelling spaces to achieve an interior noise standard of 45 dBA as required by Title 24. Consequently, this impact would primarily result in a significant noise increase to exterior areas only (e.g., balconies, and public gathering areas). However, traffic noise increases associated with the Proposed Project would be cumulatively considerable and there are no feasible mitigation measures that would reduce the Project's contribution to this cumulative impact to a less-than-significant level. Therefore, the impact is considered significant and unavoidable.

G. AIR QUALITY

This section discusses the regulatory framework for air quality management and the existing air quality conditions in the area, and analyzes the potential for the Proposed Project to affect existing air quality conditions, both regionally and locally, from activities that emit criteria and non-criteria air pollutants. It also analyzes the types and quantities of emissions that would be generated on a temporary basis due to proposed construction and over the long term due to proposed operation. The section determines whether those emissions are significant in relation to applicable air quality standards, and identifies mitigation measures addressing significant impacts. Finally, the section provides an analysis of cumulative air quality impacts. Emissions of greenhouse gases resulting from the Proposed Project and their potential impacts to climate change and the goals of Assembly Bill 32 are presented and discussed in Section IV.H, Greenhouse Gases, of this EIR.

The analysis in this section is based on a review of existing air quality conditions in the region and air quality regulations administered by the U.S. Environmental Protection Agency ("EPA"), the California Air Resources Board (CARB), and the Bay Area Air Quality Management District ("BAAQMD"). This analysis includes methodologies identified in both the existing (1999) and updated *CEQA Air Quality Guidelines* adopted by BAAQMD on June 2, 2010.

This section presents estimates of existing and future emissions based on standard air quality modeling techniques recommended by the BAAQMD. This section also presents the results of a health risk assessment undertaken to evaluate potential effects on humans from exposure to emissions of toxic air contaminants ("TACs") generated by diesel buses and diesel-powered ferry trips into and out of the Project Area.

SETTING

CRITERIA AIR POLLUTANTS

As required by the 1970 Federal Clean Air Act, the United States Environmental Protection Agency ("EPA") initially identified six criteria air pollutants that are pervasive in urban environments and for which state and federal health-based ambient air quality standards have been established. The EPA calls these pollutants criteria air pollutants because the agency has regulated them by developing specific public health- and welfare-based criteria as the basis for setting permissible levels. Ozone, carbon monoxide ("CO"), particulate matter ("PM"), nitrogen dioxide ("NO_2"), sulfur dioxide ("SO_2"), and lead are the six criteria air pollutants originally identified by EPA. Since that time, subsets of particulate matter have been identified for which permissible levels have been established. These include particulate matter of 10 microns in diameter or less ("PM10") and particulate matter of 2.5 microns in diameter or less ("PM2.5").

The BAAQMD's air quality monitoring network provides information on ambient concentrations of criteria air pollutants at various locations in the San Francisco Bay Area. Table IV.G.1 is a five-year summary of highest annual criteria air pollutant concentrations (2005 to 2009), collected at the BAAQMD's air quality monitoring station at 16th and Arkansas Streets, in San Francisco's lower Potrero Hill area, which is the closest monitoring station to Treasure Island.[1] Table IV.G.1 compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (State or Federal). A complete compilation of both state and federal ambient air quality standards is provided in Table IV.G.2.

Ozone

Ozone is a secondary air pollutant produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases ("ROG", also sometimes referred to as volatile organic compounds or "VOC" by some regulating agencies) and nitrogen oxides ("NOx"). The main sources of ROG and NOx, often referred to as ozone precursors, are combustion processes (including motor vehicle engines) and the evaporation of solvents, paints, and fuels. In the Bay Area, automobiles are the single largest source of ozone precursors. Ozone is referred to as a regional air pollutant because its precursors are transported and diffused by wind concurrently with ozone production through the photochemical reaction process. Ozone causes eye irritation, airway constriction, and shortness of breath and can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Table IV.G.1 shows that, according to published data, the most stringent applicable standards (state 1-hour standard of 9 parts per hundred million ("pphm") and the federal 8-hour standard of 8 pphm were not exceeded in San Francisco between 2004 and 2008.

Carbon Monoxide

CO is an odorless, colorless gas usually formed as the result of the incomplete combustion of fuels. The single largest source of CO is motor vehicles; the highest emissions occur during low travel speeds, stop-and-go driving, cold starts, and hard acceleration. Exposure to high concentrations of CO reduces the oxygen-carrying capacity of the blood and can cause headaches, nausea, dizziness, and fatigue, impair central nervous system function, and induce angina (chest pain) in persons with serious heart disease. Very high levels of CO can be fatal. As shown in Table IV.G.1, the more stringent state CO standards were not exceeded between 2004 and 2008. Measurements of CO indicate hourly maximums ranging between 15 to 25 percent of the more stringent state standard, and maximum 8-hour CO levels that are approximately 30 percent of the allowable 8-hour standard.

[1] Data from this single location do not describe pollutant levels throughout San Francisco, as these levels may vary depending on distance from key emissions sources and local meteorology. However, the BAAQMD monitoring network does provide a reliable picture of pollutant levels over time.

Table IV.G.1: Summary of San Francisco Air Quality Monitoring Data (2005–2009)

Pollutant	Most Stringent Applicable Standard	Number of Days Standards Were Exceeded and Maximum Concentrations Measured[a]				
		2005	2006	2007	2008	2009
Ozone						
- Days 1-hour Std. Exceeded		0	0	0	0	0
- Max. 1-hour Conc. (pphm)	>9 pphm[b]	6	5	6	8	7
- Days 8-hour Std. Exceeded		0	0	0	0	0
- Max. 8-hour Conc. (pphm)	>7 pphm[c]	5	5	5	7	6
Carbon Monoxide (CO)						
- Days 1-hour Std. Exceeded		0	0	0	0	ND
- Max. 1-hour Conc. (ppm)	>20 ppm[b]	2.9	2.9	2.7	5.7	ND
- Days 8-hour Std. Exceeded		0	0	0	0	0
- Max. 8-hour Conc. (ppm)	>9 ppm[b]	2.1	2.1	1.6	2.3	2.9
Suspended Particulates (PM_{10})						
- Days 24-hour Std. Exceeded[d]		0	3	2	0	0
- Max. 24-hour Conc. (µg/m^3)	>50 µg/m^3 [b]	46	**61**	**70**	41	36
Suspended Particulates ($PM_{2.5}$)						
- Days 24-hour Std. Exceeded[e]		0	3	5	0	1
- Max. 24-hour Conc. (µg/m^3)	>35 µg/m^3 [c]	44[e]	**54**	**45**	29	**36**
- Annual Average (µg/m^3)	>12 µg/m^3 [b]	9.5	9.7	8.7	9.8	ND
Nitrogen Dioxide (NO_2)						
- Days 1-hour Std. Exceeded		0	0	0	0	0
- Max. 1-hour Conc. (pphm)	>25 pphm[b]	7	11	7	6	6
Sulfur Dioxide (SO_2)						
- Days 24-hour Std. Exceeded		0	0	0	0	ND
- Max. 24-hour Conc. (ppb)	>40 ppb[b]	7	6	6	4	ND

Notes:

Bold values are in excess of applicable standard. "NA" indicates that data is not available.
conc. = concentration; ppm = parts per million; pphm = parts per hundred million; ppb=parts per billion;
µg/m3 = micrograms per cubic meter
ND = No data or insufficient data.

[a] Number of days exceeded is for all days in a given year, except for particulate matter. PM10 and PM2.5 are monitored every six days and therefore the number of days exceeded is out of approximately 60 annual samples.
[b] State standard, not to be exceeded.
[c] Federal standard, not to be exceeded.
[d] Based on a sampling schedule of one out of every six days, for a total of approximately 60 samples per year.
[e] Federal standard was reduced from 65 µg/m3 to 35 µg/m3 in 2006.

Source: BAAQMD, Bay Area Air Pollution Summary, 2004 – 2008. Available online at: http://www.baaqmd.gov/Divisions/Communications-and-Outreach/Air-Quality-in-the-Bay-Area/Air-Quality-Summaries.aspx and http://www.arb.ca.gov/adam/cgi-bin/db2www/adamtop4b.d2w/start and http://www.arb.ca.gov/adam/topfour/topfour1.php

Table IV.G.2: State and Federal Ambient Air Quality Standards and Attainment Status

		State SAAQs[a]		(Federal) NAAQS[b]	
Pollutant	**Averaging Time**	**Standard**	**Attainment Status**	**Standard**	**Attainment Status**
Ozone	1 hour	0.09 ppm	**N**	NA	See Note c
	8 hour	0.07 ppm	U[d]	0.075 ppm	**N**/Marginal
Carbon Monoxide (CO)	1 hour	20 ppm	A	35 ppm	A
	8 hour	9 ppm	A	9 ppm	A
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	A	NA	NA
	Annual	NA	NA	0.053 ppm	A
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	A	NA	NA
	24 hour	0.04 ppm	A	0.14 ppm	A
	Annual	NA	NA	0.03 ppm	A
Particulate Matter (PM_{10})	24 hour	50 µg/m^3	**N**	150 µg/m^3	U
	Annual[e]	20 µg/m^3 [f]	**N**	50 µg/m^3	A
Fine Particulate Matter ($PM_{2.5}$)	24 hour	NA	NA	35 µg/m^3	U
	Annual	12 µg/m^3	**N**	15 µg/m^3	A
Sulfates	24 hour	25 µg/m^3	A	NA	NA
Lead	30 day	1.5 µg/m^3	A	NA	NA
	Cal. Quarter	NA	NA	1.5 µg/m^3	A
Hydrogen Sulfide	1 hour	0.03 ppm	U	NA	NA
Visibility-Reducing Particles	8 hour	See Note g	A	NA	NA

Notes: A = Attainment; **N** = Nonattainment; U = Unclassified; NA = Not Applicable, no applicable standard;= ppm = parts per million; µg/m^3 = micrograms per cubic meter.

[a] SAAQs = state ambient air quality standards (California). SAAQS for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All other state standards shown are values not to be equaled or exceeded.

[b] NAAQs = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the three-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour PM10 standard is attained when the three-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour PM2.5 standard is attained when the three-year average of the 98th percentile is less than the standard.

[c] The U.S. EPA revoked the national 1-hour ozone standard on June 15, 2005.

[d] This state 8-hour ozone standard was approved in April 2005 and became effective in May 2006.

[e] State standard = annual geometric mean; national standard = annual arithmetic mean.

[f] In June 2002, The California Air Resources Board (ARB) established new annual standards for PM2.5 and PM10.

[g] Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

Source: Bay Area Air Quality Management District (BAAQMD), Standards and Attainment Status, May 2006. Website accessed on October 28, 2006: http://www.baaqmd.gov/pln/air_quality/ambient_air_quality.htm

Particulate Matter

Particulate matter is a class of air pollutants that consists of heterogeneous solid and liquid airborne particles from manmade and natural sources. Particulate matter is measured in two size ranges: PM10 for particles less than 10 microns in diameter, and PM2.5 for particles less than 2.5 microns in diameter. In the Bay Area, motor vehicles generate about one-half of the air basin's particulates, through tailpipe emissions as well as brake pad and tire wear. Wood burning in fireplaces and stoves, industrial facilities, and ground-disturbing activities such as construction are other sources of such fine particulates. These fine particulates are small enough to be inhaled into the deepest parts of the human lung and can cause adverse health effects. According to the CARB, studies in the United States and elsewhere "have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks," and studies of children's health in California have demonstrated that particle pollution "may significantly reduce lung function growth in children." The CARB also reports that statewide attainment of particulate matter standards could prevent thousands of premature deaths, lower hospital admissions for cardiovascular and respiratory disease and asthma-related emergency room visits, and avoid hundreds of thousands of episodes of respiratory illness in California.[2]

Among the criteria pollutants that are regulated, particulates appear to represent a serious ongoing health hazard. As long ago as 1999, the BAAQMD was reporting, in its *CEQA Guidelines*, that studies had shown that elevated particulate levels contribute to the death of approximately 200 to 500 people per year in the Bay Area. Compelling evidence suggests that PM2.5 is by far the most harmful air pollutant in the San Francisco Bay Area Air Basin in terms of the associated impact on public health. A large body of scientific evidence indicates that both long-term and short-term exposure to PM2.5 can cause a wide range of health effects (e.g., aggravating asthma and bronchitis, causing visits to the hospital for respiratory and cardiovascular symptoms, and contributing to heart attacks and deaths).[3]

Table IV.G.1 shows that exceedances of the state PM10 standard have routinely occurred in San Francisco. It is estimated that the state 24-hour PM10 standard of 50 micrograms per cubic meter ("$\mu g/m^3$") was exceeded on up to 30 days per year between 2005 and 2009.[4] The

[2] California Air Resources, Board, "Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution," November 2007. Accessed on February 1, 2010. Available on the internet at: http://www.arb.ca.gov/research/health/fs/pm_ozone-fs.pdf. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[3] BAAQMD, *BAAQMD CEQA Guidelines, California Environmental Quality Act Air Quality Guidelines.* June, 2010; p. 5.2. Available on the internet at: http://www.baaqmd.gov/pln/ceqa/ceqa_guide.pdf. Accessed on June 25, 2010.

[4] PM10 is sampled every sixth day; therefore, actual days over the standard can be estimated to be six times the numbers listed in the table.

BAAQMD began monitoring PM2.5 concentrations in San Francisco in 2002. The federal 24-hour PM2.5 standard was not exceeded until 2006, when the standard was lowered from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. It is estimated that the state 24-hour PM2.5 standard was exceeded on up to 54 days per year between 2005 and 2009. The state annual average standard was not exceeded between 2004 and 2008.

Nitrogen Dioxide

NO_2 is a reddish brown gas that is a byproduct of combustion processes. Automobiles and industrial operations are the main sources of NO_2. Aside from its contribution to ozone formation, NO_2 can increase the risk of acute and chronic respiratory disease and reduce visibility. NO_2 may be visible as a coloring component on high pollution days, especially in conjunction with high ozone levels. Table IV.G.1 shows that the standard for NO_2 is being met in the Bay Area, and pollutant trends suggest that the air basin will continue to meet these standards for the foreseeable future.

Sulfur Dioxide

SO_2 is a colorless acidic gas with a strong odor. It is produced by the combustion of sulfur-containing fuels such as oil, coal, and diesel. SO_2 has the potential to damage materials and can cause health effects at high concentrations. It can irritate lung tissue and increase the risk of acute and chronic respiratory disease.[5,6] Table IV.G.1 shows that the standard for SO_2 is being met in the Bay Area, and pollutant trends suggest that the air basin will continue to meet these standards for the foreseeable future.

Lead

Leaded gasoline (phased out in the United States beginning in 1973), paint (on older houses, cars), smelters (metal refineries), and manufacture of lead storage batteries have been the primary sources of lead released into the atmosphere. Lead has a range of adverse neurotoxic health effects, which puts children at special risk. Some lead-containing chemicals cause cancer in animals. Lead levels in the air have decreased substantially since leaded gasoline was eliminated. Ambient lead concentrations are only monitored on an as-warranted, site-specific basis in California. On October 15, 2008, EPA strengthened the National Ambient Air Quality Standard for lead by lowering it from1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$. The EPA is in the process of revising the monitoring requirements for lead, with an expected promulgation date of fall 2010. Early versions of the regulation suggest that lead monitors will need to be placed at larger private

---

[5] BAAQMD, *CEQA Guidelines*, op. cit.; p. B-2.
[6] BAAQMD, CEQA Air Quality Guidelines, May, 2010, http://www.oehha.org/air/hot_spots/pdf/HRA guidefinal.pdf; p. C-16.

airplane airports. After that regulation is finalized, the BAAQMD will have up to one year to install any required lead monitors.[7]

TOXIC AIR CONTAMINANTS

Toxic air contaminants ("TACs") are air pollutants that may lead to serious illness or increased mortality, even when present in relatively low concentrations. Potential human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

TACs do not have ambient air quality standards, but are regulated by the BAAQMD using a risk-based approach. This approach uses a health risk assessment to determine what sources and pollutants to control as well as the degree of control. A health risk assessment is an analysis of exposure to toxic substances and human health risks from exposure to toxic substances is estimated, based on the potency of the toxic substances.[8]

In addition to monitoring criteria pollutants, both BAAQMD and CARB operate TAC monitoring networks in the San Francisco Bay Area. These stations measure 10 to 15 TACs, depending on the specific station. The TACs selected for monitoring are those that have traditionally been found in the highest concentrations in ambient air, and therefore tend to produce the most significant risk. The nearest BAAQMD ambient TAC monitoring station to the Proposed Project is the station at 16th and Arkansas Streets in San Francisco. Table IV.G.3 shows ambient concentrations of carcinogenic TACs measured at the Arkansas Street station, and the estimated cancer risks from a lifetime exposure to these substances is also reported in the table. When TAC measurements at this station are compared to ambient concentrations of various TACs for the Bay Area as a whole, the cancer risks associated with mean TAC concentrations in San Francisco are similar to those for the Bay Area as a whole. Therefore, the estimated average lifetime cancer risk resulting from exposure to TAC concentrations monitored at the San Francisco station do not appear to be any greater than for the Bay Area as a region.

---

[7] BAAQMD, 2009 Air Monitoring Network Report, To be Submitted July 21, 2010, p. 20. Available at http://www.baaqmd.gov/~/media/Files/Technical%20Services/2009_Network_Plan.ashx. Accessed June 1, 2010.

[8] A health risk assessment is required for permitting approval if the BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk. In these instances, a health risk assessment for the source in question must be prepared. Such an assessment generally evaluates chronic, long-term effects, calculating the increased risk of cancer as a result of exposure to one or more TACs.

Table IV.G.3: Annual Average Ambient Concentrations of Carcinogenic TACs Measured at BAAQMD Monitoring Station, 10 Arkansas Street, San Francisco[a]

Substance	Conc.	Cancer Risk per million[b]
Gaseous TACs	**(ppb)**	
Acetaldehyde	0.39	2
Benzene	0.18	17
1,3-Butadiene	0.036	14
para-Dichlorobenzene	0.15	10
Carbon Tetrachloride	0.094	25
Formaldehyde	2.69	20
Perchloroethylene	0.02	0.8
Methylene Chloride	0.12	0.4
Chloroform	0.015	0.4
Trichloroethylene	0.01	0.1
Particulate TACs	**(ng/m^3)**	
Chromium (Hexavalent)	0.059	9
Total Risk for All TACs		**89.7**

Notes:
ppb - part per billion, ng/m^3 - nanograms per cubic meter.
[a] All values are from BAAQMD 2008 monitoring data for the Arkansas Street station, except for Formaldehyde and Hexavalent Chromium, which are statewide averages for the year 2008.
[b] Cancer risks were estimated by applying published unit risk values to the measured concentrations.

Source: California Air Resources Board, *Ambient Air Toxics Summary-2008*, available online at: http://www.arb.ca.gov/adam/toxics/sitesubstance.html

BAAQMD provides two public source inventories of TAC emissions sources within its jurisdiction. The first is its TAC Annual Report, the most recent of which was published in 2007 and does not identify any TAC sources on Treasure Island or Yerba Buena Island. The second source is its recently released (May 2010) Google Earth-based inventory of stationary source risks and hazards. This latter source indicates one permitted TAC source on Yerba Buena Island and none on Treasure Island. This single source on Yerba Buena Island is a buoy painting facility operated by the US Coast Guard on the eastern side of the island, approximately 700 feet east of the San Francisco – Oakland Bay Bridge ("Bay Bridge"). BAAQMD identifies a cancer risk of 13.7 in one million associated with this facility, a chronic hazard index[9] of 0.0096 and an acute hazard index of 0.00432. These risk values are for the maximally exposed receptor.

[9] Hazard Index is a summation of the hazard quotients for all chemicals to which an individual is exposed. A hazard index value of 1.0 or less than 1.0 indicates that no adverse human health effects (noncancer) are expected to occur.

Diesel Particulate Matter

Diesel exhaust is a growing concern throughout California. The CARB identified diesel particulate matter ("DPM") as a toxic air contaminant in 1998, primarily based on evidence demonstrating cancer effects in humans.[10] The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Many of these toxic compounds adhere to diesel particles, which are very small and can penetrate deeply into the lungs. The toxic substances represented by diesel particulate matter are not included in the concentrations reported in Table IV.G.3, but would be in addition to those when determining total cancer risk from TACs. Mobile sources such as trucks, buses, and, to a much lesser extent, automobiles are some of the primary sources of diesel emissions. Studies show that the estimated cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other toxic air pollutant routinely measured in the region. CARB estimated the average Bay Area cancer risk from DPM, based on a population-weighted average ambient diesel particulate concentration, at about 480 in one million as of 2000. The risk from DPM has declined from 750 in one million in 1990 and 570 in one million in 1995. CARB estimated the average statewide cancer risk from DPM at 540 in one million in 2000.[11,12] Other studies have shown that diesel exhaust and other cancer-causing chemicals emitted from cars and trucks are responsible for much of the cumulative cancer risk from airborne toxics in California. Diesel exhaust also contains pulmonary irritants and hazardous compounds that could affect non-cancer health effects in sensitive receptors such as young children, senior citizens, or those susceptible to chronic respiratory disease such as asthma, bronchitis, and emphysema.

Recent air pollution studies have shown an association between respiratory and other non-cancer health effects and proximity to high traffic roadways. The CARB community health risk assessments and regulatory programs have produced air quality information about certain types of facilities for consideration by local authorities when siting new residences, schools, day care centers, parks and playgrounds, and medical facilities (i.e., sensitive land uses). Sensitive land

---

[10] California Air Resources Board, Fact Sheet, "The Toxic Air Contaminant Identification Process: Toxic Air Contaminant Emissions from Diesel-fueled Engines," October 1998. Available on the internet at: http://www.arb.ca.gov/toxics/dieseltac/factsht1.pdf. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[11] CARB, *California Almanac of Emissions and Air Quality - 2009 Edition*, Table 5-44 and Figure 5-12. Available on the internet at: http://www.arb.ca.gov/aqd/almanac/almanac09/chap509.htm. Accessed February 1, 2010.

[12] This calculated cancer risk values from ambient air exposure in the Bay Area can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in one million, according to the American Cancer Society. American Cancer Society, "Lifetime Probability of Developing or Dying from Cancer," Last Revised 07/13/2009, available online at http://www.cancer.org/docroot/CRI/content/CRI_2_6x_Lifetime_Probability_of_Developing_or_Dying_From_Cancer.asp.

uses deserve special attention because children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the non-cancer effects of air pollution. There is also substantial evidence that children are more sensitive to cancer-causing chemicals.[13]

In 2000, the CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. The Plan aims to develop and implement specific statewide regulations designed to reduce DPM emissions and the associated health risk 75 percent by 2010 and 85 percent by 2020. In addition to implementing more stringent engine controls (diesel engines produced today have one-eighth the tailpipe exhausts of a truck or bus built in 1990), diesel fuel is required to have lower sulfur levels. As of June 1, 2006, at least 80 percent of on-road diesel fuel refined in the United States was required to be ultra-low sulfur diesel, which resulted in a reduction in sulfur emissions by 97 percent. All of the diesel fuel sold in California for use with on-road trucks is now ultra-low sulfur diesel. With new controls and fuel requirements, 60 trucks built in 2007 would have the same soot exhaust emissions as one truck built in 1988.[14]

Despite these dramatic reductions in emission rates, reducing DPM emissions will take time since older trucks will need to be retrofitted or phased out as part of fleet turnover. While these efforts are reducing diesel particulate emissions on a statewide basis, they do not yet capture every site on which diesel vehicles and engines operate. As a result, the CARB recommends that proximity to sources of DPM emissions be considered in the siting of new development. For example, CARB's guidance is that new sensitive land uses (e.g., residences, schools, daycare centers, playgrounds, or medical facilities) not be located within 500 feet of a freeway or urban roads carrying at least 100,000 vehicles per day.

The CARB notes that these recommendations are advisory and should not be interpreted as defined "buffer zones." CARB acknowledges that land use agencies must balance other considerations, including housing and transportation needs, the benefits of urban infill, community economic development priorities, and other quality of life issues. With careful evaluation of exposure, health risks, and affirmative steps to reduce risk where necessary, CARB's position is that infill development, mixed use, higher density, transit-oriented development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level.[15]

---

[13] California Air Resources Board, *Air Quality and Land Use Handbook: A Community Health Perspective*, April 2005 (hereinafter "ARB *Air Quality and Land Use Handbook")*. Available on the internet at: http://www.arb.ca.gov/ch/handbook.pdf.

[14] Pollution Engineering, *New Diesel Fuel Rules Start,* website accessed on October 30, 2006: http://www.pollutioneng.com/CDA/.

[15] CARB *Air Quality and Land Use Handbook*; see footnote 133, p. 11.

Traffic Related Pollutants

Engine exhaust, from both diesel and gasoline engines in roadway vehicles, is a complex mixture of particles and gases. As discussed above, vehicle emissions generate both NAAQS criteria air pollutants such as CO, PM, and NOx as well as other non-criteria toxic air contaminants, including benzene, 1,3-butadiene, formaldehyde, acetaldehyde, acrolein, naphthalene, and diesel exhaust. Collectively, these may be referred to as traffic related pollutants ("TRPs").

While each constituent pollutant in engine exhaust may have a unique toxicological profile, health effects have been associated with proximity or exposure to TRPs *collectively* as a mixture.[16] Individual epidemiological studies have linked roadway proximity or vehicle emissions to impairments of lung function.[17] There are currently no exposure standards or risk exposure levels specific to TRPs as a mixture.

ODOR EMISSIONS

The only facilities that would potentially be identified as existing sources of odor emissions in the Development Plan Area are the existing wastewater treatment plant located at the northeastern boundary of Treasure Island. The San Francisco Public Utilities Commission (SFPUC) operates this secondary treatment facility, which is approximately one quarter mile from the closest currently occupied residence. According to BAAQMD records, there have been no odor complaints within the last five years.[18]

CLIMATE EFFECTS ON REGIONAL AIR QUALITY

Atmospheric conditions such as wind speed, wind direction, and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants regionally. The Redevelopment Plan Project Area lies between the Peninsula and northern Alameda climatological subregions. Marine air travelling through the Golden Gate is a dominant weather factor affecting dispersal of air pollutants within the region. Wind measurements collected on the San Francisco mainland indicate a prevailing wind direction from the west and an average annual wind speed of 10.6 miles per hour.[19] Increased temperatures create the conditions in which ozone formation can increase.

---

[16] Delfino RJ, 2002. Epidemiologic evidence for asthma and exposure to air toxics: linkages between occupational, indoor, and community air pollution research. Environmental Health Perspectives, 110(S4):573-589.

[17] Brunekreef, B. *et al*. "Air pollution from truck traffic and lung function in children living near motorways." Epidemiology. 1997; 8:298-303.

[18] BAAQMD, Response to Public Records Request received via e-mail January 11, 2010.

[19] http://www.wrcc.dri.edu/htmlfiles/westwinddir.html#CALIFORNIA, accessed on June 1, 2010.

SENSITIVE RECEPTORS

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young, population subgroups with higher rates of respiratory disease such as asthma and chronic obstructive pulmonary disease, and populations with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. Land uses such as schools, children's day care centers, parks and playgrounds, hospitals, and nursing and convalescent homes are considered to be more sensitive than the general public to poor air quality because the population groups associated with these uses have increased susceptibility to respiratory distress. Persons engaged in strenuous work or exercise also have increased sensitivity to poor air quality. Residential areas are considered more sensitive to air quality conditions compared to commercial and industrial areas because people generally spend longer periods of time at their residences, with associated greater exposure to ambient air quality conditions.[20]

Motor vehicles are responsible for a large share of air pollution especially in California. Epidemiologic studies have consistently demonstrated that children and adults living in proximity to freeways or busy roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections, and decreased pulmonary function and lung development in children. Vehicles also contribute to particulates by generating road dust and through tire wear.

There are several sensitive receptors currently on Yerba Buena Island and Treasure Island. The nearest residential buildings within the Redevelopment Plan Project Area are the 725 occupiable housing units on Treasure Island, 80 occupiable housing units on Yerba Buena Island and dormitories on the Job Corp site. These residential buildings would constitute a sensitive receptor. The child development center run by Catholic Charities at Avenue D and 11th Street would also constitute a sensitive receptor.

While there is an elementary school building on Treasure Island, it is not currently used by elementary school children, and therefore does not represent an existing sensitive receptor location. Within the Redevelopment Plan Project Area there are several educational programs for older teens and adults. The Glide YouthBuild Program for teens and young adults to learn job skills and get a GED and the San Francisco Sheriff's Five Keys School for formerly incarcerated women are located within the Treasure Island School building. The Life Learning Academy for at-risk high school youth and the Treasure Island Clubhouse of the Boy's and Girl's Clubs are located elsewhere on Treasure Island. Because these programs do not serve school children, they

[20] The factors responsible for variation in exposure are also often similar to factors associated with greater susceptibility to air quality health effects. For example, poorer residents may be more likely to live in crowded substandard housing and be more likely to live near industrial or roadway sources of air pollution.

are not considered existing sensitive receptors. There are no hospitals or convalescent homes in the vicinity of the Redevelopment Plan Project Area.

REGULATORY FRAMEWORK

Air Quality Regulations and Plans

Federal Ambient Air Quality Standards

The 1970 Clean Air Act (last amended in 1990) required that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled in order to achieve all standards by the deadlines specified in the Clean Air Act. These ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, including asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards before adverse health effects are observed.

The current attainment status for the San Francisco Bay Area Air Basin, with respect to federal standards, is summarized in Table IV.G.2. In general, the Bay Area Air Basin experiences low concentrations of most pollutants when compared to federal standards, except for ozone and particulate matter (PM10 and PM2.5), for which standards are exceeded periodically.

In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard.[21] EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 parts per million ("ppm") effective May 27, 2008. EPA will issue final designations based upon the new 0.75 ppm ozone standard by March 2011.[22] The Bay Area Air Basin is in attainment for other criteria pollutants, with the exception of the 24-hour standards for PM10 and PM2.5, for which the Bay Area is designated "Unclassified." "Unclassified" is defined by the Clean Air Act Amendments as any area that cannot be classified, on the basis of available information, as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[21] "Marginal nonattainment area" means an area designated marginal nonattainment for the one (1) hour national ambient air quality standard for ozone.
[22] U.S. EPA, *Fact Sheet for Extension of Deadline for Promulgating Designations for the 2008 Ozone National Ambient Air Quality Standards*, Available at http://www.epa.gov/air/ozonepollution/pdfs/fs20100106des.pdf , accessed on May 28, 2010.

State Ambient Air Quality Standards

Although the federal Clean Air Act established national ambient air quality standards, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established, and because of the unique meteorological problems in California, there is considerable diversity between the state and national ambient air quality standards, as shown in Table IV.G.2. California ambient standards tend to be at least as protective as national ambient standards and are often more stringent.

In 1988, California passed the California Clean Air Act (California Health and Safety Code Sections 39600 et seq.), which, like its federal counterpart, called for the designation of areas as attainment or nonattainment, but based on state ambient air quality standards rather than the federal standards. As indicated in Table IV.G.3, the Bay Area Air Basin is designated as "nonattainment" for state ozone, PM10, and PM2.5 standards. The Bay Area Air Basin is designated as "attainment" for most other pollutants listed in the table.

The California Clean Air Act requires that Air Districts in which state air quality standards are exceeded, must prepare a plan that documents reasonable progress towards attainment. A three-year update is required. In the Bay Area, this planning process is incorporated into its Clean Air Plan.

Air Quality Planning Relative to State and Federal Standards

The BAAQMD is the regional agency responsible for air quality regulation within the San Francisco Bay Area Air Basin. The BAAQMD regulates air quality through its planning and review activities. The BAAQMD has permit authority over most types of stationary emission sources and can require stationary sources to obtain permits, and can impose emission limits, set fuel or material specifications, or establish operational limits to reduce air emissions. The BAAQMD regulates new or expanding stationary sources of toxic air contaminants.

In January 2006, the BAAQMD, in cooperation with the Bay Area Metropolitan Transportation Commission ("MTC") and the Association of Bay Area Governments ("ABAG") adopted the *Bay Area 2005 Ozone Strategy* ("*2005 Ozone Strategy*"). The *2005 Ozone Strategy* is a roadmap showing how the San Francisco Bay Area will achieve compliance with the state one-hour ozone standard as expeditiously as practicable, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others. The *2005 Ozone Strategy* also represents the Bay Area's most recent triennial assessment of the region's strategy to attain the state one-hour ozone standard and is the most recent plan for the region. Currently, the BAAQMD has released its Draft version of the 2010 *Clean Air Plan,* which is still pending adoption. The 2010 Clean Air Plan will:

- Update the Bay Area *2005 Ozone Strategy* in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone;
- Consider the impacts of ozone control measures on PM10 and PM2.5, TACs, and GHG, in a single, integrated plan;
- Review progress in improving air quality in recent years; and
- Establish emission control measures to be adopted or implemented in the 2009-2012 timeframe.

<u>Toxic Air Contaminants</u>

In 2005, the CARB approved a regulatory measure to reduce emissions of toxic and criteria pollutants by limiting the idling of new heavy-duty diesel vehicles. The regulations generally limit idling of commercial motor vehicles (including buses and trucks) within 100 feet of a school or residential area for more than five consecutive minutes or periods aggregating more than five minutes in any one hour.[23] Buses or vehicles also must turn off their engines upon stopping at a school and must not turn their engines on more than 30 seconds before beginning to depart from a school. Also, state law SB351 (adopted in 2003) prohibits locating public schools within 500 feet of a freeway or busy traffic corridor.

SB 636 required the BAAQMD to complete a Particulate Matter Implementation Schedule, which it did in November 2005. This schedule evaluates applicability of the 103 PM control measures on CARB's list and discusses how the District implements applicable measures. The BAAQMD implements a number of regulations and programs to reduce PM emissions, such as controlling dust from earthmoving and construction/demolition operations, limiting emissions from various combustion sources such as cement kilns and furnaces, and reducing PM from composting and chipping activities. In addition to limiting stationary sources, the BAAQMD implements a variety of mobile source incentive programs to encourage heavy-duty diesel engines and install after-market emissions control devices to reduce particulates and NOx emissions.

[23] There are 12 exceptions to this requirement (e.g., emergency situations, military, adverse weather conditions, etc.), including: when a vehicle's power takeoff is being used to run pumps, blowers, or other equipment; when a vehicle is stuck in traffic, stopped at a light, or under direction of a police officer; when a vehicle is queuing beyond 100 feet from any restricted area; or when an engine is being tested, serviced, or repaired.

San Francisco General Plan Air Quality Element

The *San Francisco General Plan* (“*General Plan*”) includes the 1997 Air Quality Element.[24] The objectives specified by the City include the following:

Objective 1: Adhere to State and federal air quality standards and regional programs.

Objective 2: Reduce mobile sources of air pollution through implementation of the Transportation Element of the *General Plan.*

Objective 3: Decrease the air quality impacts of development by coordination of land use and transportation decisions.

Objective 5: Minimize particulate matter emissions from road and construction sites.

Objective 6: Link the positive effects of energy conservation and waste management to emission reductions.

San Francisco Construction Dust Control Ordinance

The Dust Control Ordinance was adopted in July 2008 and requires that all site preparation work, demolition, or other construction activities within the City and County of San Francisco comply with specific dust control measures.[25] For projects over one-half acre, the Dust Control Ordinance requires that the project sponsor submit a Dust Control Plan for approval by the San Francisco Health Department prior to issuance of a building permit by Department of Building Inspection (“DBI”). Building permits will not be issued without written notification from the Director of Public Health that the applicant has a site-specific Dust Control Plan, unless the Director waives the requirement. The Dust Control Ordinance requires project sponsors and contractors responsible for construction activities to control construction dust on the site or implement other practices that result in equivalent dust control that are acceptable to the Director of DBI.

Reclaimed water must be used if required by Article 21, Section 1100 et seq. of the San Francisco *Public Works Code*. This Article requires the use of reclaimed water for soil compaction or dust control activities unless the Director of Public Works determines in writing that either (1) reclaimed water is not available in sufficient quality and quantity from wastewater treatment facilities located within 10 miles of the construction site, or (2) well water or ground water is not available in sufficient quality and quantity from wells and groundwater sources located within 10 miles of the construction site.

If not required, based on the Director of Public Works’ determination, reclaimed water still should be used whenever possible. Contractors are required to provide as much water as

[24] San Francisco Planning Department, Air Quality, an Element of the *General Plan* of the City and County of San Francisco, July 1997, updated in 2000.
[25] City and County of San Francisco Municipal Code, Health Code Article 22b.

necessary to control dust (without creating run-off in any area of land clearing and/or earth movement). During excavation and dirt-moving activities, contractors are required to wet sweep or vacuum the streets, sidewalks, paths and intersections where work is in progress at the end of the workday. Inactive stockpiles (where no disturbance occurs for more than seven days) greater than 10 cubic yards or 500 square feet of excavated materials, backfill material, import material, gravel, sand, road base, and soil are required to be covered with a 10 millimeter (0.01 inch) polyethylene plastic (or equivalent) tarp, braced down, or use other equivalent soil stabilization techniques.

The Dust Control Ordinance requires that the applicant submit a Dust Control Plan for approval by the San Francisco Health Department. Site-specific Dust Control Plans require the project sponsor to: submit a map to the Director of Public Health showing all sensitive receptors within 1,000 feet of the site; wet down areas of soil at least three times per day; provide an analysis of wind direction and install upwind and downwind particulate dust monitors; record particulate monitoring results; hire an independent, third party to conduct inspections and keep a record of those inspections; establish shut-down conditions based on wind, soil migration, etc.; establish a hotline for surrounding community members who may be potentially affected by project-related dust; limit the area subject to construction activities at any one time; install dust curtains and windbreaks on the property lines, as necessary; limit the amount of soil in hauling trucks to the size of the truck bed and secure with a tarpaulin; enforce a 15 mph speed limit for vehicles entering and exiting construction areas; sweep affected streets with water sweepers at the end of the day; install and utilize wheel washers to clean truck tires; terminate construction activities when winds exceed 25 miles per hour; apply soil stabilizers to inactive areas; and sweep off adjacent streets to reduce particulate emissions. The project applicant would be required to designate an individual to monitor compliance with dust control requirements.

San Francisco Health Code Article 38

PM2.5 is of particular concern to the San Francisco Department of Public Health (“DPH”) because epidemiologic studies have demonstrated that people who live near freeways and high-traffic roadways have poorer health outcomes, including increased asthma symptoms and respiratory infections and decreased pulmonary function and lung development in children. As a result, DPH sponsored local legislation to require air quality modeling and installation of air filtration systems under specified circumstances, now codified as Article 38 of the Health Code. Article 38 requires that proposed residential projects located near high-volume roadways be subject to air quality modeling conducted to determine if annual average concentrations of PM2.5 from roadway sources within 500 feet of a project site would exceed a concentration of

0.2 micrograms per cubic meter (annual average).[26] According to DPH, this action level (of 0.2 micrograms per cubic meter) represents about 8 percent to 10 percent of the range of ambient PM2.5 concentrations in San Francisco based on monitoring data, and is based on epidemiological research that indicates that such a concentration can result in an approximately 0.28 percent increase in non-injury mortality, or an increased mortality at a rate of approximately 20 "excess deaths" per year per one million population in San Francisco.[27] [28] If this standard is exceeded, Article 38 requires that the project applicant install a filtered air supply system, with high-efficiency filters, to maintain all residential units under positive pressure when windows are closed.

Figure IV.G.1 presents annual average PM2.5 concentrations around the Bay Bridge. As can be seen from this Figure, any residences located within approximately 800 feet of the Bridge would be exposed to PM2.5 concentrations in excess the Article 38 action level of 0.2μg/m^3. Therefore, the project sponsors would be required to install a filtered air supply system, with high-efficiency filters, to maintain all new residential units under positive pressure when windows are closed.

IMPACTS

SIGNIFICANCE CRITERIA

The City and County of San Francisco has not formally adopted significance standards for impacts related to air quality. The Planning Department's Initial Study Checklist provides a framework of topics to be considered in evaluating potential impacts under CEQA. Implementation of a project could have significant impacts related to air quality, if it were to:

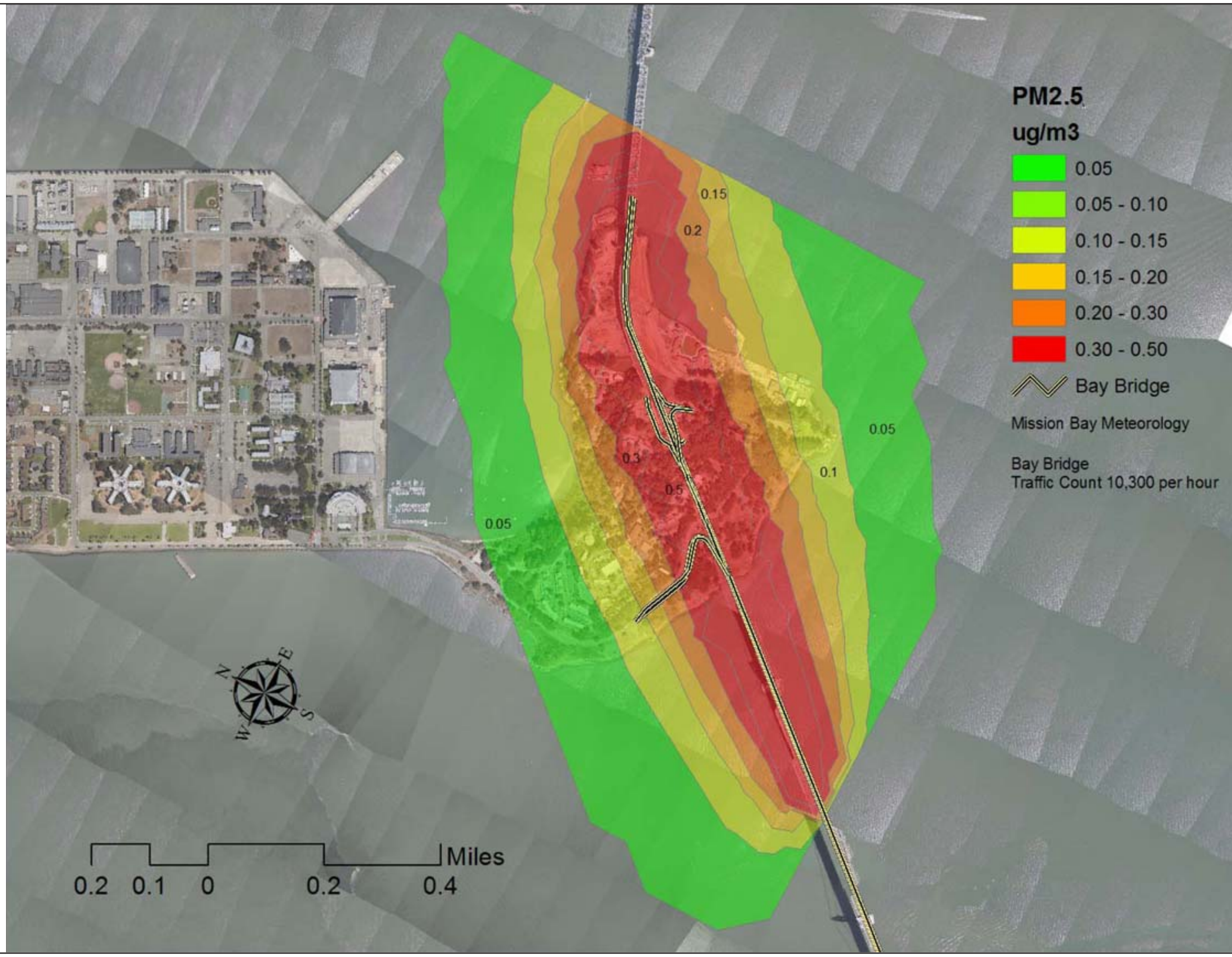
- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

---

[26] For purposes of evaluation of potential effects of PM2.5 exposure, DPH also recommends analysis where there are more than 50,000 daily vehicles within 330 feet (100 meters) of the site, or more than 10,000 daily vehicles within 165 feet (50 meters). These latter two conditions are included to capture equivalent impacts from lesser concentrations of traffic in smaller areas than the ARB-recommended standard of 100,000 daily vehicles within 500 feet (150 meters) (CARB, *Air Quality and Land Use Handbook: A Community Health Perspective*, 2005).

[27] "Excess deaths" (also referred to as premature mortality) refer to deaths that occur sooner than otherwise expected, absent the specific condition under evaluation; in this case, exposure to PM2.5.

[28] San Francisco Department of Public Health, Occupational and Environmental Health Section, Program on Health, Equity, and Sustainability, "Assessment and Mitigation of Air Pollutant Health Effects from Intra-urban Roadways: Guidance for Land Use Planning and Environmental Review," May 6, 2008. Twenty excess deaths per million based on non-injury, non-homicide, non-suicide mortality rate of approximately 714 per 100,000. Although San Francisco's population is less than one million, the presentation of excess deaths is commonly given as a rate per million population.



SOURCE: San Francisco Department of Public Health

FIGURE IV.G.1: ANNUAL PM2.5 CONCENTRATION IN THE VICINITY OF THE BAY BRIDGE

- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

Updated BAAQMD Thresholds

The BAAQMD adopted updated CEQA Guidelines[29] and Thresholds of Significance[30] in June of 2010, which also provide reference points for considering whether a project would have a significant impact. It is the Air District's policy that the adopted thresholds apply to projects for which a Notice of Preparation ("NOP") is published, or environmental analysis begins, on or after the applicable effective date. Because both the NOP and environmental analysis for the Proposed Project began prior to June 2, 2010, these new thresholds and associated guidance are not formally applicable to the Proposed Project. Although not formally applicable, this analysis includes as assessment of project impacts with regard to both the newly-adopted 2010 BAAQMD significance thresholds as well as to the formally applicable 1999 BAAQMD significance thresholds. These guidelines, published for assessing impacts relative to these thresholds, are recommended procedures for evaluating potential air quality impacts during the environmental review process. Additionally, the BAAQMD has adopted new risk and hazard exposure thresholds that will not go into affect until January 1, 2011.

<u>Construction Impacts – Applicable 1999 BAAQMD Thresholds</u>

For construction phase-related impacts, the existing 1999 BAAQMD Guidelines do not require quantification of construction emissions, but recommend that significance be based on a consideration of the control measures to be implemented (BAAQMD, 1999). However, in its response to the NOP for the Proposed Project, BAAQMD specifically requested that construction emissions be quantified in the Draft EIR. Therefore, construction impacts are discussed qualitatively with regard to the applicable BAAQMD-recommended BMPs for dust abatement and are also discussed quantitatively with respect to construction-level exhaust thresholds recently adopted by BAAQMD.

---

[29] BAAQMD, *CEQA Air Quality Guidelines*, May, 2010, Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Draft_BAAQMD_CEQA_Guidelines_May_2010_Final.ashx.

[30] BAAQMD, *CEQA Guidelines Update, Proposed Thresholds of Significance*, May 2010, Available at http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Proposed_Thresholds_Report_%20May_3_2010_Final.ashx

Construction Impacts – 2010 BAAQMD Thresholds

Under the updated BAAQMD CEQA thresholds, a project would have a significant air quality impact if it would result in average daily construction-related emissions of ROG, NOx, or PM2.5 (non-inclusive of fugitive dust[31]) of 54 pounds (25 kilograms) average daily emissions or greater. These Thresholds have a separate emission threshold for PM10 (non-inclusive of fugitive dust[32]) of 82 pounds (37 kilograms) average daily emissions. The thresholds for PM10 and PM2.5 are inclusive only of construction exhaust emissions. BAAQMD guidance regarding construction-related emission of fugitive dust identifies implementation of Best Management Practices as its threshold of significance (Table 2-1). While the Guidelines do not specifically define what constitute Best Management Practices, they do reference them as the "current" approach and, as such, this analysis considers them to consist of BAAQMD's list of eight *Basic Construction Mitigation Measures Recommended for All Proposed Projects*.

The updated BAAQMD CEQA thresholds identify that a project would also have a significant air quality impact if construction activities would result in an incremental increase in localized annual average concentrations of PM2.5 exceeding 0.3 micrograms per cubic meter within a 1,000-foot radius from the property line of the construction area or a receptor. These new PM2.5 thresholds are not applicable until January 1, 2011. A project would also have a significant air quality impact if it would expose persons to substantial levels of TACs (including DPM), such that the probability of contracting cancer for the Maximally Exposed Individual ("MEI")[33] exceeds 10 in one million or if it would expose persons to TACs such that a non-cancer Hazard Index of 1.0 would be exceeded.

A project's construction activities and operations may also result in localized cumulative air quality impact. If proposed construction activities in addition to all other local sources of PM2.5 result in a cumulative concentration of greater than 0.8 micrograms per cubic meter within a 1,000-foot radius from the property line of the construction area or receptor, then project construction activities would be considered to result in a cumulative impact. A project would also have a significant cumulative construction-related air quality impact if construction activities in addition to existing sources with a 1,000 foot radius of the construction area would expose persons to substantial levels of TACs, such that the probability of contracting cancer for the MEI exceeds 100 in one million or if it would result in exposure of persons to TACs such that a non-cancer Hazard Index of 10.0 would be exceeded. These new cumulative exposure thresholds are not applicable until January 1, 2011.

[31] Fugitive dust consists of very small liquid and solid particulate matter that is suspended in the air by the wind and human activities. Fugitive dust originates primarily from the soil.
[32] Fugitive dust is PM suspended in the air by the wind and human activities. It originates primarily from the soil and is not emitted from exhaust pipes, vents, or stacks.
[33] The Maximally Exposed Individual is the person with the highest exposure in a given population.

Project-Level Operational Impacts Applicable 1999 BAAQMD Thresholds

For project-level impact analyses, the 1999 BAAQMD CEQA Thresholds include various thresholds and tests of significance. For ROG, NOx and PM10, a net increase equal to or greater than 15 tons per year or 80 pounds average daily emissions is considered significant. For CO emissions, a project would be considered to have a significant impact if it leads to or contributes to CO concentrations exceeding the State Ambient Air Quality Standards of 9.0 parts per million, 8-hour average and 20.0 parts per million, 1-hour average.

Under the 1999 BAAQMD thresholds, a project would also have a significant air quality impact if it would expose persons to substantial levels of TACs, such that the probability of contracting cancer for the MEI exceeds 10 in one million or if would expose persons to TACs such that a non-cancer Hazard Index of 1.0 would be exceeded. A Hazard Index is a summation of the non-cancer hazard quotients for all chemicals to which an individual is exposed. A Hazard Index value of 1.0 or less than 1.0 indicates that no adverse human health effects (non-cancer) are expected to occur.

Project-Level Operational Impacts 2010 BAAQMD Thresholds

For project-level impact analyses, the updated BAAQMD CEQA Thresholds include various thresholds and tests of significance. For ROG, NOx and PM2.5, a net increase equal to or greater than 10 tons per year or 54 pounds average daily emissions is considered significant, while for PM10 a net increase equal to or greater than 15 tons per year or 82 pounds average daily emissions is considered significant. For CO emissions, a project would be considered to have a significant impact if it leads to or contributes to CO concentrations exceeding the State Ambient Air Quality Standards of 9.0 parts per million, 8-hour average, and/or 20.0 parts per million, 1-hour average.

Under the updated BAAQMD thresholds, a project would also have a significant air quality impact if it would result in an incremental increase in localized annual average concentrations of PM2.5 exceeding 0.3 micrograms per cubic meter from project operations.

Additionally, a project would also have a significant air quality impact if it would expose persons to substantial levels of TACs, such that the probability of contracting cancer for the MEI exceeds 10 in one million or if would expose persons to TACs such that a non-cancer Hazard Index of 1.0 would be exceeded. A Hazard Index is a summation of the non-cancer hazard quotients for all chemicals to which an individual is exposed. A Hazard Index value of 1.0 or less than 1.0 indicates that no adverse human health effects (non-cancer) are expected to occur.

Cumulative Impacts

Generally, based on updated BAAQMD thresholds, if a project results in an increase in ROG, NOx, PM2.5, or PM10 of more than their respective daily mass thresholds, then it would also be considered to contribute considerably to a significant cumulative effect. Cumulative air quality impacts relative to emissions of PM2.5 and TACs are new concepts contained in BAAQMD's updated thresholds.

With regard to cumulative impacts from PM2.5, a significant cumulative air quality impact would occur if localized annual average concentrations of PM2.5 would exceed 0.8 micrograms per cubic meter at any receptor from project operations in addition to existing emission sources and cumulative emissions sources within a 1,000-foot radius of the Development Plan Area, based on BAAQMD's updated thresholds.

With regard to cumulative impacts from TACs, a significant cumulative air quality impact would occur if the probability of contracting cancer for the MEI would exceed 100 in one million or if the Proposed Project would expose persons to TACs such that a non-cancer Hazard Index of 10.0 would be exceeded at any receptor as a result of project operations, in addition to existing emission sources and cumulative emissions sources within a 1,000 foot radius of the project site.

APPROACH TO ANALYSIS

The proposed *Treasure Island/Yerba Buena Island Redevelopment Plan* and Development Program is both a Plan-level and a Project-level analysis. While the 1999 and updated 2010 BAAQMD CEQA Thresholds do include both plan- and project-level thresholds, given the relatively substantial amount of project-specific detail available for the Proposed Project, this analysis applies the BAAQMD's project-level criteria. Project-related air quality impacts fall into two categories: short-term impacts due to construction, and long-term impacts due to project operation. During project construction, the Proposed Project would affect local particulate concentrations primarily due to fugitive dust sources, as well as construction equipment exhaust. Over the long term, the Proposed Project would result in an increase in emissions primarily due to increased motor vehicle trips, emissions from new ferry boat operations, and new bus operations. On-site stationary sources (such as natural gas boilers for water and space heating) and area sources (such as landscaping and use of consumer products) would result in lesser quantities of pollutant emissions.

Each impact is assessed relative to both the applicable 1999 BAAQMD thresholds of significance as well as the recently adopted 2010 BAAQMD thresholds of significance. For construction dust impacts, BAAQMD does not require quantification of construction dust emissions for projects, but recommends that significance be based on a consideration of the construction dust control measures (1999 Thresholds) or best management practices ("BMPs") (2010 thresholds to be implemented.[34] Therefore, construction impacts are discussed qualitatively with regard to the applicable BAAQMD-recommended BMPs for dust abatement and are also discussed quantitatively with respect to construction-level thresholds recently adopted by BAAQMD for exhaust emissions.

Construction and operational emissions of criteria air pollutants were estimated using the URBEMIS 2007 model (version 9.2.4) and compared to BAAQMD significance thresholds. The model combines information on trip generation with vehicular emissions data specific to different types of trips in the San Francisco area (home-to-work, work-other, etc.) from the CARB's EMFAC 2007 BURDEN model to create an estimated daily emissions burden for travel within the San Francisco Bay Area Air Basin.

Localized CO concentrations near congested intersections are analyzed using BAAQMD's new screening criteria. The BAAQMD identifies the following screening criteria to evaluate whether a project would result in a less than significant impact to localized CO concentrations: 1) the project is consistent with an applicable congestion management program ("CMP") established by the county congestion management agency ("CMA") and with applicable CMPs for designated roads or highways, regional transportation plan or local CMP; and 2) the project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour or 24,000 vehicles per hour where atmospheric mixing is limited (e.g., tunnel, parking garage, bridge underpass, natural or urban canyon, below grade roadway). If all the above criteria are met, then the project would be considered to have a less than significant impact to localized CO concentrations. If any one of the above criteria is not met, then modeling of roadside CO concentrations is required to evaluate if state/federal CO ambient air quality standards are exceeded to evaluate significance.

Last, cumulative impacts of the project were evaluated based on the BAAQMD CEQA Guidelines as discussed under the significance thresholds.

PROJECT IMPACTS

Construction Impacts

Impact AQ-1: Construction of the Proposed Project would result in localized construction dust-related air quality impacts. (*Less than Significant with Mitigation*)

Demolition, grading and new construction activities would temporarily affect local air quality during the project's proposed 20-year construction schedule, causing temporary increases in particulate dust and other pollutants. Emissions generated from construction activities include

[34] Bay Area Air Quality Management District (BAAQMD), *BAAQMD CEQA Air Quality Guidelines*, June 2010; Table 2.1, p. 2-2. Available on the internet at: http://www.baaqmd.gov/pln/ceqa/index.htm. Accessed June 25, 2010.

dust (including PM10 and PM2.5)[35] primarily from fugitive sources. For project-level fugitive dust emissions from construction, the BAAQMD CEQA Guidelines use the implementation of BMPs as its threshold of significance. Project-related demolition, excavation, compaction, grading and other construction activities may cause wind-blown dust that could disperse particulate matter into the local atmosphere. Although there are federal standards for air pollutants and implementation of state and regional air quality control plans, air pollutants continue to have impacts on human health throughout the country. California has found that particulate matter exposure can cause health effects at lower levels than national standards. The current health burden of particulate matter demands that, where possible, public agencies take feasible available actions to reduce sources of particulate matter exposure. The San Francisco Construction Dust Control Ordinance (Ordinance 176-08, effective July 30, 2008) discussed in the Regulatory Framework would reduce the quantity of dust generated during site preparation, demolition, and construction work in order to protect the health of the general public and of onsite workers, and to minimize public nuisance complaints. The Ordinance requires that all site preparation work, demolition, or other construction activities within San Francisco that have the potential to create dust or to expose or disturb more than 10 cubic yards or 500 square feet of soil comply with specified dust control measures whether or not the activity requires a permit from DBI.

The Ordinance requires that the applicant and the contractor responsible for construction activities use practices to control construction dust on the site or other practices that result in equivalent dust control that are acceptable to the Director of DBI. Dust suppression measures may include watering all active construction areas sufficiently to prevent dust from becoming airborne; increased watering frequency may be necessary whenever wind speeds exceed 15 miles per hour.

The Ordinance requires that the applicant submit a Dust Control Plan for approval by the San Francisco Health Department. The project applicant would also be required to designate an individual to monitor compliance with dust control requirements.

Current and proposed BAAQMD guidance for assessing construction dust impacts state that for a project to have a less-than-significant air quality impact from construction generated dust that BAAQMD-identified dust control measures (1999 Guidelines) or BAAQMD-recommended BMPs for dust abatement (2010 Guidelines) must be implemented. These measures include the following elements:

1. All exposed surfaces shall be watered two times daily.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

[35] Particles that are 10 microns or less in diameter and 2.5 microns or less in diameter, respectively.

3. All visible mud or dirt tracked-out onto adjacent public roads shall be removed using wet-power vacuum street sweepers at least once per day.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturers specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

While the regulations and procedures set forth in the Construction Dust Control Ordinance in the San Francisco Health Code contain some of the BAAQMD-recommended BMPs identified above, each is not specifically identified within the ordinance. Therefore, Mitigation Measure M-AQ-1 requires that all eight of the BAAMD recommended BMPs be included in the Project's Construction Dust Control Plan, to address potentially significant construction dust air quality impacts. Additionally, Mitigation Measure M-AQ-4 would also reduce particulate emissions.

<u>Mitigation Measure M-AQ-1: Implementation of BAAQMD-Identified Basic Construction Mitigation Measures</u>

The following eight BAAQMD-identified construction mitigation measures shall be incorporated into the required Construction Dust Control Plan for the Proposed Project:

1. All exposed surfaces shall be watered two times daily.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt tracked-out onto adjacent public roads shall be removed using wet-power vacuum street sweepers at least once per day.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes. Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturers specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

The BAAQMD's May 2010 Thresholds of Significance document states on page 51 "For fugitive dust emissions, staff recommends following the current best management practices approach which has been a pragmatic and effective approach to the control of fugitive dust emissions. Studies have demonstrated (Western Regional Air Partnership, U.S.EPA) that the application of best management practices at construction sites have significantly controlled fugitive dust emissions. These studies support staff's recommendation that projects implementing construction best management practices will reduce fugitive dust emissions to a less than significant level." Therefore, by incorporating these mitigation measures into the required Construction Dust Control Plan, project-generated construction dust would be reduced to a less-than-significant level.

Impact AQ-2: Construction of the Proposed Project could violate an air quality standard or contribute significantly to an existing or projected air quality violation. *(Less than Significant under Applicable 1999 Guidelines, Significant and Unavoidable with Mitigation under 2010 Guidelines)*

Construction within the Development Plan Area is anticipated to occur continuously for approximately 20 years. Construction activities would include site preparation, grading, placement of infrastructure, placement of foundations for structures, and fabrication of structures. Demolition, excavation and construction activities would require the use of heavy trucks, excavating and grading equipment, material loaders, cranes, concrete breakers, and other mobile and stationary construction equipment. Emissions during construction would be caused by materials-handling, traffic on unpaved or unimproved surfaces, demolition of structures, use of paving materials and architectural coatings, exhaust from construction worker vehicle trips, truck trips, and exhaust from construction equipment such as loaders, graders, and cranes.

Criteria pollutant emissions of ROG and NOx from construction equipment would incrementally add to the regional atmospheric loading of ozone precursors during project construction. The 1999 BAAQMD CEQA Guidelines[36] recognize that construction equipment emits ozone precursors, but for the purposes of CEQA analyses, the guidelines indicate that such emissions are included in the emissions inventory that is the basis for regional air quality plans. Therefore, the construction equipment emissions would be consistent with emissions inventory estimates and

[36] BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans, December, 1999, p. 13, note 3.

would not be expected to impede attainment or maintenance of ozone standards in the Bay Area. Therefore, under the applicable 1999 BAAQMD CEQA Guidelines, constructions projects would be presumed to have a less than significant impact.

In June 2010, the BAAQMD adopted its Thresholds of Significance document as part of its updated CEQA Guidelines, which indicates a number of modifications to its previous guidelines, including requirements for the quantification of criteria pollutant from construction activities. Applying the new BAAQMD CEQA Guidelines, the estimated average daily project construction emissions are presented in Table IV.G.4.[37] These emissions do not include any reductions in emissions that may result from implementation of Mitigation Measure M-AQ-1. Emissions are greatest during the import of fill materials and earth moving activities. Tug operations, construction crew commuting, and fugitive dust sources contribute a lesser percentage of the overall emissions.[38]

As indicated in Table IV.G.4, construction related mass emissions of PM10 and PM2.5 would not exceed the 2010 BAAQMD thresholds for construction emissions, and therefore, the impact as it relates to those criteria pollutants is less than significant. Construction related emissions of ROG and NOx would exceed the BAAQMD thresholds for construction emissions. Therefore, Mitigation Measure M-AQ-2 is identified to reduce construction exhaust emissions for ROG and NOx.

Given current technologies, Mitigation Measure M-AQ-2 would achieve a maximum NOx and ROG reduction of approximately 50 percent each. It is therefore unlikely that the mitigation measure identified could achieve either a 95 percent reduction in NOx emissions, the level necessary to reduce emissions from these sources to a level below the BAAQMD's 54 pounds average daily emissions significance threshold, or a 51 percent reduction in ROG emissions, the level necessary to reduce emissions from these sources to a level below the BAAQMD's significance threshold. Therefore, the potential impacts of the Proposed Project with respect to the BAAQMD CEQA construction thresholds would be significant and unavoidable for NOx and ROG relative to the 2010 BAAQMD Thresholds, even with implementation of Mitigation Measure M-AQ-2.

[37] Annual emissions during construction were estimated based on project sponsor estimates of construction activities during each year. The project sponsor estimates were based on construction sequencing assumptions for the representative project, given the representative phasing plan. The actual sequencing assumptions may differ, as the Proposed Project's DDA permits the phasing to be adjusted to differ from the representative analysis set forth in this EIR.

[38] Additional information on the assumptions and methodology for the construction emissions inventory is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File 2007.0903E.

Table IV.G.4: Average Daily Construction Emissions of Criteria Air Pollutants

	Estimated Daily Emissions (pounds per day)				
Construction Phase and Year	**ROG**	**NOx**	**CO**	**PM10**	**PM2.5**
2011	55.8	549	238	32.7	23.0
2012	62.9	601	262	34.3	24.4
2013	127	1,147	508	55.9	43.9
2014	104	884	425	41.7	33.7
2015	89.9	788	359	38.1	30.5
2016	116	892	504	42.0	33.8
2017	109	801	501	40.8	31.1
2018	72.4	509	350	28.9	20.4
2019	96.6	633	473	33.7	24.6
2020	97.6	598	508	29.7	22.8
2021	68.2	395	381	21.6	15.5
2022	56.5	308	322	17.7	12.1
2023	53.9	259	329	19.6	11.4
2024	40.2	191	265	16.6	8.7
2025	24.1	109	167	13.4	5.8
2026	1.1	4.7	9.0	0.2	0.2
2027	3.4	11.6	22.4	0.5	0.4
2028	1.1	4.2	9.0	0.2	0.1
2010 BAAQMD Threshold	54	54	NA	82	54
Significant?	**Yes**	**Yes**	NA	**No**	**No**

Source: ESA/KB Environmental, 2010

Mitigation Measure M-AQ-2: Construction Exhaust Emissions

TIDA shall require project sponsors to implement combustion emission reduction measures, during construction activities, including the following measures:

- The contractor shall keep all off-road equipment well-tuned and regularly serviced to minimize exhaust emissions, and shall establish a regular and frequent check-up and service/maintenance program for equipment.
- Off-road diesel equipment operators shall be required to shut down their engines rather than idle for more than five minutes, unless such idling is necessary for proper operation of the equipment.[39] Clear signage shall be provided for construction workers at all access points.

[39] CARB Heavy-Duty Vehicle Idling Emission Reduction Program, http://www.arb.ca.gov/msprog/truck-idling/factsheet.pdf California Code of Regulations Title 13, Section 2485.

TIDA shall require that, to the extent feasible, project sponsors also engage in early implementation of the following combustion emission reduction measures, during construction activities:

- To the extent feasible, the project shall utilize EPA Tier 3 engine standards or better at the start of construction for all off-road equipment, or utilize Retrofit Emission Control Devices which consist of diesel oxidation catalysts, diesel particulate filters or similar retrofit equipment control technology verified by the California Air Resources Board ("CARB") (http://www.arb.ca.gov/diesel/verdev/verdev.htm).
- To the extent feasible, the project applicant shall utilize EPA Tier 4 engine standards or better for 50 percent of the fleet at construction initiation, increasing to 75 percent by 2015, and 100 percent by 2020.
- To the extent feasible, the project applicant shall utilize 2007 or newer model year haul trucks.

Given current technologies, conversion of diesel equipment to EPA Tier 3 standards, would achieve a maximum NOx and ROG reduction of approximately 50 percent. Conversion of all diesel equipment to Tier 4 standards would achieve a NOx reduction of 95 percent and a ROG reduction of 85 percent.[40] It is therefore unlikely without full implementation of Tier 4 equipment that the mitigation measures identified could achieve a 95 percent reduction in NOx emissions, the level necessary to reduce emissions from these sources to a level below the BAAQMD's 54 pounds per day significance threshold. A 51 percent reduction in ROG emissions, the level necessary to reduce emissions from these sources to a level below the BAAQMD's significance threshold would also not quite be attainable. However, Tier 4 equipment is not currently readily available for earthmoving and other activities proposed by the project, so it is not likely that this mitigation measure could be fully implemented in the near-term. With the implementation of all feasible mitigation measures, NOx and ROG emissions from construction would remain a significant and unavoidable impact of project approval (under the 2010 BAAQMD CEQA Guidelines).

Impact AQ-3: Construction of the Proposed Project could expose sensitive receptors to substantial levels of toxic air contaminants which may lead to adverse health effects. (*Potentially Significant and Unavoidable for both 1999 and 2010 BAAQMD thresholds in Phase 2*)

The only toxic air contaminant that construction of the Proposed Project would generate at potentially substantial levels would be diesel particulate matter ("DPM"). The Proposed Project could increase cancer risk from exposure to DPM emissions associated with off-road construction equipment, on road haul trucks and tug boats used during construction of the Proposed Project. While the exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic, these toxic compounds adhere to diesel particles and are

[40] http://www.dieselnet.com/standards/us/nonroad.php

included in the risk assessment factors for DPM. The BAAQMD's 1999 and 2010 CEQA significance threshold for individuals exposed to new TAC sources is an increased cancer risk of 10 in one million or greater (the increased incremental cancer risk) per individual source and/or non-cancer risk annualized Hazard Indices greater than or equal to one.

Emissions rates for construction of the Proposed Project were derived from construction emissions described above under Impact AQ-2. To be conservative, it was assumed that all off-road PM2.5 exhaust emissions would be DPM. Construction emissions were modeled as four distinct phases (see Chapter II, Project Description, for a full description of construction phasing assumptions).

The EPA dispersion model AERMOD was used to determine average DPM concentrations at nearby receptors during construction. The following assumptions were used to determine risk at the Maximum Exposed Individual Resident ("MEIR"):[41]

- Treasure Island Receptors:
  - Existing residents in housing located in the northwest corner of Treasure Island would remain occupied through Phases 1, 2, and 3 of construction and would be removed by about prior to Phase 4 construction;
  - New residents in buildings on Treasure Island constructed in Phase 2 would be exposed to DPM emissions generated during construction of Phases 2, 3 and 4;
  - New residents in buildings on Treasure Island constructed during Phase 3 would be exposed to DPM emissions generated during construction of Phases 3 and 4; and
  - New residents in buildings on Treasure Island constructed during Phase 4 would be exposed to DPM emissions generated during construction of Phase 4; and
- Yerba Buena Island Receptors:
  - Existing residents of Yerba Buena Island would be relocated to Treasure Island as part of Phase 1 activities, and would therefore be considered in the Treasure Island existing receptor group, above;
  - New residents in buildings on Yerba Buena Island constructed during Phase 2 would be exposed to DPM emissions generated during construction of Phases 2, 3, and 4;
  - New residents in buildings on Yerba Buena Island constructed during Phase 3 would be exposed to DPM emissions generated during construction of Phases 3 and 4; and
  - During Phase 4 no construction would occur on Yerba Buena Island and all residences would be occupied.

All receptors were modeled at a breathing height of 1.8 meters (typical breathing height). Elevations for receptors and sources were derived from the USGS Oakland West and San

[41] The MEIR is the residential receptor or other sensitive receptor with the highest modeled risk exposure and is based on an assumed exposure of 350 days per year. The MEIW is the commercial or industrial locations with the highest modeled risk exposure and is based on an assumed exposure of 245 days per year.

Francisco North 7.5 minute digital elevation models ("DEMs") using AERMAP, an accessory program to AERMOD.

Meteorological data from the BAAQMD's Port of Oakland Station for 1998 through 2000 was used to prepare hourly meteorological data for use in AERMOD. This station was selected as representative of the project site because it more accurately reflects the wind exposures of the open Bay than meteorological stations in the interior of San Francisco. Airport meteorological data is necessary to operate dispersion models because this data contains elements such as upper air cloud cover that are not collected at non-airport metrological stations. Opaque cloud cover data from the San Francisco Airport was used to supplement the Port of Oakland data for use in AERMOD. Upper air data from Oakland International Airport was used to estimate atmospheric mixing heights for the region.

The maximum incremental cancer risk from exposure to DPM was calculated following the guidelines established by California Office of Environmental Health Hazard Assessment[42] ("OEHHA") in conjunction with the BAAQMD's Health Risk Screening Analysis ("HRSA") Guidelines.[43] The equation used to determine exposure to DPM through inhalation is presented below. Specific equations for each modeled scenario are presented in Appendix E along with supporting documentation.

$$\text{Dose-inhalation} = \frac{C_{air} * \{DBR\} * A * EF * ED * 10^{-6} * CRAF}{AT}$$

Where:

Dose-inh	=	Dose of the toxic substance through inhalation in milligrams per kilogram of body weight per day ("mg/kg-day")
10^{-6}	=	Micrograms to milligrams conversion, Liters to cubic meters conversion
C_{air}	=	Concentration in air ($\mu g/m^3$)
{DBR}	=	Daily breathing rate (L/kg body weight – day)
A	=	Inhalation absorption factor
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
AT	=	Averaging time period over which exposure is averaged in days (25,550 days for a 70 year cancer risk)
CRAF	=	Cancer risk adjustment factor (an age sensitivity factor of 1.7 de4rvided by BAAQMD[44])

[42] Office of Environmental Health Hazards Assessment ("OEHHA"), 2003. *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, available online at: http://www.oehha.org/air/hot_spots/pdf/HRAguidefinal.pdf, August 2003.

[43] BAAQMD, *Air Toxics NSR Program Health Risk Screening Analysis ("HRSA") Guidelines*, Draft 2009.

[44] BAAQMD, Recommended Methods for Screening and Modeling Local Risks and Hazards, May 2010, Page 80.

Modeling results were used to determine the annual average concentration of DPM in the air during construction activities. For residential risk, BAAQMD-HRSA recommended 80th percentile adult breathing rate of 302 L/kg-day was used in the equation and the exposure frequency was assumed to be 350 days per year. Exposure duration for Phases 1, 2, and 3 were assumed to be three years, while exposure duration for Phase 4 was assumed to be nine years. The inhalation absorption factor was assumed to be one, i.e., conservatively assuming all pollution is absorbed.

To determine incremental cancer risk, the estimated dose through inhalation was multiplied by the OEHHA established cancer potency slope factor for DPM, which is 1.1 $(mg/kg\text{-}day)^{-1}$.

The non-cancer adverse health risk, both for acute (short-term) and chronic (long-term) exposure, is measured against a hazard index, which is defined as the ratio of the predicted incremental exposure concentration from the Proposed Project emissions to a published reference exposure level ("REL") that could cause adverse health effects as established by OEHHA. RELs are expressed in units of $\mu g/m^3$ for inhalation exposure and represent the concentration at or below which no adverse health effects are anticipated following exposure. The ratio (referred to as the Hazard Quotient) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall Hazard Index for that organ system. Overall, Hazard Indices are calculated for each organ system. If the overall Hazard Index for the highest-impacted organ system is greater than one, then the impact is considered to be significant. OEHHA has assigned diesel exhaust a chronic REL of 5.0 $\mu g/m^3$. This REL represents the level below which exposure to diesel exhaust would not result in adverse health effects to the respiratory system and is compared to the annual average exposure of the MEIR to determine the HI.

<u>Residential Risk</u>

Risk was evaluated for the four sets of residential receptors on Treasure Island and the two sets of residential receptors on Yerba Buena Island described previously to represent those receptors that would remain on the island during construction activities. The analysis for each of these groups follows.

<u>*Existing Treasure Island Residential Receptors*</u>

Existing residents located on the northwest corner of Treasure Island would be exposed to DPM emissions generated during construction of Phases 1, 2 and 3 of the Proposed Project. The maximum annual average DPM concentration at any receptor within this neighborhood during construction of Phases 1, 2 and 3 would be 0.25$\mu g/m^3$, 0.35$\mu g/m^3$, and 0.05$\mu g/m^3$, respectively. It should be noted that the maximum annual average DPM concentration for each of these phases would occur at a different receptor within this neighborhood; therefore this analysis presents a conservative analytic assumption as it assumes that an individual receptor would be exposed to the maximum concentration throughout construction. As shown in Appendix E, incremental cancer risk at the MEIR in this neighborhood from construction of the Proposed Project would be approximately 8.8 in one million. Application of a recently adopted age sensitivity factor derived by BAAQMD to account for exposure to prenatal and very young children increases this predicted risk to 14.9 in one million. This is exceeds the BAAQMD significance threshold of 10 in one million; therefore impacts associated with incremental cancer risk would be significant at existing residential receptors located on Treasure Island.

The overall non-cancer hazard index associated with the DPM exposure at this receptor would be approximately 0.07 (0.35 $\mu g/m^3$ / 5.0$\mu g/m^3$). This is well below the BAAQMD recommended threshold of 1.0; therefore, chronic non-cancer health impacts at existing residential receptors would also be less than significant. No mitigation is required.

Phase 2 Treasure Island New Residential Receptors

New residences constructed on Treasure Island during Phase 2 would likely be occupied during construction of Phases 2, 3 and 4 and would therefore be exposed to elevated concentrations of DPM. During construction of Phase 2, the adjacent receptors within the Phase 2 area during Phase 2 development would be exposed to a DPM concentration in excess of 0.36$\mu g/m^3$. During construction of Phase 3, the maximum exposed receptor in the area developed during Phase 2 would be exposed to a DPM concentration of up to 0.36$\mu g/m^3$ and would be located at the southeastern portion of this area. During construction of Phase 4, the maximum exposed Phase 2 receptor would be exposed to a DPM concentration of up to 0.12$\mu g/m^3$ and would be located near the northern end of the Phase 2 Development Plan Area. It should be noted that the maximum annual average DPM concentration would occur at different receptors within this cluster of receptors during Phases 3 and 4. Thus, considering these individual impacts at the same receptor would render this a conservative conservative analysis. As shown in Appendix E, incremental cancer risk at the MEIR would be 9.9 in one million, which is just below the BAAQMD significance threshold of 10 in one million. However, application of a recently adopted age sensitivity factor derived by BAAQMD to account for exposure to prenatal and very young children increases this predicted risk to 16.8 in one million. Additionally, impacts to Phase 2 occupants during Phase 2 construction could be greater than 16.8 and significant, depending on their location relative to the predominant wind direction.

The overall non-cancer hazard index associated with the DPM exposure at this receptor would be approximately 0.072 (0.36 $\mu g/m^3$ / 5.0$\mu g/m^3$). This is well below the BAAQMD recommended threshold of 1.0; therefore, chronic non-cancer health impacts at these receptors would also be less than significant. No mitigation is required.

Phase 3 Treasure Island Residential Receptors

New residences constructed on the east side of Treasure Island during Phase 3 would likely be occupied during construction of Phases 3 and 4 and would therefore be exposed to DPM emissions associated with construction activities. During construction of Phase 4, the maximum exposed resident on the east side of the island would be exposed to an annual average DPM concentration of approximately 0.14μg/m^3. As shown in Appendix E, this would result in an incremental cancer risk of 5.7 in one million. Applying application of a recently adopted age sensitivity factor derived by BAAQMD to account for exposure to prenatal and very young children increases this predicted risk to 9.7 in one million. Additionally, impacts to Phase 3 occupants during Phase 3 construction could be greater than the predicted 9.7 in one million, depending on their location relative to the predominant wind direction. Consequently, as a conservative analysis, occupancy of Phase 3 structures during Phase 3 construction is considered a potential significant impact. This would be below the BAAQMD significance threshold of 10 in one million and impacts would be less than significant.

The overall non-cancer hazard index associated with the DPM exposure at this receptor would be approximately 0.028 (0.14 μg/m^3 / 5.0μg/m^3). This is well below the BAAQMD recommended threshold of 1.0; therefore, chronic non-cancer health impacts at these receptors would also be less than significant. No mitigation is required.

New Yerba Buena Island Residential Receptors

New residences constructed on Yerba Buena Island during Phases 2 and 3 would likely be occupied during construction of Phases 2, 3, and 4. New Yerba Buena Island residents would be exposed to elevated DPM concentrations during construction of Phases 2, 3, and 4. Summing the calculated maximum incremental cancer risk in this neighborhood for Phases 2, 3, and 4 results in a total exposure risk of 5.7 in one million. Application of a recently adopted age sensitivity factor derived by BAAQMD increases this predicted risk to 9.7 in one million. This risk is less than the BAAQMD threshold of 10 in one million; therefore construction DPM cancer impacts would be less than significant for new Yerba Buena Island residential receptors. No mitigation is required.

The overall non-cancer hazard index associated with the DPM exposure at new Yerba Buena Island residential receptors would be approximately 0.074 (0.37 μg/m^3 / 5.0μg/m^3). This is well below the BAAQMD recommended threshold of 1.0; therefore, chronic non-cancer health impacts at these receptors would also be less than significant. No mitigation is required.

Conclusion

Based upon the representative project phasing analyzed here, the DPM exposure cancer risk levels associated with each group of receptors described above would be significant for most phases. Additionally, because of the flexibility in the proposed DDA between TICD and TIDA that allows for different phasing scenarios, it is possible that the actual phasing and location of sensitive receptors could differ from that of the representative project analyzed here, potentially resulting in other significant impacts to sensitive receptors from toxic air contaminants. Implementation of Mitigation Measure M-AQ-3 would reduce the impact; however, because elements of this Mitigation Measure would only be implemented to the extent feasible, it cannot be concluded with certainty that the mitigation measure would reduce the impacts to a less than significant level. Therefore, even with mitigation, the impact is found to be potentially significant and unavoidable.

<u>Mitigation Measure M-AQ-3</u>

At the submission of any Major Phase application, TIDA shall require that an Air Quality consultant review the proposed development in that Major Phase along with existing uses and uses approved in prior Major Phases to determine whether the actual project phasing deviates materially from the representative phasing plan. If the Air Quality consultant determines the possible impact of the actual phasing could result in a significant impact on any group of receptors, then TIDA shall require that the applicant implement in connection with that Major Phase best management practices to the extent that TIDA determines feasible to reduce construction emissions in accordance with Mitigation Measures M-AQ-1, M-AQ-2, and M-AQ-4.

However, because Mitigation Measures M-AQ-2 and M-AQ-4 would only be implemented to the extent that TIDA determines such measures are feasible, it is possible that if a material change in phasing were to occur that even with imposition of these mitigation measures, the impact to one or more sensitive receptors could be significant and unavoidable.

Impact AQ-4: Construction of the Proposed Project would expose sensitive receptors to substantial levels of PM2.5 which may lead to adverse health effects. (*Not Applicable to 1999 BAAQMD Thresholds, Significant and Unavoidable with Mitigation for 2010 BAAQMD Thresholds*)

The 1999 BAAQMD thresholds did not identify a concentration-based exposure threshold for PM2.5. Therefore this impact is not applicable to assessment relative to the 1999 BAAQMD thresholds.

Concentrations of PM2.5 generated by earth movement, off-road construction equipment, on-road haul trucks and tug boats used to transport barges for construction of the Proposed Project were evaluated similarly to DPM concentrations described under Impact AQ-3. However, given that the PM2.5 threshold of $0.3 \mu g/m^3$ is an annualized threshold, as opposed to cancer risk based on lifetime exposure, annual average concentrations were also estimated for the worst case year at sensitive receptor locations discussed in Impact AQ-3. Furthermore, in addition to exhaust emissions, fugitive dust emissions were also included in the dispersion model to determine total PM2.5 concentrations at nearby receptors in that analysis.

Modeling results estimated that maximum annual PM2.5 concentrations from construction activities would be as high as 0.84$\mu g/m^3$ at the closest receptor. This is above the BAAQMD threshold of 0.3$\mu g/m^3$ that will become effective for projects that submit a Notice of Preparation after January 1, 2011. Consequently, although project construction exhaust emissions of PM2.5 are less than significant on a regional basis (Impact AQ-2) localized PM2.5 concentrations that consider both fugitive dust and emissions would be significant. These estimates assume that fugitive dust control measures specified in Mitigation Measure M-AQ-1 would already be implemented. Mitigation Measure M-AQ-4 below would implement additional mitigation measures recommended by BAAQMD for projects with construction emissions above thresholds.

<u>Mitigation Measure M-AQ-4: Implement Additional Construction Mitigation Measures Recommended for Projects with Construction Emissions Above Thresholds</u>

TIDA shall require the project sponsors to implement all of the following mitigation measures identified by BAAQMD, to the extent feasible, for projects that exceed construction thresholds that would be applicable to reducing PM2.5 emissions. Although there may be some overlap, these mitigation measures are identified by BAAQMD as additional to those identified in Mitigation Measure AQ-1 which BAAQMD identifies as recommended for all projects regardless of whether thresholds are exceeded:

1. All exposed surfaces shall be watered at a frequency adequate to maintain minimum soil moisture of 12 percent. Moisture content can be verified by lab samples or moisture probe.
2. All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.
3. Wind breaks (e.g., trees, fences) shall be installed on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.
4. Vegetative ground cover (e.g., fast-germinating native grass seed) shall be planted in disturbed areas as soon as possible and watered appropriately until vegetation is established.
5. The simultaneous occurrence of excavation, grading, and ground-disturbing construction activities on the same area at any one time shall be limited.
6. Activities shall be phased to reduce the amount of disturbed surfaces at any one time.
7. All trucks and equipment, including their tires, shall be washed off prior to leaving the site.
8. Site accesses to a distance of 100 feet from the paved road shall be treated with a 6 to 12 inch compacted layer of wood chips, mulch, or gravel.

9. Sandbags or other erosion control measures shall be installed to prevent silt runoff to public roadways from sites with a slope greater than one percent.
10. Minimizing the idling time of diesel-powered construction equipment to two minutes.
11. Same as Mitigation Measure AQ-2.
12. Requiring that all construction equipment, diesel trucks, and generators be equipped with Best Available Control Technology for emission reductions of NOx and PM.
13. Requiring all contractors use equipment that meets CARB's most recent certification standard for off-road heavy duty diesel engines.

All 13 components of this mitigation measure may or may not be feasible, and thus cannot be assumed to be implemented. Even if all 13 components were implemented, the mitigation would be unlikely to achieve a 65 percent reduction in PM2.5 emissions and resultant concentrations, the level necessary to reduce emissions from these sources to a level below the BAAQMD's 0.3 microgram per cubic meter significance threshold. Therefore, even with the implementation of all feasible (BAAQMD-identified) mitigation measures, PM2.5 concentrations would remain a significant and unavoidable impact.

Operational Impacts

Impact AQ-5: The Proposed Project's operations would violate an air quality standard or contribute substantially to an existing or projected air quality violation. (*Significant and Unavoidable with Mitigation for both 1999 and 2010 BAAQMD thresholds*)

The Proposed Project consists of high-density, compact residential and commercial development located within walking distance of a Transit Hub to maximize walking bicycling, and use of public transportation, and to minimize the use and impacts of private automobiles.

As discussed in Chapter II, Project Description, and the Section IV.E, Transportation, the Proposed Project would include numerous elements that would reduce motor vehicle trips compared to a similar project without trip reduction elements (termed a "business as usual" or BAU project). Specifically the impact analysis considers both the Proposed Project's base transit scenario and Expanded Transit Service, which is the Proposed Project with implementation of Mitigation Measure M-TR-2, as discussed in Section IV.E Transportation. The Proposed Project would include the following trip-reduction elements:

- Ferry service every 50 minutes (corresponding to a single ferry operating at one of the existing docks in San Francisco);
- AC Transit bus service to downtown Oakland with service every 10 minutes;
- Continued SF Muni line 108 – Treasure Island bus service to Treasure Island with no on-island circulation; and
- On-island fleet shuttle service using alternative-fueled shuttle buses.

Expanded Transit Service would include the same elements as the Proposed Project's transit scenario, plus the following additions:

- New ferry service to San Francisco every 15 minutes during peak hours (corresponding to three ferries operating at one of the existing docks in San Francisco);
- Modification of the existing SF Muni line 108 – Treasure Island bus service to increase peak hour frequency from every 15 minutes to every 7 minutes in the AM peak hour and every 5 minutes in the PM peak hour. Additionally, existing buses would be replaced with larger capacity buses; and
- New SF Muni bus service to the San Francisco Civic Center area.

Operational emissions for vehicle trips and some area sources were calculated using the URBEMIS2007 computer model. Trip generation rates of the model were adjusted to reflect the project-specific vehicle trip generation of the Transportation Impact Study (Fehr & Peers, 2009). The model default vehicle trip lengths specific to urban areas of the San Francisco Bay Area Air Basin were adjusted to account for the fact that a majority of the vehicle trips would be destined for off-islands locations. Consequently these trips would necessitate an additional 1.7 miles or 3.2 miles if traveling toward San Francisco or Oakland, respectively. Using a trip distribution ratio of 79 percent toward San Francisco and 21 percent toward Oakland from the Transportation Impact Study included as Appendix C of this EIR, a composite average trip length addition factor of 2.0 miles was assumed for each trip type.

Bus-related emissions were calculated separately not using URBEMIS2007 because the specific number of bus trips and distances were known and are separate from standard vehicle trip assumptions. Bus emissions were estimated using emission factors for diesel buses generated by the EMFAC2007 model of CARB, daily vehicle bus trip generation provided by Fehr & Peers, and trip lengths estimated based on destinations. For proposed new AC Transit service bus trip lengths of 8.3 miles to Downtown Oakland were assumed. Additions to SF Muni bus service under Expanded Transit Service assumed trip lengths from Treasure Island to the Transbay Terminal (3.6 miles) for additions to the existing SF Muni line 108 – Treasure Island line, and to the Civic Center area of San Francisco (5.3 miles) as a new service line (consistent with the Transportation Study).

Emissions from the proposed new ferry service were estimated using data provided by Elliot Bay Design Group specific to the types of ferries under consideration for the Proposed Project.[45] These emissions estimates examined three different engine and generator configurations. The worst case configuration was assumed for each pollutant analyzed. The daily profile assumed 15 round trips, 8 percent at commute speed, 10 percent at maneuvering speed, 15 percent at

[45] Elliot Bay Design Group, Memorandum to Wilson Meany Sullivan, August 15, 2009. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

commute speed and a 25 percent at dock during the day. Ferries were assumed to use shore power during non-operational idle time at the dock during off-service nighttime hours. Data provided by Elliott Bay included only bulk particulate matter emissions, not speciation of PM10 and PM2.5, and did not include estimates of ROG emissions. To determine emissions of PM10, PM2.5 and ROG, data ratios from CARB's 2008 statewide emission inventory for commercial harbor craft were used to scale PM10 and PM2.5 emissions from bulk PM emissions. Similarly, ROG emissions were scaled from statewide NOx emissions for harbor craft.

The Proposed Project would result in a net increase of 30,330 standard vehicle trips per day over existing conditions. New transit trips under the Proposed Project include 120 daily one-way diesel bus trips (AC Transit to/from Oakland only),[46] 120 daily alternative fuel (assumed to be compressed natural gas based on its ubiquity as an alternative bus fuel) on-island shuttle trips and operation of a single ferry for 15 daily round trips.

Expanded Transit Service would result in a net increase of 25,466 standard vehicle trips per day over existing conditions. Transit trips under Expanded Transit Service include 334 new daily diesel bus trips[47] (AC Transit and SF Muni), 120 daily alternative fuel (assumed to be compressed natural gas) on-island shuttle trips and operation of three ferries for 45 daily round trips.

The BAU scenario of the Proposed Project would result in a net increase of 66,304 standard vehicle trips per day over existing conditions. However, ferry emissions and increased transit emissions are presumed to not occur under a BAU scenario.

All scenarios account for area sources that consist of landscape maintenance equipment exhaust, use of consumer products that emit ROGs, and maintenance application of architectural coatings, all of which were calculated using URBEMIS default values for each land use type. Emissions from on-site natural gas combustion were calculated using project-specific natural gas demand data from the Development Energy Study[48] and emission factors from URBEMIS 2007.

As shown in Table IV.G.5, the Proposed Project would result in an increase in criteria pollutant emissions that would be considered significant under both 1999 and 2010 BAAQMD thresholds.

---

[46] AC Transit currently has three hydrogen fuel cell buses as part of a demonstration project and 12 more will be in service in 2010. These 15 AC Transit zero-emission busses represent approximately two percent of its current fleet of 674 buses. Consequently, as a conservative analysis, emissions from new bus service under the Proposed Project are assumed to be entirely diesel.

[47] Although San Francisco uses electricity to power its electric buses and trolleys, these vehicles do not and would not serve the Islands. While approximately 17 percent of the SFMTA non-electric bus fleet consist of hybrid buses that reduce fuel usage by 25 percent, as a conservative assumption, all new SFMTA bus trips were assumed to be diesel.

[48] ARUP, *TICD Treasure Island Development Energy Study Final*, December, 2009. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

Table IV.G.5: Estimated Daily Emissions for the Proposed Project

	Estimated Daily Emissions (pound per day)					
Emission Source	**ROG**	**NOx**	**CO**	**SO_2**	**PM10**	**PM2.5**
Proposed Project (2030)						
On Site Natural Gas	2	26	22	<1	<1	<1
Landscape Equipment	1	<1	18	<1	<1	<1
Consumer Products	392	NA	NA	NA	NA	NA
Architectural Coating	66	NA	NA	NA	NA	NA
Motor Vehicles	130	97	1,047	3	517	97
Buses	1	29	4	<1	3	1
Ferries	21	290	136	<1	8	7
Shuttle Buses	2	15	9	<1	<1	<1
Total Proposed Project (2030)	**615**	**457**	1,236	3	**528**	**105**
1999 BAAQMD Threshold	80	80	550	NA	80	NA
Significant?	**Yes**	**Yes**	Yes	NA	**Yes**	**NA**
2010 BAAQMD Threshold	54	54	NA	NA	82	54
Significant?	**Yes**	**Yes**	NA	NA	**Yes**	**Yes**
Expanded Transit Service (2030)						
On Site Natural Gas	2	26	22	<1	<1	<1
Landscape Equipment	1	<1	18	<1	<1	<1
Consumer Products	392	NA	NA	NA	NA	NA
Architectural Coating	66	NA	NA	NA	NA	NA
Motor Vehicles	103115	81	879	2	434	82
Buses	2	57	8	<1	5	3
Ferries	62	871	409	<1	23	22
Shuttle Buses	2	15	9	<1	<1	<1
Total MT (2030)	**642**	**1,050**	**1,345**	**2**	**462**	**107**
1999 BAAQMD Threshold	80	80	550	NA	80	NA
Significant?	**Yes**	**Yes**	Yes	NA	**Yes**	**NA**
2010 BAAQMD Threshold	54	54	NA	NA	82	54
Significant?	**Yes**	**Yes**	No	No	**Yes**	**Yes**
Business As Usual Scenario (2030)						
On Site Natural Gas	2	23	19	<1	<1	<1
Landscape Equipment	1	<1	18	<1	<1	<1
Consumer Products	392	NA	NA	NA	NA	NA
Architectural Coating	66	NA	NA	NA	NA	NA
Motor Vehicles	238	215	2,341	6	1,151	216
Buses	0	0	0	0	0	0
Ferries	0	0	0	0	0	0
Shuttle Buses	0	0	0	0	0	0
Total BAU (2030)	**696**	**215**	**2,341**	**6**	**1,151**	**216**
Proposed Project Change compared to BAU	- 12%	+ 112%	- 47 %	- 50%	- 54%	- 51%
Expanded TransitServiceo change compared to BAU	- 8%	+ 388%	- 43%	-670%	- 60%	- 50%

Notes:
Emissions shown represent worst case summertime emissions except for emissions of CO which assume wintertime conditions. Emissions may not appear to add up correctly due to rounding. The existing BAAQMD significance threshold of 550 pounds per day of CO represents a threshold which, if exceeded, would necessitate dispersion modeling to determine ambient CO concentrations to further assess significance. This further assessment is addressed in Impact AQ-6.
URBEMIS output sheets are available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File 2007.0903E.

Source: Environmental Science Associates, 2010

Both the Proposed Project and Expanded Transit Service would substantially reduce emissions of CO, SO_2, PM10 and PM2.5 compared to the BAU scenario. However, because ferries proposed under the Proposed Project and Expanded Transit Service would operate on diesel fuel, emissions of NOx under these two scenarios would substantially increase when compared to the BAU scenario.

Emissions from Proposed Project operations would exceed 1999 BAAQMD thresholds for ROG, NOx, and PM10 and 2010 BAAQMD thresholds for ROG, NOx, PM10, and PM2.5. While NOx emissions can be reduced by up to 85 percent by use of selective catalytic reduction technology, this technology is not feasible because the relatively short ferry trips that would be generated would not allow for adequate engine temperatures to be maintained for catalysis to occur.[49] Therefore no feasible mitigation has been identified for NOx emissions. An additional mitigation measure is identified to reduce PM10 and PM2.5 impacts from the ferries.

<u>Mitigation Measure M-AQ-5: Ferry Particulate Emissions</u>

All ferries providing service between Treasure Island and San Francisco shall be equipped with diesel particulate filters or an alternative equivalent technology to reduce diesel particulate emissions. If diesel particulate filters are operated at the proper temperatures, they are reported to achieve up to 90 percent reduction in particulate emissions. However, because the Water Emergency Transit Authority would operate the ferry service, implementation of this measure is outside the jurisdiction of the City and is not assured.

The Proposed Project already includes substantial Transportation Demand Measures. Public transit improvements and further measures to reduce motor vehicle emissions, which alone would be significant, are not available. ROG emissions would result primarily from use of consumer products and architectural coating applications by future residents (non-construction) which could not feasibly be mitigated. Consequently, regional emissions of ROG, NOx and PM10 would be significant and unavoidable under the applicable 1999 BAAQMD Guideline thresholds. Additionally, emissions of PM2.5 would be significant and unavoidable under the 2010 BAAQMD thresholds.

Impact AQ-6: Operation of the Proposed Project could expose sensitive receptors to substantial pollutant concentrations. (*Significant and Unavoidable with Mitigation for both 1999 and 2010 BAAQMD thresholds*)

---

[49] Waterhouse, John, Elliot Bay Design Group, meeting notes from telephone conference January 14, 2010.

Carbon Monoxide

Significance of localized CO emissions from mobile sources is determined by modeling the ambient CO concentration under project and future cumulative conditions, and comparing the resulting one-hour and eight-hour concentrations to the respective state and federal CO standards.

This comparison is presented in Table IV.G.6. The analysis indicates that the state and federal 1-hour and 8-hour standards for CO would not be violated at study intersections during worst-case atmospheric conditions (wintertime conditions when CO concentrations are typically greatest). Moreover, CO concentrations will decrease in the future due to attrition of older, high polluting vehicles, improvements in the overall automobile fleet, and improved fuel mixtures (as a result of ongoing state and federal emissions standards and programs for on-road motor vehicles). Therefore, the Proposed Project would have a less-than-significant impact on local CO concentrations.

Diesel Particulate Matter Emitted by the Proposed Project

The Proposed Project could increase cancer risk from exposure to DPM emissions associated with bus and ferry trips generated by the project operations as well as existing emissions from the Bay Bridge. There are no new point sources of DPM in the Proposed Project but there is one existing point source that could impact new residences of the Proposed Project. The BAAQMD has both a 1999 and a 2010 CEQA significance threshold for individuals exposed to new TAC sources of 10 in one million or greater (the increased incremental cancer risk) per individual source and/or non-cancer risk hazard indices greater than or equal to one.

Vehicle emission rates have been substantially reduced in recent years due to increasingly stringent emissions standards. Therefore, total emissions generated by buses traveling to and from Treasure Island would vary substantially depending on the year in which the engine was manufactured. In response to these varying emission rates, CARB has developed an emissions inventory model commonly referred to as EMFAC2007. When estimating emissions for future years, EMFAC2007 assumes a mix of model years, and it assumes that a certain fraction of vehicles are older models that are not subject to the newest regulations. EMFAC2007 also allows the user to edit model years included in the vehicle fleet mix, thereby adjusting emission rates to reflect specific model years selected. Bus emission rates used to estimate DPM ambient air concentrations associated with the Proposed Project are described in more detail below. For the purpose of this analysis it was assumed that buses traveling to and from the site would be diesel-fueled.

Table IV.G.6: Estimated Future CO Concentrations at Selected Intersections

			Concentrations (ppm)[1]	
Intersection	**Averaging Time (hrs.)**	**Standard (ppm)**	**With Project Proposed Project (2030[50])**	**With Project Mitigated Transit (2030)**
Fremont Street at Howard Street	1	20	4.1	4.1
	8	9	2.4	2.4
Fremont Street at Harrison Street	1	20	3.9	3.9
	8	9	2.2	2.2
Howard Street at 1st Street	1	20	4.1	4.1
	8	9	2.3	2.3
Folsom Street at 1st Street	1	20	4.0	3.9
	8	9	2.3	2.2
Harrison Street at 1st Street	1	20	4.0	3.9
	8	9	2.2	2.2
Folsom Street at 2nd Street	1	20	4.0	4.0
	8	9	2.3	2.3
Bryant Street at 2nd Street	1	20	3.9	3.9
	8	9	2.2	2.2
The Embarcadero at Harrison Street	1	20	4.2	4.3
	8	9	2.4	2.5
Bryant Street at 5th Street	1	20	3.9	4.0
	8	9	2.2	2.3
Harrison Street at 5th Street	1	20	4.1	4.1
	8	9	2.3	2.3
Avenue of the Palms at 1st Avenue	1	20	4.0	3.9
	8	9	2.3	2.2

Notes:
[1] Concentrations relate to a location at the edge of the roadways that form the intersection. The carbon monoxide analysis focuses on the weekday afternoon (p.m.) peak-hour because the project's effects on traffic congestion and related carbon monoxide concentrations are greatest during those periods. The BAAQMD manual CO screening model was used to develop these estimates based on peak-hour traffic volumes prepared for this report. One-hour-average concentrations include a background value of 3.6 parts per million (ppm) while eight-hour average concentration include background values of 2.0 ppm, both of which represent the second highest value recorded at the San Francisco Monitoring station over the past 2 years.

Source: Environmental Science Associates, 2010

In addition to buses, ferry travel between Treasure Island and San Francisco would generate DPM emissions. Ferries would use shore power electricity while docked and would therefore generate minimal emissions while at the Ferry Terminal. Emissions from ferries approaching the terminal were included in the modeling.

To estimate emissions from the Proposed Project, it was assumed that there would be 120 new one-way bus trips to the site each day under the Proposed Project and 334 under Expanded Transit Service. Emissions were modeled from the Bay Bridge exit to the proposed ferry terminal (approximately one mile each way). With regard to ferry emissions, it was assumed that there would be one ferry operating throughout the day for 15 round trips between Treasure Island and San Francisco under the Proposed Project. Under Expanded Transit Service it was assumed that

[50] 2030 is the year for which traffic volumes were generated for the proposed project in the Transportation report (see Appendix C)

there would be three ferries for 45 daily round trips. Emissions from ferries were modeled from the proposed Ferry Terminal to a point approximately 500 meters southwest of the terminal.

Total mobile DPM emissions from buses along the modeled segment of roadway would be approximately 20 grams per day ("g/day") under the funded transit option and approximately 54 g/day under the enhanced transit option. Emissions from ferries along the modeled 500 meter segment would be approximately 553 g/day for the funded transit option and approximately 1,659 g/day under the enhanced transit option.

Receptors were modeled on both Yerba Buena Island and Treasure Island. To be conservative, it was assumed that all receptors would be residents. All receptors were modeled at a breathing height of 1.8 meters (typical breathing height).

As with construction modeling of DPM concentrations, meteorological data from the BAAQMD's Port of Oakland station were used with supplemental opaque cloud cover data from San Francisco International Airport to prepare hourly surface meteorological files for use in AERMOD. Upper air data from Oakland Airport was used to estimate atmospheric mixing heights for the region.

Source and receptor elevations were derived from the San Francisco North and Oakland West 7.5 minute digital elevation models. These elevations were processed and imported using AERMAP, an accessory program to AERMOD. To account for the turbulence induced by moving buses, the bus emissions were modeled as volume sources with a release height of three meters. Ferries were also modeled as volume sources, however the release height for ferry emissions was assumed to be approximately nine meters (~30 feet).

Modeling results from the Proposed Project under the funded transit option demonstrated a maximum annual average DPM concentration of 0.047 $\mu g/m^3$ at the maximum exposed resident. Of this, approximately 87 percent (or 0.041$\mu g/m^3$ of DPM) can be attributed to ferry operations with the remaining percentage resulting from bus emissions.

Under Expanded Transit Service, the maximum annual average DPM concentration was calculated to be approximately 0.14$\mu g/m^3$ at the maximum exposed resident. Of this, nearly 89 percent (or 0.124$\mu g/m^3$) of DPM can be attributed to ferry operations, with the remaining percentage resulting from bus emissions.

The maximum incremental cancer risk and chronic non-cancer hazard indices from exposure to DPM was calculated following the guidelines established by OEHHA (see discussion under Impact AQ-3 for a full description of methods used).

Proposed Project Transit Scenario

As shown in the equation below, the maximum incremental residential cancer risk from the Proposed Project operations would be 15.0 in one million. Equations for other scenarios as well as supporting calculation sheets are provided in Appendix E. This predicted risk would be greater than the BAAQMD recommended significance threshold of 10 in one million and impacts would be significant.

$$\text{Dose-inh} = \frac{0.047\ \mu g/m^3 * 350\ \text{days/year} * 70\ \text{years} * 302\ \text{L/kg-day} * 1 * 10^{-6}}{(25{,}550\ \text{days})}$$

$$= 13.6 * 10^{-6}$$

$$\text{Cancer Risk} = 13.6 * 10^{-6}\ \text{mg/kg-day} * 1.1\ (\text{mg/kg-day})^{-1} * \text{Age Adjustment Factor } 1.7$$

$$= 25.5 * 10^{-6}$$

~ 25.5 in one million

As discussed previously, approximately 87 percent of the maximum DPM concentration under the Proposed Project's transit scenario would be attributed to ferry emissions. Given that risk is directly proportional to concentration, it can be assumed that 87 percent of risk (about 22.2 in one million) can be attributed to ferry emissions. Implementation of Mitigation Measure M-AQ-3 would reduce DPM emissions from ferries by up to 85 percent by requiring ferries to be equipped with particulate traps or similarly capable technology which would result in a 85 percent reduction in risk from ferries. Therefore, with implementation of this measure, risk from ferries would be approximately 3.3 in one million. When added to risk from buses, total risk under the Proposed Project after mitigation would be approximately 6.6 in one million; therefore impacts would be less than significant with mitigation.

The overall hazard index associated with the DPM exposure under the Proposed Project would be approximately 0.009 (0.047 $\mu g/m^3$ / 5.0$\mu g/m^3$). This is well below the BAAQMD recommended threshold of 1.0 even without implementation of Mitigation Measure M-AQ-5. Therefore, chronic non-cancer health impacts associated with the Proposed Project would be less than significant.

Expanded Transit Service

The maximum incremental residential cancer risk from Expanded Transit Service would be 44.6 in one million. Applying application of a recently adopted age sensitivity factor derived by BAAQMD to account for exposure to prenatal and very young children increases this predicted risk to 75.8 in one million. This would be greater than the BAAQMD recommended threshold of 10 in one million and impacts would be significant.

As discussed previously, approximately 89 percent of the maximum DPM concentration under Expanded Transit Service would be attributed to ferry emissions. Given that risk is directly proportional to concentration, it can be assumed that 89 percent of risk (about 67.5 in one million) can be attributed to ferry emissions. Implementation of Mitigation Measure M-AQ-5 would reduce DPM emissions from ferries by 85 percent[51] by requiring ferries to be equipped with particulate traps that would result in a 85-percent reduction in risk from ferries. Therefore, with implementation of this measure, risk from ferries would be approximately 10.1 in one million. When added to risk from buses, total risk under Expanded Transit Service after mitigation would be approximately 18.4 in one million; therefore impacts would be significant with air emissions mitigation.

The overall hazard index associated with the DPM exposure under Expanded Transit Service would be approximately 0.028 (0.14 $\mu g/m^3$ / 5.0$\mu g/m^3$). This is well below the BAAQMD recommended threshold of 1.0 even without implementation of Mitigation Measure M-AQ-5. Therefore, chronic non-cancer health impacts associated with Expanded Transit Service would be less than significant.

Diesel Particulate Matter Health Risks from the Bay Bridge

The BAAQMD has published screening tables that indicate the lifetime excess cancer risk from roadways in San Francisco County, including Interstate 80 to Treasure Island and Yerba Buena Island. This data is presented in Table IV.G.7. As can be seen from this table, excess cancer risk from this segment of roadway ranges from 24 in one million at a distance of 100 feet to 0.21 in one million at a distance of 1,000 feet. Consequently, any residences on Yerba Buena Island that would be within approximately 400 feet of the Bay Bridge could be exposed to cancer risks in excess of 10 in one million. This would be a significant impact for several of the residences proposed for Yerba Buena Island. The maximum Health Indices for the Bay Bridge are 0.06, which is less than the 1.0 significance threshold.

Table IV.G.7: Lifetime Cancer Risk Near the San Francisco-Oakland Bay Bridge

Distance East or West of I-80 in San Francisco (feet)	**100**	**200**	**500**	**700**	**1,000**
Cancer Risk (1 x 10^6)	24	17	7.1	3.1	0.28

Source: BAAQMD, 2010

TAC Risks from Stationary Sources in the Proposed Development Plan Area

There are few sources of TACs in the Development Plan Area, none of which are identified by BAAQMD as major emitters. As discussed in the Setting section, the U.S. Coast Guard operates a buoy painting facility on the southern side of Yerba Buena Island, approximately 700 feet south of the Bay Bridge. BAAQMD identifies a cancer risk of 13.7 in one million associated with this

[51] Per CARB http://www.arb.ca.gov/msprog/decsinstall/decsinstall.htm accessed June 25, 2010.

facility, a chronic hazard index[52] of 0.0096, and an acute hazard index of 0.00432. These risk values are for the maximally exposed receptor. This source is located more than 1,000 feet from Treasure Island and downwind from the predominant wind direction. Proposed improvements on Yerba Buena Island would also occur upwind of the predominant wind direction and would be separated topographically from the Coast Guard facility. There are no residences proposed for the south side of the Bay Bridge where this facility is located. However, it can reasonably be expected that residences within 300 feet of the north side of the Bay Bridge would be within a 1,000 foot radius of the facility and may be exposed to increased cancer risks.

Health Indices for this Coast Guard facility are 0.0096, which is less than the 1.0 significance threshold.

<u>Project Generated Fine Particulate Matter (PM 2.5)</u>

In addition to diesel-fueled buses, non-diesel fueled passenger vehicles would also emit PM2.5. Annual average PM2.5 concentrations from roadway traffic including busses were modeled similarly to DPM emissions as described above. In addition to exhaust emissions from buses and passenger vehicles, PM2.5 emissions associated with tire and brake wear were included in the modeling.

Under the Proposed Project's transit scenario there would be approximately 30,330 vehicle trips generated per day. Modeling results of passenger vehicles in addition to buses and ferries demonstrated a maximum PM2.5 concentration of approximately 0.2µg/m^3. This increase would not exceed the BAAQMD significance threshold of 0.3µg/m^3; therefore, impacts would be less than significant. Mitigation Measure M-AQ-5 would require particulate traps for ferries that would reduce PM2.5 emissions from ferries by 85 percent, further reducing PM2.5 emissions.

Under Expanded Transit Service, there would be approximately 25,466 vehicle trips generated per day. Modeling results of passenger vehicles in addition to buses and ferries demonstrated a maximum PM2.5 concentration of approximately 0.27µg/m^3. While passenger vehicle trips would be lower under Expanded Transit Service, annual average PM2.5 concentrations would still be greater that those anticipated under the Proposed Project's transit scenario. This is due to the fact that a large portion of the PM2.5 concentration associated with Expanded Transit Service can be attributed to ferry and bus emissions rather than passenger vehicle emissions. Nevertheless, this increase would not exceed the pending BAAQMD significance threshold of 0.3µg/m^3; therefore, impacts would be less than significant. Mitigation Measure M-AQ-5 would require particulate traps for ferries that would reduce PM2.5 emissions from ferries by 85 percent, further reducing PM2.5 emissions.

---

[52] Hazard Index is a summation of the hazard quotients for all chemicals to which an individual is exposed. A hazard index value of 1.0 or less than 1.0 indicates that no adverse human health effects (noncancer) are expected to occur.

Fine Particulate Matter (PM 2.5) Exposure from Bay Bridge

A map presenting annual average PM2.5 concentrations around the Bay Bridge was presented in Figure IV.G-1. As can be seen from this Figure, any residences located within approximately 600 feet of the Bay Bridge would be expose to PM2.5 concentrations in excess of the BAAQMD's pending significance threshold of $0.3 \mu g/m^3$. This would be a significant impact with respect to the pending thresholds of the 2010 BAAQMD Guidelines, which become effective January 1, 2011. As discussed in the Setting section, residences exposed to PM2.5 concentrations in excess of $0.2 \mu g/m^3$ would need to comply with SF DPH Article 38, including installing appropriate air filtration equipment in new residential buildings.

Impact AQ-7: The Proposed Project could generate odors. (*Less than Significant*)

The principal proposed use that would have the potential to generate objectionable odors would be the proposed new or upgraded wastewater treatment plant. The new or upgraded wastewater treatment plant ("treatment plant") would be in the same location as the existing wastewater treatment plant, at the northeastern corner of Treasure Island and would not introduce any new permitted stationary emission sources such as diesel generators. The existing treatment plant treats wastewater from existing development on the Islands. The treatment plant provides secondary treatment and has a peak dry weather treatment capacity of 0.80 mgd.

The BAAQMD CEQA Guidelines require that odor impacts be screened, based on the distance of an emitting facility to nearby sensitive receptors. Wastewater treatment facilities have an odor screening distance of one mile. Existing and proposed sensitive receptors within this distance would consist of all residences, schools, and daycare facilities on Treasure Island. Yerba Buena Island is beyond this one mile screening distance.

As discussed in the Setting section, according to BAAQMD records, BAAQMD has received no odor complaints within the last five years with respect to the existing Treasure Island treatment plant.

As currently envisioned, the new or upgraded treatment plant would have the capacity to treat an average dry weather flow of about 1.3 mgd (the estimated dry-weather flow for project buildout) and a peak wet-weather flow capacity of about 2.9 mgd. The treatment process would start with the existing baseline of primary and secondary treatment and is discussed in detail in Chapter II, Project Description and Section IV.K, Utilities.

Although the Proposed Project would result in an increase in throughput of wastewater, implementation of updated treatment equipment and processes as well as odor control technology with the Proposed Project would be expected to result in a reduction in potential odors compared to existing conditions.

The facility would be required to comply BAAQMD Regulation 7, which places general limitations on odorous substances and specific emission limitations on certain odorous compounds, BAAQMD Regulation 9, Rule 2, which limits ground level concentrations of hydrogen sulfide and BAAQMD Regulation 8, Rule 8, which limits the emissions of organic compounds from wastewater collection and separation systems that handle liquid organic compounds from industrial processes.

The Proposed Project would result in updated treatment processes and equipment at an existing wastewater treatment plant. There are existing regulatory mechanisms contained in Regulation 7 through which any potential odor impacts would be verified by use of a dynamic olfactometer and corrections made until no odor complaints are received over a one year period. Finally, the Proposed Project would increase the existing buffer distance between the plant and the nearest residences. Consequently odor impacts are expected to be less than significant, and no mitigation is required.

Impact AQ-8: The Proposed Project could conflict with adopted plans related to air quality. (*Significant for the Proposed Project and Less than Significant for Expanded Transit Service*)

The most recently adopted air quality plan in the San Francisco Bay Area Air Basin is the *Bay Area 2005 Ozone Strategy* (the 2010 Clean Air Plan is still in Draft form). The *2005 Ozone Strategy* is a roadmap showing how the San Francisco Bay Area will achieve compliance with the state one-hour ozone standard as expeditiously as practicable, and how the region will reduce transport of ozone and ozone precursors to neighboring air basins. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others. The *2005 Ozone Strategy* also represents the Bay Area's most recent triennial assessment of the region's strategy to attain the state one-hour ozone standard. In this, the *2005 Ozone Strategy* replaces the *2000 Clean Air Plan*. Under BAAQMD's methodology, a determination of consistency with the most recently adopted *Clean Air Plan* ("CAP"), currently the *Bay Area 2005 Ozone Strategy*, must demonstrate that a plan or project not exceed the population or vehicle miles traveled ("VMT") assumptions contained in the CAP and that the project or plan implements transportation control measures ("TCMs") as applicable.

<u>Criterion 1: Population Growth and VMT Consistency</u>

For a project to be consistent with the CAP, BAAQMD requires that the projected increase in VMT associated with a proposed project be less than the projected population increase. Because the majority of vehicle trips from the Proposed Project would be distributed not just to San

Francisco, but also to Alameda County via the Bay Bridge, percentage increases of VMT and population are compared on a region-wide basis that includes both San Francisco and Alameda Counties.

The MTC maintains an inventory of population VMT for the region and by county,[53] the latest version of which was published in 2008. The population estimates of the MTC cite a 2035 Alameda and San Francisco county region-wide population of 2,895,400. As discussed in Section IV.C, Population and Housing, development of the full buildout of the Proposed Project would result in a population increase of approximately 16,820 persons (18,640 future population minus an existing population of 1,820). This represents a regional population increase of 0.58 percent.

As discussed in the analysis of criteria pollutant impacts, the proposed development would result in a net new vehicle trip generation of 30,330 trips per day in the Proposed Project’s transit scenario and 25,466 trips per day under Expanded Transit Service. Using trip length assumptions from the CARB URBEMIS 2007 model, the resulting regional increase in VMT would be 302,185 and 253,731 miles per day for each respective scenario.

The MTC maintains an inventory of VMT for the region and by county.[54] For 2030, MTC data shows VMT for the combined counties of San Francisco and Alameda of 49,169,014 miles. The addition of project-related VMT to the 2035 forecast results in a total increase of 0.61 percent in the VMT for the Proposed Project, and a total increase of 0.52 percent in the VMT for Expanded Transit Service.

Consequently, the rate of increase in VMT (0.61 percent) would be more than the rate of increase in population (0.58 percent) for the Proposed Project and would be considered inconsistent with the population and VMT assumptions of the CAP. However, for Expanded Transit Service, the rate of increase in VMT (0.52 percent) would be less than the rate of increase in population (0.58 percent) which would be considered to be consistent with the CAP. Thus, implementation of Mitigation Measure M-TR-2 would reduce this impact to a less-than-significant level.

<u>Criterion 2: Plan consistency with TCMs contained in the CAP</u>

Air pollutant emissions are a function of human activity. The 1988 California Clean Air Act, Section 40919(d) requires regions to implement “transportation control measures to substantially reduce the rate of increase in passenger vehicle trips and miles traveled.” Consistent with this requirement, one of the goals of the *Bay Area 2005 Ozone Strategy* is to reduce the number of trips and vehicle miles Bay Area residents travel in single-occupant vehicles through the implementation of twenty TCMs. Table IV.G.8 identifies those TCMs that local governments

[53] http://www.mtc.ca.gov/planning/2035_plan/Supplementary/T2035-Travel_Forecast_Data_Summary.pdf
[54] http://www.mtc.ca.gov/planning/2035_plan/Supplementary/T2035-Travel_Forecast_Data_Summary.pdf

should implement through local plans to be considered in conformance with the *2005 Ozone Strategy*. The BAAQMD recommends that local plans that do not demonstrate reasonable efforts to implement these TCMs be considered inconsistent with the regional air quality plan and therefore have a significant impact. As presented in Table IV.G.8 below, the Proposed Project contains elements consistent with the applicable TCMs in the *2005 Ozone Strategy*. This table identifies each applicable TCM and correlates it to a specific element or elements of the project that address the TCM. Therefore, the Proposed Project would be consistent with the TCMs contained in the Clean Air Plan for the San Francisco Bay Area Air Basin.

Overall, the Proposed Project would have a significant impact with regard to conflicts with the Air Quality Plan, while the Proposed Project with Expanded Transit Service would be less than significant with regard to conflicts with the Air Quality Plan. Therefore, the Proposed Project with Expanded Transit Service would represent a mitigated scenario for this significant impact. However, the Proposed Project with Expanded Transit Service would have other air quality impacts related to increased ferry emissions, as discussed in Impacts AQ-5 and AQ-6.

CUMULATIVE IMPACTS

Impact AQ-9: The Proposed Project could result in significant cumulative air quality impacts. (*Significant and Unavoidable*)

Cumulative Construction Criteria Pollutant Impacts

The applicable 1999 BAAMD guidelines and thresholds do not require quantification of construction emissions. Therefore with inclusion of dust control Mitigation Measures M-AQ-1, the Proposed Project would have a less-than-significant cumulative impact with regard to construction emissions relative to this guidance.

The discussion of thresholds of significance in the 2010 BAAQMD CEQA Air Quality Guidelines state that if a project exceeds the identified significance thresholds (presented in Table IV.G.4), its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. As a result, additional analysis to assess cumulative criteria pollutant impacts is deemed unnecessary by BAAQMD.[55]

As indicated in Table IV.G.4, the proposed Development Plan would exceed BAAQMD construction-related significance thresholds for ROG, and NOx. Consequently, the Proposed Project would result in a significant cumulative impact with regard to regional emissions of these criteria pollutants. Construction activities for the Proposed Project are expected to begin in 2011 and would overlap with construction of the Bay Bridge East Span project for up to about three years and could overlap with the Yerba Buena Island Ramps Improvement Project for about two to five years, depending on when it starts.

[55] BAAQMD, *CEQA Air Quality Guidelines*, 2010, p. 2-1.

Table IV.G.8: Clean Air Plan TCMs to Be Implemented by Local Governments

TCM in the 2005 Ozone Strategy	*Elements of the Proposed Project Consistent with the TCM*
1. Support Voluntary Employer-Based Trip Reduction Programs (TCM #1)	The Proposed Project would include formation of a Treasure Island Transportation Management Agency ("TITMA") responsible for implementing a comprehensive transportation management plan designed to discourage driving and promote use of alternative travel modes. The TITMA would oversee the provision of transit services as well as implement a series of transportation demand management ("TDM") measures to affect travel behavior.
2. Improve Local and Area wide Bus Service (TCM #3)	Project sponsors would fund the purchase of articulated Muni buses for service to and from the Transbay Terminal via the existing Muni route; ultimately, a second location such as the Civic Center and/or Caltrain Depot at 4th and King Streets are planned via new routes to be established by Muni in coordination with TIDA and TITMA based on future demand. Only the existing Transbay Terminal route is assumed in the Proposed Project. To initiate AC Transit service to the East Bay, project sponsors would fund the purchase of about 8 to 10 buses as necessary for service to the Islands based on the *Transportation Plan*, to be operated by AC Transit or another operator.
3. Improve Access to Rail & Ferries (TCM #5)	The Proposed Project would include construction of a ferry terminal that would be located just north of the causeway, opposite Building 1. It would include two ferry slips for bow-loading ferries. An intra-island shuttle bus would provide residents with access to the proposed ferry terminal.
4. Improve Ferry Service (TCM #7)	The Proposed Project would implement new ferry service between Treasure Island and San Francisco. *Expanded Transit Service* anticipates that ferry service would ultimately be provided to and from San Francisco at 15-minute intervals at peak periods, with the ferry operating between 5:00 a.m. and 9:00 PM. The Proposed Project analyzed in this EIR assumes that one ferry would provide service at approximately 50-minute intervals because only one ferry vessel is proposed to be fully funded by project sponsors; additional ferries and shorter headways are included in Expanded Transit Service.
5. Improve Bicycle Access and Facilities (TCM #9)	The draft *Design for Development* and *Transportation Plan* are intended to encourage the use of walking and bicycling as primary on-Island travel modes. The proposed pedestrian and bicycle facilities are illustrated in Figures 12, Proposed Bicycle Routes on Treasure Island, and 13, Proposed Bicycle and Pedestrian Routes on Yerba Buena Island.
6. Improve Arterial Traffic Management (TCM #12)	All of the streets on Treasure Island would be newly constructed, and would meet the requirements of the San Francisco Fire Department ("SFFD"), SFPUC, San Francisco Department of Public Works ("SFDPW"), and the Municipal Transportation Agency's Division of Parking & Traffic ("DPT"). Major arterial streets would comprise the main east/west and north/south streets on Treasure Island, including the access to the causeway in the transit hub area. The typical sections for these streets would include, in each direction, a 12-foot-wide traffic lane, an 8-foot-wide parking bay, and a 5-foot-wide Class II striped bike lane. Additional ten-foot-wide

TCM in the 2005 Ozone Strategy	*Elements of the Proposed Project Consistent with the TCM*
	lanes may be added for exclusive turn lanes in high traffic areas. Landscaping and a sidewalk would be provided on each side of the road. One secondary arterial street on Treasure Island – First Street – would serve the rest of the transit hub area along the south edge of the island and in front of Building 2. This street would not provide direct access to the causeway and the Bay Bridge; therefore it was not classified as a major arterial. Typical cross sections would include 11-foot-wide traffic lanes and a 7-foot-wide parking bay in the eastbound direction and a 5-foot-wide Class II bicycle lane and an 8-foot-wide parking bay in the westbound direction. Where parking is placed adjacent to the bus route, a 6-foot flex lane would be included between the parking bay and the travel lane. As with major arterials, there would be landscaping and sidewalks on both sides of the street. Building setbacks would typically be about 6 feet from the right-of-way; this space could be used for residential stoops, porches, or gardens related to residential entries in residential buildings.
7. Local Clean Air Plans, Policies and Programs (TCM #15) - Cities are to promote car sharing as a way to reduce parking requirements.	The proposed transit hub would provide a pool of shared bicycles ("bicycle library") and a car share pod to promote car sharing.
8. Implement Transportation Pricing Reform (TCM #18)	Proposed TDM measures designed to discourage automobile use include parking pricing policies requiring that fees for all visitor parking for the Islands be charged, and that residential parking be leased or purchased separately from the residential unit; a congestion pricing program; and ramp metering on the access ramps to the Bay Bridge. The congestion pricing program would allow for imposition of fees applicable to residents who drive on and/or off the Islands. The congestion pricing fees could be adjusted to reflect traffic patterns, congestion levels, time of day, and other conditions that affect the roadway system.
9. Improve Pedestrian Access and Facilities (TCM #19)	The draft *Design for Development* and *Transportation Plan* are intended to encourage the use of walking and bicycling as primary on-Island travel modes. The proposed pedestrian and bicycle facilities are illustrated in Figures 12, Proposed Bicycle Routes on Treasure Island, and 13, Proposed Bicycle and Pedestrian Routes on Yerba Buena Island.
10. Promote Traffic Calming Measures (TCM #20)	The *Transportation Plan* describes how the Development Plan is designed to encourage walking and bicycling as primary on-Island travel modes. Streets would be designed to be low-speed to create an environment that is compatible with walking and biking; the busiest streets would incorporate Class II bicycle lanes.

Source: Environmental Science Associates, 2010.

Cumulative Construction Hazard Impacts

The applicable 1999 BAAMD guidelines and thresholds do not identify hazard-related significance criteria for construction impacts. Therefore, the Proposed Project would have a less-than-significant cumulative impact with regard to construction emissions relative to this guidance.

The 2010 BAAQMD CEQA Air Quality Guidelines identify cumulative hazard thresholds relative to cancer risk, Hazard Indices, and PM2.5 concentrations. The following analysis sums the risks from Proposed Project construction in addition to existing stationary sources and roadway sources. This analysis is performed as a worst case screening exercise. If impacts at the maximally impacted receptor from each source is summed and still found to be less than the cumulative significance criterion, then more distant receptors can be assumed to experience lesser concentrations and therefore would also be impacted at a less-than-significant level.

There are few sources of TACs in the Development Plan Area, none of which are identified by the BAAQMD as major emitters. The Community Health Air Pollution Information System ("CHAPIS") database of the CARB maps facilities which emit inventoried criteria air pollutants and toxic air contaminants throughout California. The CHAPIS database does not indicate any inventoried air toxic or criteria pollutant emitting facilities within a one mile radius of the Development Plan Area. As discussed in the Setting section, the U.S. Coast Guard operates a buoy painting facility on the eastern side of Yerba Buena Island, approximately 700 feet east of the Bay Bridge. The BAAQMD identifies a cancer risk of 13.7 in one million associated with this facility, a chronic hazard index[56] of 0.0096 and an acute hazard index of 0.00432. The PM2.5 concentration at the facility fenceline is reported to be 0.149 micrograms per cubic meter. These risk values are for the maximally exposed receptor. This source is located more than 1,000 feet from Treasure Island and downwind from the predominant wind direction. Proposed improvements on Yerba Buena Island would also occur upwind of the predominant wind direction and would be separated topographically from the Coast Guard facility.

The only other potential sources are two emergency diesel-powered generators that would be relocated near the wastewater treatment plant as part of the Proposed Project and would not represent new sources of emissions.

Other cumulative development projects in the area consist of the Yerba Buena Island Ramps Improvement Project, the realignment of the east span of the Bay Bridge, and the expansion of Clipper Cove Marina. The first two of these cumulative projects involve relatively minor relocations of existing mobile sources and, as such, would not introduce a new source of DPM or PM2.5 to the area. Additionally, while the Bay Bridge accommodates a large volume of vehicle

[56] Hazard Index is a summation of the hazard quotients for all chemicals to which an individual is exposed. A hazard index value of 1.0 or less than 1.0 indicates that no adverse human health effects (noncancer) are expected to occur.

traffic in the Project Area, it is located more than 1,000 feet from Treasure Island and downwind from the predominant wind direction. Proposed improvements on Yerba Buena Island would also occur upwind of the predominant wind direction and would be separated topographically from the bridge. BAAQMD screening tables for cancer risk along this section of I-80[57] indicate a cancer risk of 15 in one million at a distance of 200 feet and a chronic and acute hazard index of 0.4 at 200 feet north of the bridge. Cumulative construction-related hazard impacts may be summed. Summing the increased cancer risks from the Bay Bridge (17 in one million at the nearest receptor (200 feet), the Coast Guard facility (13.7 in one million) and the Proposed Project construction (16.8 in one million for Phase 2 Treasure Island receptors with mitigation) results in a cumulative cancer risk of 47.5 in one million. This is less than the BAAQMD cumulative cancer risk threshold of 100 in one million.

Summing the chronic hazard indices from the Bay Bridge (0.4), the Coast Guard facility (0.0096), and the Proposed Project (0.072 for Phase 2 Treasure Island receptors with mitigation) results in a cumulative Hazard Index of 0.48 which is less than the BAAQMD cumulative chronic hazard index threshold of 10.0.

Predicted PM2.5 concentrations from the construction of the Proposed Project alone would exceed the cumulative PM2.5 threshold of 0.8 micrograms per cubic meter (see Impact AQ-4). Therefore, cumulative PM2.5 contributions from other sources at receptors near to the Bay Bridge and the Coast Guard facility would exacerbate these predicted significant PM2.5 concentrations. Consequently there would be significant cumulative PM2.5 construction impacts at residences close to peak Phase 2 construction activities.

Mitigation Measures M-AQ-3 and M-AQ-4 would be unlikely to achieve a 61 percent reduction in PM2.5 emissions and resultant concentrations, the level necessary to reduce emissions from these sources to a level below the BAAQMD's 0.8 microgram per cubic meter cumulative significance threshold. Therefore, even with the implementation of all feasible (BAAQMD-identified) mitigation measures, PM2.5 concentrations would remain significant and would be a potential significant and unavoidable cumulative impact with respect to pending 2010 BAAQMD thresholds.

Cumulative Regional Criteria Pollutant Impacts

The discussion of thresholds of significance in both the 1999 and 2010 BAAQMD CEQA Air Quality Guidelines state that if a project exceeds the identified significance thresholds (presented in Table IV.G.4), its emissions would be cumulatively considerable, resulting in significant

[57] http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/Roadway_Screening_Tables_May_2010.ashx

adverse air quality impacts to the region's existing air quality conditions. As a result, additional analysis to assess cumulative criteria pollutant impacts is deemed unnecessary by BAAQMD.[58]

As indicated in Table IV.G.5, the Proposed Project would exceed BAAQMD significance thresholds for ROG, NOx, PM10 and PM2.5. Consequently, the Proposed Project would result in a significant cumulative impact with regard to emissions of these criteria pollutants.

Cumulative Risk and Hazard Impacts for DPM, TACs and PM2.5

Like the cumulative construction analysis, the following cumulative project-level analysis sums the risks from Proposed Project construction in addition to existing stationary sources and roadway sources. This analysis is performed as a worst case screening exercise. If impacts at the maximally impacted receptor from each source are summed and still found to be less than the cumulative significance criterion, then more distant receptors can be assumed to experience lesser concentrations and therefore also be impacted at a less than significant level.

Summing the risks from the Bay Bridge (15 in one million), the Coast Guard facility (13.7 in one million) and the Proposed Project (18.4 in one million for Expanded Transit Service with mitigation) results in a cumulative cancer risk of 47.1 in one million. This is less than the BAAQMD cumulative cancer risk threshold of 100 in one million.

Summing the chronic hazard indices from the Bay Bridge (0.4), the Coast Guard facility (0.0096) and the Proposed Project (0.028 for Expanded Transit Service with mitigation) results in a cumulative Hazard Index of cancer risk of 0.61, which is less than the BAAQMD cumulative chronic hazard index threshold of 10.0.

Summing the PM2.5 concentration contributions from the Bay Bridge (0.50 microgram per cubic meter as shown in Figure IV.G-1), the Coast Guard facility (0.149 micrograms per cubic meter) and the Proposed Project (0.27 micrograms per cubic meter for Expanded Transit Service) results in a cumulative PM2.5 concentration of 0.78 micrograms per cubic meter, which is less than the BAAQMD cumulative PM2.5 concentration threshold of 0.8 micrograms per cubic meter. These screening level concentrations are conservative in that they apply the fenceline concentration from the Coast Guard facility and the worst case receptor for the Proposed Project, which is on Treasure Island.

The Clipper Cove Marina expansion would generate a relatively small amount of standard motor vehicle traffic and recreational boat operations. According to the 2005*Treasure Island Transfer and Reuse EIR*, the marina boats consist of sail boats, diesel-powered boats, and gasoline-powered boats. The anticipated future diesel and gasoline power boats would be a small percent of the total boats at the marina. The total trips associated with power boats from the marina

[58] BAAQMD, *CEQA Air Quality Guidelines*, 2010, pg 2-1.

would not be substantial, since not all boats would be operating simultaneously. In addition, recreational power boats normally use small engines and operate over short travel distances with limited hours per day. Therefore, the contribution of emissions from marina motorboats to the total estimated emissions associated with the Proposed Project, the Bay Bridge and the Coast Guard buoy painting facility would be negligible. Therefore the proposed cumulative projects in the area are not anticipated to contribute cumulatively considerable emissions in addition to the project.

REFERENCES

BAAQMD, *Toxic Air Contaminant Trigger Levels*, June 15, 2005.

CARB, *Methodology for Estimating Premature Deaths Associated with Long-Term Exposure to Fine Airborne Particulate Matter in California*, October 24, 2008.

CARB, *Aerometric Data Analysis and Management* website, http://www.arb.ca.gov/adam/welcome.html, accessed March 3, 2009.

H. GREENHOUSE GAS EMISSIONS

INTRODUCTION

It is widely recognized that greenhouse gas ("GHG") emissions[1] associated with human activities are contributing to changes in the global climate, and that such changes are having and would continue to have adverse effects on the environment, the economy, and public health. These are the cumulative effects of past, present, and future actions worldwide. While worldwide contributions of GHGs are expected to have widespread consequences, it is not possible to link particular changes to the environment of California to GHGs emitted from a particular source or location. Thus, when considering a project's contribution to impacts from climate change, it is possible to examine the quantity of GHGs that would be emitted either directly from project sources or indirectly from other sources, such as production of electricity. However, that quantity cannot be tied to a particular adverse effect on the environment of California associated with climate change.

During buildout and operation of the Proposed Project, GHGs would be emitted as the result of construction activities and deliveries; new direct operational sources, such as natural gas usage; and indirect operational sources, such as production of electricity, transport of water, and decomposition of Project-related wastes. GHGs would also be emitted by residents, visitors, and employees travelling to and from the Development Plan Area. This EIR discusses how the proposed Project would contribute to emissions of GHGs.

This EIR analysis was prepared based upon a literature review that included the latest CEQA Guidelines and advice for preparing CEQA climate change analyses by the California Office of Planning and Research ("OPR")[2] as well as approaches prepared by a number of professional associations and agencies that have published suggested approaches and strategies for complying with CEQA's environmental disclosure requirements. Such organizations include the Bay Area Air Quality Management District ("BAAQMD") which publishes its *CEQA Air Quality Guidelines*, the California Attorney General's Office ("AGO"), the California Air Pollution Control Officers Association ("CAPCOA"), the United Nations and World Meteorological Organization's Intergovernmental Panel on Climate Change ("IPCC"), and the Association of Environmental Professionals ("AEP"). While CEQA focuses on emissions associated with new

---

[1] For the purposes of this analysis, the term "greenhouse gases" refers to carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, those gases regulated under California Assembly Bill 32 and the Kyoto Protocol of the United Nations Framework Convention on Climate Change.

[2] OPR, Technical Advisory, CEQA and Climate Change: Addressing Climate Change Through CEQA Review, June 19, 2008. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

development, other regulatory means would need to be implemented to address reductions in existing emissions.

The State of California, through the *California Global Warming Solutions Act of 2006*, Assembly Bill ("AB") 32, and Executive Order S-3-05, has set statewide targets for the reduction of GHG emissions. "The goal of AB 32 and S-3-05 is the significant reduction of future GHG emissions in a state that is expected to rapidly grow in both population and economic output."[3] Accordingly, to achieve the state's goals, there would have to be a significant reduction in per capita GHG emissions.

For this EIR, emissions from project generated sources such as construction, vehicles, energy consumption, water supply and wastewater treatment, and solid waste generation are inventoried and discussed quantitatively and qualitatively. All emissions inventories are presented in metric tons ("MT") unless otherwise indicated. This section of the EIR discusses the Proposed Project's emissions of greenhouse gases and therefore its potential contribution to global climate change. Climate-change induced sea level rise and its impact on the Proposed Project is discussed in Section IV.O, Hydrology.

Sources used for this section include energy forecasts and consumption reports produced by the California Energy Commission ("CEC"); energy consumption data[4] provided by the Project Sponsors; Construction equipment usage data provided by the applicant, vehicle trip generation rates prepared by Fehr & Peers Transportation Consultants; and information from the City and County of San Francisco Climate Action Plan ("SFCAP"), California Air Resources Board ("CARB"), and the California Climate Action Team ("CAT").

SETTING

OVERVIEW OF CLIMATE CHANGE

Global climate change refers to changes in the normal[5] weather of the earth measured by alterations in wind patterns, storms, precipitation, and temperature relative to historical averages. Such changes vary considerably by geographic location. Over time, the earth's climate has undergone periodic ice ages and warming periods, as observed in fossil isotopes, ice core samples, and through other measurement techniques. Recent climate change studies use the

---

[3] CAPCOA 2008. CEQA and Climate Change, p. 32. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[4] ARUP, *Treasure Island Development Energy Study*, prepared for TICD, December 2009 (hereinafter referred to as "*2009 Energy Study*"). A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[5] "Normal" weather patterns include statistically normal variations within a specified range.

historical record to predict future climate variations and the level of fluctuation that might be considered statistically normal, given historical trends.

Temperature records from the Industrial Age (ranging from the late eighteenth century to the present) deviate from normal predictions in both rate and magnitude. Most modern climatologists predict an unprecedented warming period during the next century and beyond, a trend that is increasingly attributed to human-generated GHG emissions resulting from the industrial processes, transportation, solid waste generation, and land use patterns of the twentieth and twenty-first centuries. According to the IPCC, GHG emissions associated with human activities have grown since pre-industrial times, increasing by 70 percent between 1970 and 2004.[6] Increased GHG emissions are largely the result of increasing fuel consumption, particularly the incineration of fossil fuels.

As emissions of GHGs increase, temperatures in California are projected to rise significantly over the twenty-first century. The modeled magnitudes of the warming vary because of uncertainties in future emissions and in the climate sensitivity. According to the California Climate Change Center,[7] there are three projected warming scenarios (which are separate from sea level rise scenarios) referred to as the low, medium, and high range. These expected increases from 2000 to 2100 vary from approximately 1.7 degrees Celsius ("C") to 3.0°C (3.0 degrees Fahrenheit ("°F") to 5.4°F) in the lower range of projected warming, 3.1°C to 4.3°C (5.5°F to 7.8°F) in the medium range, and 4.4°C to 5.8°C (8.0°F to 10.4°F) in the higher range. To comprehend the magnitude of these projected temperature changes over the next century, the lower range of projected temperature rise is slightly larger than the difference in annual mean temperature between Monterey, CA and Salinas, CA, which is 2.5°F, and the upper range of projected warming is greater than the temperature difference between San Francisco, CA and San Jose, CA, which is 7.4ºF. The GHG emissions from an individual project, even a very large development project, would not individually generate sufficient GHG emissions to measurably influence global climate change.[8] However, climate change is a significant cumulative impact on a global scale.

---

6 Intergovernmental Panel on Climate Change, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

7 California Energy Commission, Sce*narios of Climate Change in California: An Overview*, Publication CEC-500-2005-186-SF, Published December 2005. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

8 Association of Environmental Professionals (AEP). 2007. Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents. http://www.califaep.org/userdocuments/File/AEP_Global_Climate_Change_June_29_Final.pdf; and OPR, Technical Advisory, CEQA and Climate Change: Addressing Climate Change Through CEQA Review, June 19, 2008, p. 6.

Consideration of a project's impact to climate change, therefore, is essentially an analysis of a project's contribution to a cumulatively significant global impact through its emission of GHGs.

Greenhouse Gases

Gases that trap heat in the atmosphere are called GHGs because they transform the light of the sun into heat, similar to the glass walls of a greenhouse. Common GHGs include water vapor, carbon dioxide, methane, nitrous oxides, chlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, ozone, and aerosols. Without the natural heat-trapping effects of GHGs, the earth's surface would be about 34°C cooler.[9] However, it is believed that emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere beyond the level of naturally-occurring concentrations. Global atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased markedly since the late eighteenth century as a result of human activities and now far exceed pre-industrial values.

Climate change results from radiative forcings and feedbacks. Radiative forcing is defined as the difference between the radiation energy entering the earth's atmosphere and the radiation energy leaving the atmosphere. GHGs allow solar radiation to penetrate the earth's atmosphere but slow the release of atmospheric heat. A feedback is an internal process that amplifies or dampens the climate's response to a specific forcing. For example, the heat trapped by the atmosphere may cause temperatures to rise or may alter wind and weather patterns. A gas or aerosol's global warming potential is defined as its ability to trap heat in the atmosphere; it is the "cumulative radiative forcing effects of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas."[10] The accumulation of GHGs has contributed to an increase in the temperature of the earth's atmosphere and has contributed to global climate change.

Carbon dioxide ("CO_2") is an odorless, colorless gas, which has both natural and anthropogenic (arising from human activities) sources. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources of carbon dioxide are from burning coal, oil, natural gas, and wood. Concentrations of carbon dioxide were 379 parts per million ("ppm") in 2005,

---

[9] CARB, 2006. CARB Climate Action Team Report to Governor Schwarzenegger and the Legislature. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[10] U.S. Environmental Protection Agency (EPA). 2006a. The U.S. Greenhouse Gas Emissions and Sinks: Fast Facts. Office of Atmospheric Programs. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

which equates to an increase of 1.4 ppm per year since 1960.[11] CO_2 is the most common GHG generated by California activities, constituting approximately 84 percent of all GHG emissions.[12] CO_2 emissions attributed to California activities are mainly associated with in-state fossil fuel combustion and fossil fuel combustion in out-of-state power plants supplying electricity to California. Other activities that produce CO_2 emissions include mineral production, waste combustion, and land use changes that reduce vegetation.

Methane ("CH_4") is a flammable gas and is the main component of natural gas. When one molecule of methane is burned in the presence of oxygen, one molecule of carbon dioxide and two molecules of water are released. A natural source of methane is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain methane, which is extracted for fuel. Other sources are landfills, fermentation of manure, and cattle.

Nitrous oxide ("N_2O"), also known as laughing gas, is produced naturally by microbial processes in soil and water. Anthropogenic sources of nitrous oxide include agricultural sources, industrial processing, fossil fuel-fired power plants, and vehicle emissions. Nitrous oxide also is used as an aerosol spray propellant and in medical applications.

Other gases that contribute to the greenhouse effect include ozone,[13] chlorofluorocarbons ("CFCs"), hydrofluorocarbons ("HFCs"), perfluorocarbons ("PFCs"), sulfur hexafluoride ("SF_6"), and aerosols. However, these latter GHGs are generally emitted during industrial processes that are not proposed as part of the Project. This analysis, therefore, considers those GHGs most likely to be emitted by the Proposed Project: carbon dioxide, nitrous oxide, and methane.

Residents, employees, and patrons of commercial and municipal buildings on Treasure Island and Yerba Buena Island use electricity, heat their homes and water with electricity or natural gas, and are transported in motor vehicles, all of which directly or indirectly emit GHGs. The principal GHGs emissions resulting from mixed use developments are CO_2, CH_4, and N_2O. CO_2 is considered the most important GHG, due primarily to the large emissions produced by fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles. CH_4 and N_2O are also emitted by fossil fuel combustion, though their emissions are much less significant

---

[11] IPCC, 2007. R.B. Alley et al. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers.

[12] CEC, 2007. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004. A copy of this report is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[13] Ozone is a greenhouse gas; however, unlike other GHGs, ozone in the troposphere is relatively short-lived. It is difficult to make an accurate determination of the contribution of ozone precursors (nitrogen oxides and volatile organic compounds) to global climate change. California Environmental Protection Agency, 2004. Technical Support Document for Staff Proposal Regarding Reduction of Greenhouse Gas Emissions from Motor Vehicles Climate Change Overview.

than CO_2. CH_4 is also emitted from the transmission, storage, and incomplete combustion of natural gas and decomposition of waste at landfills.

Global Warming Potential

CO_2 is the reference gas for climate change because it is the predominant GHG emitted. The effect that each of the aforementioned gases can have on global warming is a combination of the mass of their emissions and their global warming potential ("GWP"). GWP indicates, on a pound-for-pound basis, how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent GHGs than CO_2, with GWPs of 21 and 310 times that of CO_2, respectively.

In emissions inventories, GHG emissions are typically reported in terms of pounds ("lbs") or metric tons of CO_2 equivalents ("CO_2e"). CO_2e are calculated as the product of the mass emitted of a given GHG and its specific GWP. While CH_4 and N_2O have much higher GWPs than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO_2e, both from residential developments and human activity in general.

The determination of GWPs for substances has occasionally been updated, the most recent of which was done in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change ("IPCC"). Although IPCC has updated the GWP for CH_4 and N_2O in its Fourth Assessment Report,[14] GWPs are still used by international convention and the U.S. to maintain the value of the CO_2 'currency.'[15] Consequently, all calculations of CO_2e in this section apply the GWPs from IPCC's Second Assessment Report. These GWPs are also used within the BAAQMD's May 2010 Greenhouse Gas estimation model discussed later in this section.

Scientific Assessment of Climate Change Scenarios

There is international scientific consensus that human-caused increases in GHGs have and will continue to contribute to global warming. Potential global warming impacts in California may include, but are not limited to, loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years. Secondary effects are

[14] IPCC, Climate Change 1995, The Science of Climate Change, Contribution of working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[15] California Climate Action Registry General Reporting Protocol, Version 3.1, January 2009, p. 94. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

likely to include a global rise in sea level, impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.[16]

Ecosystem and Biodiversity Impacts of Climate Change[17]

Climate change is expected to have effects on diverse types of ecosystems, from alpine to deep-sea habitat. As temperatures and precipitation change, seasonal shifts in vegetation would occur; this could affect the distribution of associated flora and fauna species. As the range of species shifts, habitat fragmentation could occur, with acute impacts on the distribution of certain sensitive species. The IPCC states that “20 percent to 30 percent of species assessed may be at risk of extinction from climate change impacts within this century if global mean temperatures exceed 2 to 3°C (3.6 to 5.4°F) relative to pre-industrial levels.”[18] Shifts in existing biomes could also make ecosystems vulnerable to encroachment by invasive species. Wildfires, which are an important control mechanism in many ecosystems, may become more severe and more frequent, making it difficult for native plant species to repeatedly re-germinate. In general terms, climate change is expected to put a number of stressors on ecosystems, with potentially catastrophic effects on biodiversity.

Human Health Impacts of Climate Change[19]

Climate change may increase the risk of vector-borne infectious diseases, particularly those found in tropical areas and spread by insects such as malaria, dengue fever, yellow fever, and encephalitis. Cholera, which is associated with algal blooms, could also increase. While these health impacts would largely affect tropical areas in other parts of the world, effects would also be felt in California. Warming of the atmosphere would be expected to increase smog and particulate pollution, which could adversely affect individuals with heart and respiratory problems, such as asthma. Extreme heat events would also be expected to occur with more frequency, and could adversely affect the elderly, children, and the homeless. Finally, the water supply impacts and seasonal temperature variations expected as a result of climate change could affect the viability of existing agricultural operations, making the food supply more vulnerable.

---

[16] California Climate Change Portal. Frequently Asked Questions About Global Climate Change. http://www.climatechange.ca.gov/publications/faqs.html, accessed March 2, 2010.

[17] PA, 2008. Climate Change – Ecosystems and Biodiversity. http://www.epa.gov/climatechange/effects/eco.html, accessed January 3, 2009.

[18] IPCC, 2007: Climate Change 2007: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change [Parry, Martin L., Canziani, Osvaldo F., Palutikof, Jean P., van der Linden, Paul J., and Hanson, Clair E. (eds.)]. Cambridge University Press, Cambridge, United Kingdom. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[19] EPA, 2008. Climate Change – Health and Environmental Effects. http://www.epa.gov/climatechange/effects/health.html#climate, accessed January 3, 2009.

Greenhouse Gas Emission Inventories

Worldwide emissions of GHGs in 2004 were 26.8 billion MT of CO_2e.[20] In 2004, the U.S. emitted about 7 billion MT of CO_2e or about 24 MT of CO_2e per year per person.[21] Over 80 percent of the GHG emissions in the U.S. are comprised of CO_2 emissions from energy related fossil fuel combustion. In 2004, California emitted 0.492 billion MT of CO_2e, or about 7 percent of U.S. emissions. If California were a country, it would be the 16th largest emitter of GHGs in the world.[22] This large number is due primarily to the sheer size of California. Compared to other states, California has one of the lowest per capita GHG emission rates in the country. This is due to California's higher energy efficiency standards, its temperate climate, and the fact that a comparatively large percentage of its energy generation comes from renewable sources.

In 2008, 86 percent of GHG emissions (in CO_2e) from California were comprised of CO_2 emissions from fossil fuel combustion, with 6 percent comprised of CO_2 from process emissions. High GWP gases accounted for 3.2 percent of the CO_2e emissions. Transportation is the largest end-use category of GHG emissions, and includes transportation used for industry (i.e., shipping), as well as for residential use.

In 2007, 102.6 million metric MT of CO_2-equivalent ("MMT CO_2e") GHGs were emitted in the San Francisco Bay Area (95.5 MMT CO_2e were emitted within the Bay Area Air District and 7.1 MMT CO_2e were indirect emissions from imported electricity).[23] Transportation sources (e.g., fossil fuel combustion) were associated with 41 percent of the total emissions, industrial/ commercial 34 percent, residential fuel usage 7 percent, electricity and co-generation 15 percent, and off-road equipment 3 percent. In 1990, San Francisco's total GHG emissions were approximately 8.3 million metric MT CO_2e.

Existing GHG Emissions in the Project Area

GHG emissions are generated by existing uses on both Treasure Island and Yerba Buena Island. These emissions are generated primarily from motor vehicle trips, but also by existing electrical demand, natural gas demand, solid waste generation, and water and wastewater conveyance and treatment. Existing land uses to be demolished by the Proposed Project are predominately

---

[20] Sum of Annex I and Annex II countries without counting Land-Use, Land-Use Change and Forestry ("LULUCF"). http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php, accessed July 3, 2010. For countries for which 2004 data was unavailable, the most recent year was used.

[21] 2006 Inventory of U.S. Greenhouse Gas Emissions and Sinks. http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/RAMR6MBLP4/$File/06ES.pdf.

[22] California Energy Commission, Inventory of California Greenhouse Gas Emissions and Sinks: 1990-2004 Final Staff Report, December 22, 2006. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

unoccupied commercial and institutional buildings, about 805 occupied residences, and a school. Existing GHG emissions from occupied residential units are estimated to be 15,801 MT of CO_2e per year based on calculations of the URBEMIS2007 model of the California Air Resources Board and the BAAQMD Greenhouse Gas Model. This total includes emissions from motor vehicle trips (12,877) MT CO_2e/year), electrical demand (87 MT CO_2e/year), natural gas demand (2,120 MT CO_2e/year), solid waste generation (559 MT CO_2e/year), and water and wastewater conveyance (158 MT CO_2e/year).

Data used in the determination of the Proposed Project GHG emission inventory use net increases in underlying trip generation, energy use and water and wastewater uses as determined by the Project Transportation report, Project Energy Report and the Utility sections. Therefore calculation of GHG emissions from existing uses to be demolished was not a necessary calculation for the assessment of project impacts.

REGULATORY FRAMEWORK

Climate change has only recently been widely recognized as a threat to the global climate, economy, and population. As a result, the climate change regulatory setting—federal, state, and local—is complex and evolving. This section identifies key legislation, executive orders, and seminal court cases related to climate change germane to a project's GHG emissions.

Federal

Currently, there is no federal legislation requiring reductions in GHG emissions. Rather, the United States Environmental Protection Agency ("EPA") administers a variety of voluntary programs and partnerships with GHG emitters in which the EPA partners with industries producing and utilizing synthetic GHGs to reduce emissions of particularly potent GHGs. There are federal actions requiring increasing automobile efficiency, an endangerment finding for CO_2, and a recently finalized regulation requiring large sources of GHG emissions to report their emissions to the EPA. In addition, there are several bills pending in Congress that are attempting to regulate GHG emissions in the United States; most of these bills require a cap and trade program in which GHG emissions would be reduced overall through a market-driven approach.

Corporate Average Fuel Efficiency Standards

In May 2009, President Obama announced a national policy for fuel efficiency and emissions standards in the U.S. auto industry. On September 15, 2009, EPA and NHTSA proposed an historic national program that would dramatically reduce GHG emissions and improve fuel

---

[23] BAAQMD, *Source Inventory of Bay Area Greenhouse Gas Emissions*, p. 7, December 2008. http://hank.baaqmd.gov/pln/documents/regionalinventory2007_003_000_000_000.pdf, accessed May 25, 2010.

economy for new cars and trucks sold in the United States. The combined EPA and NHTSA standards that make up this proposed national program would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. These proposed standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements. Together, these proposed standards would cut CO_2 emissions by an estimated 950 MMT and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). Public hearings regarding this proposed program were held in October 2009 and no further action has been taken to date.

Congressional Bills and Resolutions

Congress passed the Consolidated Appropriations Act of 2008 (HR 2764) in December 2007, which includes provisions requiring the establishment of mandatory GHG reporting requirements. The measure directed EPA to publish draft rules by September 2008, and final rules by June 2009 mandating reporting “for all sectors of the economy.” EPA finalized GHG reporting rules on September 22, 2009. The GHG reporting rule requires reporting of GHG emissions from facilities that emit 25,000 MT or more per year and such facilities are required to submit annual reports to EPA.

There are several pieces of proposed legislation in both the U.S. Senate and U.S. House of Representatives that address GHG emissions none of which are yet final enacted regulations.

State

Various statewide and local initiatives to reduce California’s contribution to GHG emissions have raised awareness that, even though the various contributors to and consequences of global climate change are not yet fully understood, global climate change is occurring, and that there is a real potential for severe adverse environmental, social, and economic effects in the long term. Every nation emits GHGs and therefore makes an incremental cumulative contribution to global climate change; therefore, global cooperation will be required to reduce the rate of GHG emissions enough to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

There are currently no state regulations in California that establish ambient air quality standards for GHGs. However, California has passed laws directing CARB to develop actions to reduce GHG emissions, and several state legislative actions related to climate change and GHG emissions have come into play in the past decade.

Assembly Bill 1493 (Pavley)

In 2002, then-Governor Gray Davis signed AB 1493 (Chapter 200, Statutes of 2002, amending Section 42823 of the California Health and Safety Code and adding Section 43018.5 to the code). AB 1493 required CARB to develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State."

To meet the requirements of AB 1493, CARB approved amendments to the California Code of Regulations ("CCR") in 2004 by adding GHG emissions standards to California's existing standards for motor vehicle emissions. The regulations would reduce GHG emissions from California passenger vehicles by about 22 percent by 2012 and about 30 percent by 2016.[24] EPA denied California's request for the waiver to implement AB 1493 in late December 2007. California filed a suit against EPA for its decision to deny the CAA waiver. On January 21, 2009, CARB submitted a letter to EPA Administrator Jackson regarding California's request to reconsider the waiver denial. EPA approved the waiver on June 30, 2009.

Executive Order S-3-05

Governor Schwarzenegger established Executive Order S-3-05 in 2005, in recognition of California's vulnerability to the effects of climate change. Executive Order S-3-05 set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The executive order directed the Secretary of the California Environmental Protection Agency ("Cal EPA") to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary will also submit biannual reports to the governor and California Legislature describing the progress made toward the emissions targets, the impacts of global climate change on California's resources, and mitigation and adaptation plans to combat these impacts. To comply with the executive order, the secretary of Cal EPA created the California Climate Action Team ("CAT"), made up of members from various state agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of California businesses, local governments, and communities and through state incentive and regulatory programs.

[24] California Air Resources Board, *Fact Sheet, Climate Change Emission Control Regulations*. http://www.arb.ca.gov/cc/ccms/factsheets/cc_newfs.pdf, accessed on July 1, 2009.

Assembly Bill 32 (California Global Warming Solutions Act of 2006)

California passed the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished by enforcing a statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs CARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires CARB to adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrived at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state reduces GHG emissions enough to meet the cap. AB 32 also includes guidance on instituting emissions reductions in an economically efficient manner, along with conditions to ensure that businesses and consumers are not unfairly affected by the reductions. Using these criteria to reduce statewide GHG emissions to 1990 levels by 2020 would represent an approximate 25 to 30 percent reduction in current emissions levels. However, CARB has discretionary authority to seek greater reductions in more significant and growing GHG sectors, such as transportation, as compared to other sectors that are not anticipated to significantly increase emissions. Under AB 32, CARB must adopt regulations by January 1, 2011 to achieve reductions in GHGs to meet the 1990 emissions cap by 2020.

Senate Bill 1368

SB 1368 (Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 required the California Public Utilities Commission ("CPUC") to establish a performance standard for baseload generation of GHG emissions by investor-owned utilities by February 1, 2007. SB 1368 also required CEC to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emissions rate from a baseload combined-cycle, natural gas-fired plant. Furthermore, the legislation states that all electricity provided to California, including imported electricity, must be generated by plants that meet the standards set by CPUC and CEC.

Executive Order S-1-07

Executive Order S-1-07, which was signed by Governor Schwarzenegger in 2007, proclaims that the transportation sector is the main source of GHG emissions in California, generating more than 40 percent of statewide emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in California by at least ten percent by 2020. This order also directs CARB to determine whether this Low Carbon Fuel Standard ("LCFS") has been adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

The LCFS will reduce GHG emissions from the transportation sector in California by about 16 MMT in 2020. The LCFS is designed to reduce California's dependence on petroleum, create a lasting market for clean transportation technology, and stimulate the production and use of alternative, low-carbon fuels in California.

Senate Bills 1078 and 107 and Executive Order S-14-08

SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010. In November 2008 Governor Schwarzenegger signed Executive Order S-14-08, which expands the state's Renewable Energy Standard to 33 percent renewable power by 2020. Electricity services are currently provided to the Redevelopment Project Area by San Francisco Public Utilities Commission ("SFPUC"). The City and County of San Francisco is part of PG&E's service territory.[25] The retail rates charged by PG&E include the bundled or total cost of providing electricity throughout this service territory. Currently, 15 percent of PG&E's energy mix comes from renewable energy including wind, solar, biomass, small hydropower and geothermal sources.[26] PG&E is working toward achieving the 20 percent goal of SB 1078.

Senate Bill 375

SB 375, signed in September 2008 (Chapter 728, Statutes of 2008), aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocations. SB 375 requires Metropolitan Planning Organizations ("MPOs") to adopt a sustainable communities strategy or alternative planning strategy ("APS") that will prescribe land use allocation in the MPO's regional transportation plan. CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the

---

[25] SFPUC, Levelized Cost of Various Resource Scenarios for Serving CCA Customer Load in the City and County of San Francisco, (Task 4 of 5), p. 4-2, November 9, 2009. http://sfwater.org/Files/Reports/Draft_SFPUC_Task4RPT_NOV09.pdf, accessed July 3, 2010.

[26] Pacific Gas & Electric Company website, http://www.pgecorp.com/corp_responsibility/reports/2007/environment/energy-future.html, accessed February 22, 2010.

region for 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects will not be eligible for funding programmed after January 1, 2012.

This law also extends the minimum time period for the regional housing needs allocation cycle from five years to eight years for local governments located within an MPO that meets certain requirements. City or county land use policies (including general plans) are not required to be consistent with the regional transportation plan (and associated SCS or APS). However, new provisions of CEQA would incentivize (through streamlining and other provisions) qualified projects that are consistent with an approved SCS or APS, categorized as "transit priority projects."

California Climate Action Registry General Reporting Protocol

The California Climate Action Registry ("CCAR") was established in 2001 by SB 1771 and SB 527 (Chapter 1018, Statutes of 2000, and Chapter 769, Statutes of 2001, respectively) as a nonprofit voluntary registry for GHG emissions. The purpose of the CCAR is to help companies and organizations with operations in the state to establish GHG emissions baselines against which any future GHG emissions reduction requirements may be applied. CCAR is currently encouraging its members to transition to the new regional Climate Registry, a sister organization for reporting throughout North America.

CCAR has developed a general protocol[27] and additional industry-specific protocols that provide guidance on how to inventory GHG emissions for participation in the registry. This protocol provides the principles, approach, methodology, and procedures required for participation in CCAR. It is designed to support the complete, transparent, and accurate reporting of an organization's GHG emissions inventory in a fashion that minimizes the reporting burden and maximizes the benefits associated with understanding the connection between fossil fuel consumption, electricity use, and GHG emissions in a quantifiable manner. The most updated version of this protocol was prepared in January 2009 and was used in preparation of the emissions inventory presented later in this section. It should be noted that the May 2010 GHG Emissions model of the BAAQMD also applies methodologies and emission factors contained in this protocol.

[27] California Climate Action Registry, *General Reporting Protocol*, version 3.1, January 2009.

CARB Climate Change Proposed Scoping Plan

On December 11, 2008, CARB adopted its Scoping Plan, which functions as a roadmap of CARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations.[28] CARB's Scoping Plan contains the main strategies California will implement to reduce CO_2e emissions by 169 MMT, or approximately 30 percent, from the state's projected 2020 emissions level of 596 MMT of CO_2e under a Business as Usual ("BAU") scenario (this is a reduction of 42 MMT CO_2e, or almost ten percent, from 2002 to 2004 average emissions, but requires the reductions in the face of population and economic growth through 2020).

CARB's Scoping Plan calculates 2020 BAU emissions as the emissions that would be expected to occur in the absence of any GHG reduction measures. The 2020 BAU emissions estimate was derived by projecting emissions from a past baseline year using growth factors specific to each of the different economic sectors, i.e., transportation, electrical power, commercial and residential, industrial etc. CARB used three-year average emissions, by sector, for 2002 to 2004 to forecast emissions to 2020. At the time CARB's Scoping Plan process was initiated, 2004 was the most recent year for which actual data was available.[29] The measures described in CARB's Scoping Plan are intended to reduce the projected 2020 BAU to 1990 levels, as required by AB 32.

CARB's Scoping Plan also breaks down the amount of GHG emissions reductions CARB recommends for each emissions sector of the state's GHG inventory. CARB's Scoping Plan calls for the largest reductions in GHG emissions to be achieved by implementing the following measures and standards:

- Improved emissions standards for light-duty vehicles (estimated reductions of 31.7 MMT CO_2e);
- The Low Carbon Fuel Standard (15.0 MMT CO_2e);
- Energy efficiency measures in buildings and appliances, and the widespread development of combined heat and power systems (26.3 MMT CO_2e); and
- A renewable portfolio standard for electricity production (21.3 MMT CO_2e).

CARB has identified a GHG reduction target of 5 MMT (of the 174 MMT total) for local land use changes (Table 2 of CARB's Scoping Plan), by implementation of Reduction Strategy T-3 regarding Regional Transportation-Related GHG Targets. Additional land use reductions may be achieved as SB 375 is implemented. CARB's Scoping Plan states that successful implementation of the plan relies on local governments' land use, planning, and urban growth decisions because

[28] California Air Resources Board, *Climate Change Scoping Plan, A Framework for Change*, December 2008. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

local governments have primary authority to plan, zone, approve, and permit land development to accommodate population growth and the changing needs of their jurisdictions. CARB further acknowledges that decisions on how land is used will have large effects on the GHG emissions that will result from the transportation, housing, industry, forestry, water, agriculture, electricity, and natural gas emission sectors. CARB's Scoping Plan does not include any direct discussion about GHG emissions generated by construction activity. The measures approved by the Board are scheduled to be developed over the next two years and be in place by 2012.

CARB's Scoping Plan expands the list of nine Discrete Early Action Measures to a list of 39 Recommended Actions contained in Appendices C and E of CARB's Scoping Plan. These measures are presented in Table IV.H.1.

OPR 2009 CEQA Guideline Amendments for GHG Emissions/SB 97

SB 97, signed August 2007 (Chapter 185, Statutes of 2007; PRC Sections 21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the Governor's OPR, which is part of the California State Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions (or the effects of GHG emissions), as required by CEQA, by July 1, 2009.

In January 2009, OPR released preliminary proposed amendments to the CEQA Guidelines regarding GHG emissions. On April 13, 2009, OPR submitted its proposed amendments to the CEQA Guidelines for GHG emissions to the Secretary for Natural Resources, as required by Senate Bill 97 (Chapter 185, 2007). On December 31, 2009, the Natural Resources Agency delivered its rulemaking package to the Office of Administrative Law for its review pursuant to the Administrative Procedure Act. The adopted amendments (discussed below) became effective on March 18, 2010.

No significance threshold is included in the amendments and the guidelines afford the customary deference provided to lead agencies in their analysis and methodologies. OPR emphasized the necessity of having a consistent threshold available to analyze projects, and the analyses should be performed based on the best available information. For example, if a lead agency determines that GHGs may be generated by a proposed project, the agency is responsible for assessing GHG emissions by type and source. The guideline amendments provide the following recommendations for determining the significance of GHG emissions under section 15064.4:

(a) The determination of the significance of GHG emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based on available information, to describe, calculate or

[29] California Air Resources Board, *Greenhouse Gas Inventory 2020*, http://www.arb.ca.gov/cc/inventory/data/forecast.htm, accessed on July 1, 2009.

Table IV.H.1: Recommended Actions from Climate Change Proposed Scoping Plan

ID #	Sector	Strategy Name
T-1	Transportation	Pavley I and II – Light-Duty Vehicle GHG Standards
T-2	Transportation	LCFS (Discrete Early Action)
T-3	Transportation	Regional Transportation-Related GHG Targets
T-4	Transportation	Vehicle Efficiency Measures
T-5	Transportation	Ship Electrification at Ports (Discrete Early Action)
T-6	Transportation	Goods-Movement Efficiency Measures
T-7	Transportation	Heavy Duty Vehicle GHG Emission Reduction Measure – Aerodynamic Efficiency (Discrete Early Action)
T-8	Transportation	Medium- and Heavy-Duty Vehicle Hybridization
T-9	Transportation	High Speed Rail
E-1	Electricity and Natural Gas	Increased Utility Energy Efficiency Programs More Stringent Building and Appliance Standards
E-2	Electricity and Natural Gas	Increase Combined Heat and Power Use by 30,000GWh
E-3	Electricity and Natural Gas	Renewables Portfolio Standard
E-4	Electricity and Natural Gas	Million Solar Roofs
CR-1	Electricity and Natural Gas	Energy Efficiency
CR-2	Electricity and Natural Gas	Solar Water Heating
GB-1	Green Buildings	Green Buildings
W-1	Water	Water Use Efficiency
W-2	Water	Water Recycling
W-3	Water	Water System Energy Efficiency
W-4	Water	Reuse Urban Runoff
W-5	Water	Increase Renewable Energy Production
W-6	Water	Public Goods Charge (Water)
I-1	Industry	Energy Efficiency and Co-Benefits Audits for Large Industrial Sources
I-2	Industry	Oil and Gas Extraction GHG Emission Reduction
I-3	Industry	GHG Leak Reduction from Oil and Gas Transmission
I-4	Industry	Refinery Flare Recovery Process Improvements
I-5	Industry	Removal of CH_4 Exemption from Existing Refinery Regulations
RW-1	Recycling and Waste Management	Landfill CH_4 Control (Discrete Early Action)
RW-2	Recycling and Waste Management	Additional Reductions in Landfill CH_4 – Capture Improvements
RW-3	Recycling and Waste Management	High Recycling/Zero Waste
F-1	Forestry	Sustainable Forest Target
H-1	High GWP Gases	Motor Vehicle Air Conditioning Systems (Discrete Early Action)
H-2	High GWP Gases	SF_6 Limits in Non-Utility and Non-Semiconductor Applications (Discrete Early Action)
H-3	High GWP Gases	Reduction in Perfluorocarbons in Semiconductor Manufacturing (Discrete Early Action)
H-4	High GWP Gases	Limit High GWP Use in Consumer Products (Discrete Early Action, Adopted June 2008)
H-5	High GWP Gases	High GWP Reductions from Mobile Sources
H-6	High GWP Gases	High GWP Reductions from Stationary Sources
H-7	High GWP Gases	Mitigation Fee on High GWP Gases
A-1	Agriculture	CH_4 Capture at Large Dairies

Source: CARB 2008

estimate the amount of GHG emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:

(1) Use a model or methodology to quantify GHG emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or

(2) Rely on a qualitative analysis or performance based standards.

(b) A lead agency may consider the following when assessing the significance of impacts from GHG emissions on the environment:

(1) The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting;

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

Regional

<u>BAAQMD</u>

The Bay Area Air Quality Management District ("BAAQMD") is the primary agency responsible for comprehensive air pollution control in the entire San Francisco Bay Area Air Basin. BAAQMD recently adopted the majority of its updated CEQA Guidelines, which includes the adoption of recommended significance thresholds[30], assessment methodologies, and mitigation strategies for GHG emissions. The approach that BAAQMD adopted on June 2, 2010 is set forth in its June 2010 document entitled *California Environmental Quality Act Air Quality Guidelines*.[31] This approach includes GHG thresholds for land-use development projects. BAAQMD presents three different criteria that could be used for determining significance of a mixed-use development's operational GHG emissions. One option would include a mass annual numeric threshold of 1,100 MT CO_2e per year for operational emission sources including residential and non-residential building energy use, mobile source emissions, area source

[30] BAAQMD, CEQA Guidelines Update Proposed Thresholds of Significance, May 3, 2010, approved June 2, 2010.

[31] BAAQMD, California Environmental Quality Act Air Quality Guidelines, June 2010. http://www.baaqmd.gov/Divisions/Planning-and-Research/CEQA-GUIDELINES/Updated-CEQA-Guidelines.aspx, accessed July 3, 2010.

emissions, solid waste emissions, fugitive refrigerant emissions and indirect emissions associated with water conveyance and wastewater treatment. The second option is a metric based on the service population (the residential population plus the number of jobs associated with the land uses). This metric is 4.6 MT per service population per year for operational emissions. The third option is compliance with a qualified Greenhouse Gas Reduction Plan that includes enforceable measures to reduce GHG emissions consistent with AB 32 goals or Executive Order S-03-05 targets.

Although BAAQMD staff originally (September 2009) proposed thresholds of significance criteria for construction-related GHG emissions, BAAQMD has not adopted such thresholds. However, BAAQMD still recommends that a finding of significance be made relative to construction emissions and consistency with AB 32. Emissions from BAAQMD-permitted stationary sources are to be assessed separately from land use emissions and are proposed to be subject to a separate significance threshold of 10,000 MT per year.

The updated BAAQMD CEQA Guidelines contain guidance for assessing impacts relative to emissions of GHGs. Additionally, BAAQMD has introduced the Beta version of its GHG emissions model: BAAQMD GHG Model ("BGM") which works in conjunction with the URBEMIS2007 model of the CARB.

All of the 2010 revisions to the CEQA thresholds of significance adopted by BAAQMD with the exception of risk and hazard thresholds for new receptors became effective June 2, 2010. The risk and hazard thresholds for new receptors will become effective on January 1, 2011. These recently adopted thresholds of significance for GHGs from new sources are intended to apply to projects for which a Notice of Preparation was published or environmental analysis begun on or after the applicable effective date. Therefore, the Proposed Project would be subject to the thresholds identified in the BAAQMD *1999 CEQA Guidelines*, as opposed to the recently adopted thresholds. However, because the BAAQMD *1999 CEQA Guidelines* do not address or otherwise identify significance thresholds with respect to GHG emissions, San Francisco has chosen to apply BAAQMD's recently adopted revised thresholds of significance to the Proposed Project. The second option, using 4.6 MT per service population per year, is the appropriate threshold for analysis of the Proposed Project.

Local

Greenhouse Gas Reduction Resolution

In February 2002, the San Francisco Board of Supervisors passed the Greenhouse Gas Emissions Reduction Resolution (Resolution 158-02) committing the City to a GHG emissions reduction goal of 20 percent below 1990 levels by the year 2012. The resolution also directs the San Francisco Department of the Environment, the San Francisco Public Utilities Commission

SFPUC, and other appropriate City agencies to complete a GHG emission reduction action plan. In September 2004, the San Francisco Department of the Environment and the SFPUC published the Climate Action Plan for San Francisco: *Local Actions to Reduce Greenhouse Emissions* ("SFCAP" or Plan). Although the San Francisco Board of Supervisors has not formally committed the City to perform the actions addressed in the SFCAP, and many of the actions require development and commitment of resources, it is a blueprint for GHG emission reductions, and several of the actions are now in progress.

The SFCAP presents estimates of San Francisco's baseline GHG inventory and reduction targets. It states that burning fossil fuels in vehicles and for energy use in buildings and facilities is the major contributor to San Francisco's GHG emissions; in 1990, burning fossil fuels for these purposes produced approximately 8.3 million metric tons (MMT) of CO_2. The Plan also describes recommended emissions reduction actions in the key target sectors: transportation, energy efficiency, renewable energy, and solid waste management to meet stated goals by 2012.

The SFCAP presents proposals to reduce annual CO_2 emissions by 2.5 million tons by 2012, a 20 percent reduction below 1990 emissions, including greening vehicle fleets; increasing energy efficiency in public and private buildings; developing renewable energy technologies like solar, wind, fuel cells, and tidal power; and expanding residential and commercial recycling programs. The roadmap to achieving these goals requires the cooperation of a number of city, regional, and state agencies as well as private sector partners. The City is already implementing a wide range of actions (e.g., transportation, solar, and energy efficiency) to reduce GHG emissions.

<u>Greenhouse Gas Reduction Ordinance</u>

In May 2008, the City adopted an ordinance amending the *Environment Code* to establish GHG emission targets and action plans, to authorize the Department of the Environment to coordinate efforts to meet these targets, and to make environmental findings. The ordinance establishes the following GHG emission reduction limits and target dates for San Francisco:

- Determine 1990 City GHG emissions by 2008 (baseline level with reference to which target reduction are set);
- Reduce GHG emissions by 25 percent below 1990 levels by 2017;
- Reduce GHG emission by 40 percent below 1990 levels by 2025; and
- Reduce GHG emissions by 80 percent below 1990 levels by 2050.

The ordinance also requires City departments to prepare department Climate Action Plans that assess and report GHG emissions and to prepare recommendations to reduce emissions. The San Francisco Planning Department is also required to (1) update and amend the City's applicable *General Plan* elements to include the emissions reduction limits set forth in the GHG reduction ordinance and policies to achieve those targets; (2) consider a project's impact on the City's GHG reduction limits as part of its review under CEQA; and (3) work with other City departments to enhance the "transit first" policy to encourage a shift to sustainable modes of transportation, thereby reducing emissions and helping to achieve the targets set forth by the ordinance.

Green Building Code

On August 5, 2008, the City adopted the *San Francisco Building Code* ("SFBC"), Chapter 13C, "green building codes" for new construction and for renovations of existing structures, consistent with the GHG reduction measures in the SFCAP. The new green building standards in SFBC Chapter 13C are to be phased in by 2012. At 2012, the ordinance specifically requires newly constructed commercial buildings over 5,000 square feet to be subject to Leadership in Energy and Environmental Design ("LEED®") Gold, residential buildings over 75 feet in height to be LEED® certified or an equivalent standard, and other residential buildings to be subject to GreenPoint Rated (to 75 points), which makes San Francisco the city with the most stringent green building requirements in the nation. The ordinance identifies cumulative benefits through 2012 which include reducing CO_2 emissions by 60,000 tons, saving 220,000 megawatt hours of power, saving 100 million gallons of drinking water, reducing waste and storm water by 90 million gallons of water, reducing construction and demolition waste by 700 million pounds, increasing the valuations of recycled materials by $200 million, reducing automobile trips by 540,000, and increasing green power generation by 37,000 megawatt hours.

The new codes focus on water and energy conservation, recycling and reduction of carbon emissions. They apply to most buildings in the City, including residential projects of all sizes, new commercial buildings, and renovations of large commercial spaces. Large residential and commercial buildings would be evaluated under the LEED® rating system. Medium and small residential construction would use the GreenPoint rating system, which is less stringent. New projects would be evaluated on a point system with credit given for materials used in the building, the location of the building site and water and energy efficiencies.

Transit First Policy

In 1973 San Francisco instituted the Transit First Policy (Article 8A, Section 8A.115. of the City Charter) with the goal of reducing the City's reliance on freeways and meeting transportation needs by emphasizing mass transportation. The Transit First Policy gives priority to public transit investments; adopts street capacity and parking policies to discourage increased automobile traffic; and encourages the use of transit, bicycling and walking rather than use of single-occupant vehicles.

In 2007, voters in San Francisco passed Proposition A, which requires a reduction of GHG emissions on the order of 20 percent, specific to the transportation sector. As part of this effort, the San Francisco Municipal Transportation Authority ("SFMTA") is developing a Climate Action Plan to meet the goals of this Proposition.

San Francisco has also recently adopted a Bicycle Plan that aims to encourage and increase the number of bicycle trips made in the city by further enhancing the bicycle network and adopting bicycle friendly policies.

San Francisco also adopted a commuter benefits ordinance that requires all employers in San Francisco that have 20 or more employees to offer a commuter benefits program.

San Francisco Sustainability Plan

In 1993, the San Francisco Board of Supervisors established the Commission on San Francisco's Environment, charged with, among other things, drafting and implementing a plan for San Francisco's long-term environmental sustainability. The notion of sustainability is based on the United Nations definition that "a sustainable society meets the needs of the present without sacrificing the ability of future generations and non-human forms of life to meet their own needs." The Sustainability Plan for the City of San Francisco was a result of community collaboration with the intent of establishing sustainable development as a fundamental goal of municipal public policy.

The Sustainability Plan is divided into 15 topic areas, 10 that address specific environmental issues (air quality; biodiversity; energy, climate change and ozone depletion; food and agriculture; hazardous materials; human health; parks, open spaces, and streetscapes; solid waste; transportation; and water and wastewater); and five that are broader in scope and cover many issues (economy and economic development; environmental justice; municipal expenditures; public information and education; and risk management). Additionally, the Sustainability Plan contains indicators designed to create a base of objective information on local conditions and to illustrate trends toward or away from sustainability. Although the Sustainability Plan became official City policy in July 1997, the Board of Supervisors has not committed the City to perform all of the actions addressed in the plan. The Sustainability Plan serves as a blueprint, with many of its individual proposals requiring further development and public comment.

The Electricity Resource Plan (Revised December 2002)

San Francisco adopted the Electricity Resource Plan as a long-term vision of the City of San Francisco's possible electricity future through 2012 and to help address growing environmental health concerns in San Francisco's southeast community, home to two power plants. The plan presents a framework for assuring a reliable, affordable, and renewable source of energy for the future of San Francisco.

The San Francisco Metropolitan Transportation Agency's Zero Emissions 2020 Plan

The SFMTA's Zero Emissions 2020 Plan focuses on the purchase of cleaner transit buses, including hybrid diesel-electric buses. Under this plan hybrid buses would replace the oldest diesel buses, some dating back to 1988. Hybrid buses emit 95 percent less particle matter ("PM" or soot) than the buses they replace; they produce 40 percent less oxides of nitrogen ("NO_X"), and they reduce GHGs by 30 percent.

LEED® Silver for Municipal Buildings

In 2004, the City amended Chapter 7 of the San Francisco Environment Code, requiring all new municipal construction and major renovation projects to achieve LEED® Silver Certification from the U.S. Green Building Council.

Zero Waste

In 2004, the City committed to a goal of diverting 75 percent of its waste from landfills by 2010, with the ultimate goal of zero waste by 2020. San Francisco currently recovers 72 percent of discarded material.[32] In 2009, the City added Chapter 19 to its Environment Code, which outlines the City's mandatory recycling and composting program. Everyone in San Francisco is required to separate waste into recyclables, compostable materials, and trash; and all property managers, food vendors, and refuse collectors are required to supply appropriately designed containers so that refuse can be easily be separated.

Construction and Demolition Debris Recovery Ordinance

In 2006, the City adopted Ordinance No. 27-06, requiring all construction and demolition debris to be transported to a registered facility that can divert a minimum of 65 percent of these materials from landfills. This ordinance applies to all construction, demolition, and remodeling projects within the City.

In August 2008, Mayor Gavin Newsom signed into law San Francisco's Green Building Ordinance (codified as Chapter 13C of the SFBC) for newly constructed residential and commercial buildings and renovations to existing buildings. The City's Green Building Ordinance would apply to most major new construction including all new Group R occupancy buildings (residential high rise) and includes a requirement for projects to redirect at least 75 percent of construction and demolition waste from landfills.

[32] San Francisco Department of the Environment Zero Waste program overview: http://www.sfenvironment.org/our_programs/overview.html?ssi=3, accessed June 10, 2010.

GoSolarSF

In 2008, the San Francisco Public Utilities Commission ("SFPUC") launched the "GoSolarSF" program to San Francisco's businesses and residents, offering incentives in the form of a rebate program that could pay for approximately half the cost of installation of a solar power system, and more to those qualifying as low-income residents.

The Planning Department and Department of Building Inspection have also developed a streamlining process for Solar Photovoltaic Permits and priority permitting mechanisms for projects pursuing LEED® Gold Certification.

Other Local Ordinances

San Francisco has implemented several planning and zoning ordinances that address land use related GHG emissions. Some of these ordinances enhance neighborhood-serving retail, preserve and enhance the City's supply of affordable housing, and ensure that commuter traffic does not impede Muni transit service or overburden streets and parking. The City has a ban on non-approved wood-burning fireplaces. The City also assesses a transit impact development fee that applies to many new land use development projects to offset the impact on the transportation system. For water efficiency measures the City has several ordinances including limitations on water use for landscaping in new developments.

IMPACTS

This section is divided into four parts:

1. **Significance Criteria** lists the Significance Criteria used by the City and County of San Francisco for GHG and describes specifically how the BAAQMD Thresholds are applied by the City in assessing whether the Proposed Project exceeds the criteria.
2. **Methodology** describes the Project-specific analysis approach and assumptions used to estimate the Proposed Project's net emissions.
3. The **GHG Emissions Inventory** quantifies the Proposed Project's estimated GHG emissions on a category by category basis.
4. The **Impacts** section compares the contribution of the Proposed Project emissions with thresholds of significance to determine whether the Proposed Project would have a cumulative GHG impact and whether mitigation would be required.

SIGNIFICANCE CRITERIA

The City and County of San Francisco has not formally adopted significance thresholds for impacts related to climate change. The Planning Department's Initial Study Checklist form provides a framework of topics to be considered in evaluating a project's impacts under CEQA.

Implementation of a proposed project would have a significant climate change impact if it were to:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

METHODOLOGY

The release of GHGs in general, and CO_2, specifically into the atmosphere is not of itself an adverse environmental effect. It is the effect that increased concentrations of GHGs have upon the earth's climate (i.e., climate change) and the associated consequences of climate change that could result in adverse environmental effects (e.g., sea level rise, loss of snowpack, severe weather events). Although emissions modeling can estimate a project's incremental contribution of CO_2 into the atmosphere, it is not feasible to determine whether, or how, an individual project's relatively small incremental contribution (on a global scale) might translate into physical effects on the environment. Earth's climate is determined by the complex interaction of different components of Earth and its atmosphere and it is therefore not possible to discern whether the presence or absence of GHGs emitted by the Proposed Project would result in any measurable impact that would intensify climate change or its adverse environmental impacts.

OPR published informal guidance regarding the steps lead agencies should take to address climate change in their CEQA documents.[33] According to OPR, lead agencies should determine whether GHGs may be generated by a project, and if so, quantify or estimate the GHG emissions by type and source. The lead agency must assess whether those emissions are individually and/or cumulatively significant. When assessing whether a project's effects on climate change are "cumulatively considerable" even though its GHG contribution may be individually limited, the lead agency must consider the impact of the project when viewed in connection with the effects of past, current, and probable future projects. Finally, if the lead agency determines that the GHG emissions from a proposed project are potentially significant, CEQA requires that it must investigate and implement ways to avoid, reduce, or otherwise mitigate the impacts of those emissions. Both BAAQMD and CAPCOA consider GHG impacts to be exclusively cumulative impacts[34] and, as such, assessment of significance is based on a determination of whether the GHG emissions from a project represent a cumulatively considerable contribution to the global atmosphere.

---

[33] State of California, Governors Office of Planning and Research, *CEQA and Climate Change: Addressing Climate Change through California Environmental Quality Act Review*, June 19, 2008.
[34] *Ibid.*

As of the time of this analysis, BAAQMD is the only regulatory agency with jurisdiction over the project area that has adopted quantitative thresholds for a project's operational GHG emissions relative to CEQA impact analysis.[35] In June 2010, BAAQMD adopted two quantitative and one qualitative project-specific GHG emissions thresholds. The first quantitative threshold is a mass daily threshold of 1,100 MT of CO_2e per year for application to development projects. The second quantitative threshold is 4.6 MT of CO_2e per service population per year and can be used for most land use development projects, including residential, commercial, industrial, and public land uses and facilities. This quantitative threshold (4.6 MT of CO_2e per year per capita of the service population) is intended to apply to projects that might otherwise exceed the 1,100 metric ton per day threshold, but are more efficient on a per capita basis. Service population is considered to be the combination of residents and employees that a proposed project would accommodate. This EIR applies the second quantitative efficiency threshold of 4.6 MT of CO_2e per service population per year to the Proposed Project. Application of this threshold is to include direct emissions from a project's onsite combustion of energy sources such as natural gas used in non-permitted furnaces and boilers, direct emissions from industrial processes, and fuel used in mobile sources, as well as indirect emissions from off-site electrical generation, water conveyance and treatment, and other sources.

Under the BAAQMD qualitative threshold, project-level impacts would be considered less than significant if the lead agency has adopted a Climate Action Plan that meets certain requirements (referred to as a "Qualified GHG Reduction Strategy") and the plan or project complies with the Qualified GHG Reduction Strategy.

The BAAQMD made available a GHG emissions estimation model: the BAAQMD GHG Model ("BGM"). This model uses inputs within the URBEMIS2007 Air Quality model to estimate GHG emissions. While URBEMIS was used to estimate motor vehicle air quality emissions for the Proposed Project, other mobile sources including busses and ferries could not be estimated using URBEMIS and hence BGM. Additionally, because project specific data is available for Proposed Project electrical as well as utility provider specific emission factors which cannot be adjusted in BGM, emissions from these electrical sources were not estimated using BGM. BGM was used to estimate Proposed Project GHG emissions from natural gas demand, water conveyance and solid waste generation. Specific methodologies for each calculation are discussed in the inventory.

Models used to estimate emissions in the GHG inventory are only as accurate as the baseline data used as inputs. For the inventory prepared for the Proposed Project and Expanded Transit Service input, data was taken from project specific sources such as the *Transportation Impact Study* and

---

[35] The adopted BAAQMD 2010 CEQA Guidelines specifically state that they are not recommending a significance threshold relative to construction-related emissions of GHGs. However, the BAAQMD

energy study prepared for the Proposed Project or data estimated for water use in Section IV.K, Utilities and Service Systems, of this DEIR. Additionally, these models may require the input of generalized conservative assumptions regarding usage or travel patterns. Modeling contained in the inventory is a best-effort exercise to use the latest available models and methodologies of applicable regulatory agencies and scientific consortiums. However, the potential will always exist for newer or updated methods of analysis to be developed.

This section presents a quantitative analysis of the project's GHG emissions to determine whether the Proposed Project or the Proposed Project with Expanded Transit Service would exceed the first criterion to "generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment" as required by the 2010 CEQA Guideline Amendments of OPR. This EIR applies BAAQMD's second, optional quantitative efficiency threshold of 4.6 MT of CO_2e per service population per year to the Proposed Project. Both the Proposed Project and the Proposed Project with Expanded Transit Service are analyzed quantitatively.

With respect to the second significance criterion, to "conflict with any applicable plan, policy or regulation of any agency adopted for the purpose of reducing the emissions of GHGs," BAAQMD derived its efficiency threshold (4.6 MT of CO_2e per service population per year) based on emission levels required to be met in order to achieve AB 32 goals.[36] Therefore, consistency with the quantitative threshold is also used to determine whether or not the Proposed Project conflicts with AB 32. The Proposed Project's consistency with the City of San Francisco's Greenhouse Gas Reduction Ordinance is qualitatively assessed relative to this second amended CEQA threshold regarding GHGs.

GHG EMISSIONS INVENTORY

The discussion below describes how the GHG emissions associated with the Proposed Project and Expanded Transit Service were calculated. Details of the assumptions related to these calculations are presented in a Greenhouse Gas Approach Memorandum that is contained in Appendix F.

Inventory Method

Project-generated GHG emissions were estimated and inventoried based on methodologies and emission factors recommended by BAAQMD, CCAR, IPCC, and other government agencies. Project-specific information was used to determine the total GHG emissions. In addition, energy usage studies specific to the anticipated land uses were used. The methods used in this EIR apply local emission factors for the carbon intensity of electricity, which are those recommended by the

---

Guidelines do state that a lead agency should quantify and disclose construction-related GHG emissions and make a determination of significance in relation to meeting AB 32 GHG reduction goals.

[36] BAAQMD, *CEQA Guidelines Update Proposed Thresholds of Significance*, May 3, 2010, p. 11.

CCAR to be used in GHG emission inventories.[37] While BAAQMD has made available the BGM model than can calculate many sources of GHGs, BGM (and the associated URBEMIS2007) is limited by the types of sources it includes and its inability to have emission factors adjusted. Consequently, the inventory below was calculated using the methodology of BGM (i.e., the same calculation formulas and global warming potentials), but uses project-specific usage factors and utility emission factors. Therefore, the emission inventory presented below reflects a more refined analysis than what can be calculated using BGM and URBEMIS2007. For each emission source in the inventory discussion below, justification is provided for not using BGM, as applicable.

Project GHG emissions were calculated using guidance from BAAQMD, CCAR and IPCC.[38] The GHG emissions inventory relied on scientific studies and studies conducted by government agencies that provide data on energy use patterns associated with building energy use, municipal activities, natural resources distribution, and other activities that would take place as part of the Proposed Project. The GHG emission inventory was developed using several models to estimate GHG emissions from the Proposed Project. These include the OFFROAD 2007 model, EMFAC model, BGM model and the URBEMIS2007 version 9.2.4 model.[39]

This inventory was prepared using conservative assumptions. For example, the inventory assumes that all emissions from the Proposed Project would be "new" in the sense that, absent the development of the Proposed Project, these emissions would not occur. Given the global nature of GHG emissions, "new" global GHG emissions are those caused by economic growth and population growth (births); local development projects accommodate such growth. Therefore, it is quite possible that in the absence of this project, other local or regional development projects with similar or greater GHG emissions would be constructed to accommodate otherwise occurring growth. Nevertheless, this analysis conservatively assumes that the Proposed Project's GHG emissions would be new.

A second example of why the emissions inventory is conservative and may overstate GHG emissions is that the estimates assume that there would be no reductions in GHG-generating activities over time, beyond those resulting from measures contained in the AB 32 Scoping Plan (e.g., Pavley and LCFS). This would be unlikely, and presents a conservative analysis, given the

---

[37] The CCAR General Reporting Protocol version 3.1 states on p. 34, "If your electricity provider reports an electricity delivery metric under the California Registry's Power/Utility Protocol, you may use this factor to determine your emissions, as it is more accurate than the default regional factor."

[38] ESA, Approach to Greenhouse Gas Emissions Treasure Island/Yerba Buena Island Redevelopment Project EIR Greenhouse Gas Reduction Memorandum, June 10, 2010. A copy of this report is available as Appendix F of this EIR.

[39] Printouts of model input and output, as well as spreadsheets used for customized calculations of GHG emissions based on BAAQMD and CCAR guidance are available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

expected reductions in GHG emissions from most activities that would take place in future years due to future regulations, greater public awareness, and the likely increasing costs of energy.

At the entitlement stage of a development, while the number of homes, the approximate size of commercial areas, and the locations of both are known, the exact designs of the homes, businesses, and facilities are not. The types of buildings and the types of facilities at the future project site can be used for developing an estimate of the projects anticipated GHG emissions. Energy used in a building depends in part on the built environment; however, actual future emissions from the site would depend heavily upon future homeowners' and business owners' habits. The future occupants and their habits are not yet known and average current behavior is assumed. That assumption is likely to be a very conservative assumption. The GHG emissions inventory prepared for the Proposed Project includes some aspects that are fully within the control of the Proposed Project, such as grading and the placement of utilities; some aspects that are in control of the individuals building the houses and commercial buildings, such as construction emissions; and some aspects for which control over emissions is shared by the developers and the residents, such as energy use in the built environment and emissions from traffic by the development's future residents and employees in the commercial areas.

The GHG emissions inventory prepared for the Proposed Project considers a number of different categories and the timeframe over which the Proposed Project's GHGs are assumed to be emitted varies from category to category, which is taken into consideration in the emissions inventory.

- For most of the categories, GHGs would be emitted every year that the development is inhabited. For these categories (residential buildings, nonresidential buildings, mobile sources, municipal services, and area sources), the inventory includes estimates of annual GHG emissions from ongoing operations associated with the Proposed Project.
- GHG emissions from two of the categories, construction and changes in vegetation sequestration, are time limited events that would not be part of the Proposed Project's ongoing activity. These one-time emissions can be divided by the estimated lifetime of the Proposed Project to allow direct comparison of these two emissions classes. The inventory presents estimates of these one-time emissions, converts them to annualized estimates, and integrates them into an annual inventory.

Emissions Not Calculated in this EIR

Lifecycle Emissions

Although there is no regulatory definition for "lifecycle emissions," the term is generally used to refer to all emissions associated with the creation and existence of a project, including emissions from the manufacture and transportation of component materials, and even emissions from the manufacture of the machines required to produce those materials. However, since it is impossible to accurately estimate the entire chain of emissions associated with any given project, lifecycle analyses are limited in effectiveness and meaning (relative to assessing or reducing Project-specific emissions for the CEQA analysis). The California Natural Resources Agency ("CNRA") has stated that lifecycle analyses are not required under CEQA,[40] and in December 2009 CNRA issued new energy conservation guidelines for EIRs that make no reference to lifecycle emissions.[41] The CNRA explained that: (1) There exists no standard regulatory definition for lifecycle emissions, and (2) Even if a standard definition for 'lifecycle' existed, the term might be interpreted to refer to emissions "beyond those that could be considered 'indirect effects'" as defined by CEQA Guidelines, and therefore, beyond what an EIR is required to estimate and mitigate.[42]

Fugitive Refrigerant Emissions

Refrigerant gases such as CFCs, HFCs, and HCFCs have a high global warming potential. While the BAAQMD's BGM model can calculate emissions from refrigerant losses, the model requires specific data (the pounds of charge of refrigerant for all air handling units) to make this calculation. At the entitlement stage of development, data necessary to estimate emissions is not readily available. Therefore, GHG emissions from leaking refrigerant gases could not be quantified for the Proposed Project.

At the entitlement stage of development, the degree of uncertainty in the potential facilities with sources that may have refrigerant leaks make a meaningful quantification of GHG emissions difficult. In addition, since refrigeration systems would be new, they likely would be efficient and should be designed to reduce the amount of leaks of gases that have high global warming potential. Further, the Climate Change Scoping Plan of the California Air Resources Board contains Recommended Actions that will, if implemented as planned, address the reduction in the use of refrigerants with high global warming potentials by 2020. The BAAQMD generally considers fugitive refrigerant emissions from residential development need not be analyzed and that refrigerant emissions from a few small retail uses are negligible and also need not be analyzed in most cases. The application of refrigerant emissions in the BGM model is intended for larger sources, such as supermarkets and distribution warehouses.[43]

---

[40] California Natural Resources Agency, 2009. *Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB97*, pp. 71–72. http://ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf, accessed February 4, 2010.

[41] State CEQA Guidelines, Appendix F. These new guidelines were part of amendments issued pursuant to SB97. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

[42] California Natural Resources Agency, 2009. *Final Statement of Reasons for Regulatory Action: Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB97*, p. 71. http://ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf, accessed February 4, 2010.

[43] Tholen, Greg, Senior Planner BAAAQMD, e-mail communication, June 24, 2010.

Project Design Features

The GHG emissions inventory assumed the incorporation of several project design features in its analysis. These project design features are part of the Proposed Project. The inventory of GHG emissions incorporates these design features. The project design features are listed below and further discussed in the GHG emission inventory for individual source categories.

Proposed Project Design Features for Which Emissions Reductions Were Incorporated Into the Emissions Inventory

Transportation Design Features[44]

- Provide neighborhood serving retail;
- Compact development footprint;
- Integrate land use patterns with Transit Hub that would facilitate walking and biking for on-island trips and transit for off-island trips;
- Ferry service every 50 minutes to downtown San Francisco provided by a single ferry ;
- AC Transit bus service to downtown Oakland with service every ten minutes;
- Continued SF Muni line 108 bus service to Treasure Island with no island circulation;
- On-island fleet shuttle service using alternatively-fueled shuttle buses;
- Transportation Demand Management ("TDM") Strategies. Trip generation estimates for the proposed project reflect the implementation of TDM strategies. These proposed strategies are identified in the Proposed Project's 2006 Transportation Plan and discussed in detail in Section IV.E, Transportation, and include:
  - Establishment of a Transportation Management Agency;
  - Congestion Pricing;
  - Parking Program;
  - Travel Coordinator;
  - Car Share Program;
  - Transit Hub;
  - Comprehensive Transit Pass;
  - Bicycle Fleet;
  - Carpools and Vanpools;
  - Ramp Metering; and
  - Guaranteed Ride Home Program.

Energy Design Features

- Exceed the 2008 Title 24 energy efficiency standards for home and businesses by at least five percent as determined in the energy report for the Proposed Project;

[44] As part of the transportation analysis of the Proposed Project, quantitative reductions in auto travel, and therefore emissions associated with these vehicle trips were taken for the items listed. Please see Section IV.E, Transportation, for a discussion of the methodology used to estimate these reductions.

The Proposed Project with Expanded Transit Service would include the same Transportation Design Features as the Proposed Project's Base Transit Service with the following changes or additions:

- New ferry service to San Francisco every 15 minutes provided by a fleet of three ferries;
- Modification of the existing SF Muni line 108 – Treasure Island bus service to increase peak hour frequency from every 15 minutes to every 7 minutes in the AM peak hour and every 5 minutes in the PM peak hour. Additionally, existing buses would be replaced with larger capacity buses; and
- New SF Muni bus service to the San Francisco Civic Center area.

Proposed Project Design Features for Which Emissions Reductions Were Not Incorporated Into the Emission Inventory but Could Yield Further GHG Emission Savings

The following features were not incorporated into the emissions inventory, but could yield further GHG emissions savings:

- Design standards that require most building roofs to enable the installation of photovoltaic panels;
- Infrastructure system components including storm water treatment wetlands, water storage, and a recycling and composting center;
- Establish measures to protect public health and safety including supplemental environmental remediation, geotechnical stabilization, and emergency support services;
- Deconstruction and re-use of existing buildings and materials;
- Adaptive re-use of existing historic structures;
- Provision of public and community facilities; and
- Affordable housing, including a transition component.
- Creation of wetlands. Ten to fifteen acres of storm water treatment wetlands is proposed to be created as a method of storm water treatment. Other project variants also propose smaller areas of wetlands that would provide tertiary treatment or polishing of portions of the wastewater prior to discharge into the Bay. Wetlands act as both a carbon sink due to carbon sequestration as well as a carbon source resulting from methane generation. Recent studies indicate that wetlands are likely a net GHG sink "because they support both rapid rates of carbon sequestration and low methane emissions."[45] However, given the developing availability of science around plant-specific carbon sequestration rates that are not related to forestry or agriculture, a quantitative estimate of the net carbon benefits of wetlands creation was not undertaken for this analysis, although wetlands would likely result in further GHG emission savings. Additionally, use of wetlands for storm water treatment can potentially reduce the energy-related GHG emissions as compared with standard treatment technologies.
- Increased landscaping area. Carbon sequestration estimates can be and were made for the net increase in tree plantings resulting from the Proposed Project as well as from athletic fields proposed by the Project. In addition, the Proposed Project would also result in a net

[45] Bridgeham, Scott D., et. al., *The Carbon Balance of North American Wetlands*, December 2006.

increase in landscaped areas. However, carbon sequestration rates are not available for species-specific landscape plantings. Therefore carbon sequestration benefits resulting from the net increase in landscaped areas are not estimated in the emissions inventory, although they would likely result in further GHG emission savings.

Regulations Applicable to the Proposed Project

The Proposed Project would follow the following rules and regulations that are currently in existence:

- Non-approved types of wood-burning stoves and fireplaces are prohibited.
- <u>Commuter Benefit Ordinance</u>. The Commuter Benefit Ordinance (Environment Code, Section 421), effective January 19, 2009, requires all employers in San Francisco that have 20 or more employees to offer one of the following benefits: (1) A Pre-tax Transit Benefit, (2) Employer Paid Transit Benefits, or (3) Employer Provided Transit.
- <u>City of San Francisco's Green Building Ordinance</u>. On August 4, 2008, Mayor Gavin Newsom signed into law San Francisco's Green Building Ordinance for newly constructed residential and commercial buildings and renovations to existing buildings. The ordinance specifically requires newly constructed commercial buildings over 5,000 square feet (sq. ft.), residential buildings over 75 feet in height, and renovations on buildings over 25,000 sq. ft. to be subject to an unprecedented level of LEED® and green building certifications, which makes San Francisco the city with the most stringent green building requirements in the nation. The Proposed Project would comply with the provisions of the SFBC, either through application of the SFBC directly, or through a set of equivalent or superior requirements adopted by TIDA as part of the Proposed Project's Green Building Specifications.
- <u>City of San Francisco's Municipal Green Building Ordinance</u>. In 2004, the City amended Chapter 7 of the San Francisco Environment Code, requiring all new municipal construction and major renovation projects to achieve LEED® Silver Certification from the U.S. Green Building Council. Municipal buildings within the Proposed Project would be required to comply with the standards in the Municipal Green Building Program. This requirement would be implemented either through compliance with the Municipal Green Building Program or a set of equivalent or superior requirements adopted by TIDA as part of the Proposed Project's Green Building specifications.
- <u>Universal Recycling and Composting Ordinance</u>. Signed into law on June 23, 2009, this ordinance requires all residential and commercial building owners to sign up for recycling and composting services. Any property owner or manager who fails to maintain and pay for adequate trash, recycling, and composting service is subject to liens, fines, and other fees.
- <u>Construction and Demolition Debris Recovery Ordinance</u>. In 2006 the City of San Francisco adopted Ordinance No. 27-06, requiring all construction and demolition debris to be transported to a registered facility that can divert a minimum of 65 percent of the material from landfills. This ordinance applies to all construction, demolition and remodeling projects within the City. The Proposed Project would comply with the provisions of the CDDRO, either through application of the CDDRO directly, or through a set of equivalent or superior requirements adopted by TIDA as part of the Proposed Project's Green Building Specifications.

Short-term (One-Time) Emissions

Vegetation Sequestration Change

The overall CO_2 emissions due to vegetation change would result from the amount that can be expected to be sequestered by new plantings. The Proposed Project would result in approximately 4,323 net new trees on both Islands. This assumes relocation of 100 trees on Treasure Island ("TI"), removal of all of the remaining 1,677 existing trees on all of TI and the developed areas of Yerba Buena Island ("YBI"), and the planting of 6,000 new trees, as proposed by the applicant. The Proposed Project's net increase in trees would continue to sequester carbon after 20 years, although at a slower rate that is typically offset by losses from clipping, pruning, and occasional death. The BGM model of the BAAQMD was used to estimate sequestration emissions associated with these trees assuming an equal split between medium-growth hardwoods and medium-growth conifers. BGM calculates the temporary sequestering would remove approximately 22 MT CO_2e emissions annually. This annualized sequestering is subtracted from the total Project-related GHG emissions in Table IV.H.3: Emissions of GHG from the Proposed Project, on p. IV.H.36.

Additionally, the proposed athletic fields would also sequester carbon and would have a net GHG benefit even after consideration of lawn maintenance practices. A majority of the proposed 25- to 40-acre sports park would consist of grass playing fields. Also considering residential and community plantings in addition to playing fields, the Proposed Project would result in a net increase of 106 acres of lawn[46], which was used to calculate sequestration. BAAQMD's BGM model does not calculate sequestration from grasses but only from trees. Consequently, the calculation of sequestration from grasslands was performed using available studies.[47] The 106 additional acres of athletic fields and lawn would sequester approximately 34 MT CO_2e annually. Total vegetation sequestration from trees and grass would total 56 MT of CO_2 annually. As discussed above, other landscape plantings (shrubs, etc.) would also sequester carbon, but would only marginally increase relative to existing plantings.

Ten to fifteen acres of wetlands are also proposed to be created as a method of storm water treatment. Other Proposed Project variants also propose relatively smaller areas of wetlands. Wetlands act as both a carbon sink due to carbon sequestration as well as a carbon source resulting from methane generation. Recent studies indicate that wetlands are likely a net GHG sink "because they support both rapid rates of carbon sequestration and low methane

[46] CNG e-mail response from Kim Diamond on March 1, 2010.

[47] West et al., *Considering the Influence of Sequestration Duration and Carbon Saturation on Estimates of Soil Carbon Capacity*, *Climatic Change*, January 2007. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

emissions."[48] However, given the developing nature of science around plant-specific carbon sequestration rates that are not related to forestry or agriculture, a quantitative estimate of the net carbon benefits of wetlands creation was not undertaken for this analysis, although wetlands would likely result in further GHG emission savings.

Construction-Related Activities

CO_2 emissions associated with different aspects of construction activities for urban development can be estimated using a combination of software programs. BAAQMD's BGM model does not calculate GHG emissions from construction sources. Consequently, these emissions were calculated using the OFFROAD2007 and the EMFAC2007 models are used to generate emission factor data for construction equipment and motor vehicles, respectively.

Assumptions regarding construction timing and the number, type, and operating hours of equipment are based on the number and type of equipment that would be used in the construction of the Proposed Project, as well as the duration of each construction phase. Table IV.H.2 summarizes the construction activity-related GHG inventory and presents the emissions estimates in MT of CO_2e. The table indicates that an estimated 243,039 MT CO_2e emissions from Proposed Project construction equipment would be emitted over the course of the minimum construction period of 17 years. This is a conservative emissions estimate that does not account for any Best Management Practices that may reduce GHG emissions. If these one-time emissions are annualized assuming a 40-year development life (which is likely low), the one-time emissions contribute approximately 6,076 MT CO_2e emissions annually. Annualizing of emissions is useful for comparison to significance thresholds which are established in terms of annual emission rates. These annualized emissions are added to the total Project-related GHG emissions in Table IV.H.3.

Table IV.H.2: Construction Generated GHG Emissions of the Proposed Project

	Emissions (metric tons CO_2e)			
Emission Source	**CO_2**	**CH_4**	**N_2O**	**Total CO_2e**
Worker Trips	7,402	9	59	7,470
Construction Equipment	189,851	228	1,508	191,587
Haul Trucks	42,892	51	341	43,284
Barge Tugs	693	1	5	699
Total	**240,838**	**289**	**1,913**	**243,040**
Construction Emissions (40-Year amortization)	6,021	7	48	6,076

Source: ESA, 2010

[48] Bridgeham, Scott D., et al., *The Carbon Balance of North American Wetlands*, December 2006.

Table IV.H.3: Emissions of GHGs from the Proposed Project

	Emissions (metric tons CO_2e per year)			
Emission Source/Sink	**CO_2**	**CH_4**	**N_2O**	**Total CO_2e**
Construction Emissions (40 Year amortization)	6,021	7	48	6,076
Carbon sequestration of trees and grasses (40 year amortization)	- 56	--	--	- 56
Motor vehicle trips	45,431	139	2,729	48,299
Buses	971	--	1	972
Ferries	3,215	5	26	3,246
Shuttle Buses	247	5	6	258
Natural gas	5,188	10	3	5,201
Grid Electricity	--	--	--	1,030
Solid Waste generation	--	--	--	4,544
Water Conveyance	452	--	2	455
Wastewater Treatment & Conveyance	On island WWTP Treatment & Conveyance Energy included in Grid Electricity Above (inclusive of stormwater and recycled water)			
Area Source (landscape maintenance)	3	--	--	3
Total Proposed Project Operational Greenhouse Gas Emissions	61,472	166	2,815	**70,028**

Source: ESA, 2010

Long-Term Operational Emissions

Long-term operational or annual emissions from the development of this Proposed Project include indirect GHG emissions from electricity use in residential and non-residential buildings and emissions from natural gas combustion used in residential and non-residential buildings, mobile sources, municipal sources, area sources, transit services, water conveyance and waste disposal. Table IV.H.3 lists the emissions for each of these categories. Table IV.H.4 presents the same information for the Proposed Project with Expanded Transit Service as described in Mitigation Measures M-TR-2 in Section IV.E, Transportation.

Indirect Electrical GHG Emissions

Both residential and non-residential uses require electricity for space and water heating, air conditioning, lighting, and plug-in outlets. Non-residential buildings may also require electricity to run mechanical or process equipment. The amount of energy and, therefore, the amount of associated GHG emissions emitted per dwelling unit would vary with the type of residential building.

Table IV.H.4: Emissions of GHGs from the Proposed Project with Expanded Transit Service

	Emissions (metric tons CO_2e per year)			
Emission Source/Sink	**CO_2**	**CH_4**	**N_2O**	**Total CO_2e**
Construction Emissions (40 Year amortization)	6,021	7	48	6,076
Carbon sequestration of trees and grasses	- 56	--	--	- 56
Motor vehicle trips	38,147	116	2,292	40,555
Buses	1,905	--	1	1,906
Ferries	9,645	15	77	9,737
Shuttle Buses	247	5	6	258
Natural gas	5,188	10	3	5,201
Grid Electricity	--	--	--	1,030
Solid Waste generation	--	--	--	4,544
Water Conveyance	452	--	2	455
Wastewater Treatment & Conveyance	On Island WWTP Treatment & Conveyance Energy included in Grid Electricity Above (inclusive of stormwater and recycled water)			
Area Source (landscape maintenance)	3	--	--	3
Total Proposed Project with Expanded Transit Service Operational Greenhouse Gas Emissions	61,552	153	2,429	**69,702**

Source: ESA, 2010

GHGs are indirectly emitted as a result of the electricity required for a Proposed Project. GHGs are emitted during the generation of electricity from fossil fuels. When electricity is used in a building, some portion of the electricity generation typically takes place at a power plant, while other percentages are generated by renewable resources such as hydroelectric dams. The relative percentages of renewable and non-renewable resources vary from year to year based on the magnitude of available water flows at hydroelectric dams and other source variables. SFPUC receives a majority of its electricity from Hetch Hetchy hydroelectric sources. As a result, GHG emission rate data specific to SFPUC is one of the lowest for utilities in California. For 2007, the last verifiable year of analysis available, the SFPUC electrical emission factor was 39.53 pounds of CO_2e per Megawatt hour.[49]

[49] Ostrander, Calla, Climate Action coordinator, City of San Francisco Department of the Environment, e-mail communication, June 23, 2010.

Energy use in a building may be divided into (1) energy consumed by the built environment, and (2) energy consumed by uses that are independent of the construction of the building, such as plug-in appliances. In California, Title 24 governs energy consumed by the built environment, including the HVAC system, water heating, and some fixed lighting.

While BAAQMD's BGM program can quantify GHG emissions from electrical demand, it does not allow the user to adjust the statewide average emission factors which are currently using values from an incorrect CCAR source. Consequently, electrical GHG emissions were independently calculated using SFPUC-specific emission factors for the last verifiable year to achieve a more refined analysis.

Proposed Project electrical GHG emissions were calculated based on energy demand estimates contained in the 2009 Treasure Island Development Energy Study.[50] This study contains the results of an analysis undertaken to estimate building and site energy use for the Treasure Island/Yerba Buena Development Program. The analysis also defines profiles for this energy use, identifying how much energy is used annually. The resulting energy use quantities (for Tier 4 with 5 percent peak photovoltaic build out) were then converted to GHG emissions. The net Proposed Project-related electrical GHG emissions would be 1,030 MT of CO_2e per year.

Proposed Project Natural Gas Combustion Emissions

Proposed Project electrical GHG emissions were also calculated based on natural gas demand estimates contained in the 2009 Treasure Island Development Energy Study. GHG emission estimates from natural gas used the BAAQMD BGM program. The net Project-related natural gas GHG emissions would be 5,201 MT of CO_2e per year.

Area Sources

Area source emissions stem from hearths (including gas fireplaces, wood-burning fireplaces, and wood-burning stoves) and small mobile fuel combustion sources such as lawnmowers and other landscape maintenance equipment. Fuel combustion associated with these sources produce direct GHG emissions. Because emissions from project-wide natural gas demand are already included in the natural gas combustion estimate above, no separate calculation for gas fireplaces is necessary. Further, BAAQMD and the City and County of San Francisco restrict the installation of wood-burning fireplaces and stoves to pellet stoves or EPA-approved devices in new construction.[51] This analysis assumes that hearth emissions would be from natural gas

[50] ARUP, *TICD Treasure Island Development Energy Study*, Final, December 2009.

[51] BAAQMD Regulation 6, Rule 3-304; Effective for construction permits issued after January 1, 2009, no person or builder shall commence construction of a new building or structure permitted to contain or containing a wood-burning device or install a new wood-burning device resulting from a remodel unless the device meets the requirements of Section 6-3-303. Also see San Francisco Building Code Section 3110 (wood burning fireplace ban).

combustion and does not consider pellet stoves or wood burning fireplaces; therefore, fireplaces would not contribute to Project-related GHG emissions beyond what was assumed from natural gas demand.

An estimated net 3 MT of CO_2e would be generated annually by equipment used to maintain landscape associated with proposed new residential and commercial buildings. Emissions from landscape maintenance equipment used for proposed athletic fields and lawns are accounted for in the earlier analysis of carbon sequestration of these areas. While there will also be approximately 180 acres of open space and wetlands associated with the Proposed Project, these land uses do not require the same degree of maintenance (weekly to monthly operation of landscaping equipment) as manicured landscaping, and any seasonal emissions related to equipment operations such as for fire control, would not represent a substantial contribution to these estimated annual emissions.

Water and Wastewater Treatment and Conveyance

Municipal sources of GHG emissions that can contribute to a GHG inventory include drinking water supply and wastewater treatment. In general, the majority of municipal sector GHG emissions are related to the energy used to convey, treat, and distribute water and wastewater. Thus, these emissions are generally indirect emissions from the production of electricity to power these systems. Additional emissions from wastewater treatment include CH_4 and N_2O, which are emitted directly from the wastewater.

The 2009 *Final Treasure Island Development Energy Study* accounted for electrical demand associated with all on-Island infrastructure activities. This included:

- Wastewater treatment plant operations and distribution facilities;
- Recycled water treatment plant operations and distribution facilities;
- Storm water treatment distribution facilities (storm water treatment itself is through natural, non-energy consuming processes like bioswales); and
- Potable water distribution. (Potable water treatment was not included in that report's estimate, and is discussed more below.)

Therefore, GHG emissions from wastewater treatment and conveyance are already contained in the emissions estimate for electrical demand discussed previously.

Treatment of potable water would be done off-Island and was not included in the 2009 *Final Treasure Island Development Energy Study*. The amount of electricity required to treat and supply water to the Development Plan Area depends on the volume of water involved. As indicated in Section IV.K, Utilities and Service Systems, the Proposed Project would generate a net new water demand of 1.08 million gallons per day ("mgd"). This is total net new potable water demand without use of recycled water; if recycled water would be used, potable water treatment and associated energy use would decrease. Because the 2009 *Final Treasure Island Development Energy Study* included energy use associated with the treatment and conveyance of recycled water, but the GHG emissions for potable water treatment do not assume the use of any recycled water, this analysis is conservative. Additionally a small portion of conveyance pumping would occur on-island which is already accounted for in the calculation of on-island electricity. However, this increment is assumed to be relatively small, given the substantial distances of water conveyance pumping from sources in the Sierra Nevada Mountains.

While BAAQMD's BGM program can quantify GHG emissions from water demand treatment and conveyance, it does not allow the user to adjust the calculations to remove the wastewater treatment component. Consequently, water demand treatment and conveyance GHG emissions were independently calculated using the same methods and emission factors as BGM. In total, all off-island water treatment and conveyance for the Proposed Project is expected to produce approximately 455 MT of CO_2e annually.

Solid Waste Disposal Emissions

The Proposed Project's residential and non-residential uses would generate waste. A large percentage of this waste would be diverted from landfills either by waste generation reduction, recycling, or composting. San Francisco currently diverts a large portion of its waste generated (approximately 72 percent) and has goals to even further reduce the amount of waste sent to a landfill. The remainder of the waste not diverted would be disposed of at a landfill. Landfills emit GHG emissions associated with the anaerobic breakdown of material. The BAAQMD BGM model was used to estimate GHG emissions from solid waste generation. BGM uses waste disposal rates for the various land uses from values compiled by the CalRecycle (formerly the California Integrated Waste Management Board).[52] These are likely overestimates since they do not account for the recent increases in waste percentages that would be diverted from a landfill. BGM also includes emissions from haul trucks transporting waste to the landfill. The total GHG emissions from solid waste generation are predicted by BGM to be 4,544 MT CO_2e per year for the Proposed Project. These estimates are likely conservative given the fact that there are aggressive goals for waste reduction in San Francisco and that waste generation estimates are based on 1999 data (the most recent available) when statewide recycling rates were substantially lower than the present day 72 percent in San Francisco. Additionally, on-site composting would reduce the waste haul trips associated with waste generation assumed in the calculation.

[52] California Integrated Waste Management Board, Statewide Waste Characterization Study Results and Final Report. http://www.calrecycle.ca.gov/publications/LocalAsst/34000009.pdf, December, 1999, accessed July 3, 2010.

Off-Road Vehicle Emissions

Certain types of commercial and industrial land uses may use off-road equipment during their normal course of operations. Equipment such as fork lifts, generators, pumps, or compressors are commonly used in certain industries. Commercial uses proposed in the Project are ground-floor commercial uses that would not be expected to operate off-road vehicles. Therefore no Off-road GHG emissions are anticipated as part of the Proposed Project's long-term operations.[53]

Scenarios Analyzed for Transportation-Related Emissions

The Proposed Project consists of high-density, compact residential and commercial development located within walking distance of a Transit Hub to maximize walking, bicycling, and use of public transportation, and to minimize the use and impacts of private automobiles.

- As discussed in Chapter II, Project Description and Section IV.E, Transportation, the Proposed Project would include numerous elements that would reduce motor vehicle trips compared to a similar project without trip reduction elements (termed a "business as usual" or BAU project). Specifically, the impact analysis considers both the Proposed Project with Base Transit Service and with Expanded Transit Service. The Transportation Design Features that were assumed as part of each scenario were listed earlier in this Inventory.

Mobile Source (Motor Vehicle) Emissions – Proposed Project

The mobile source emissions considered for the Proposed Project would result from the typical daily operation of motor vehicles by residents and non-residents. Vehicle trip generation from the Proposed Project is based upon information from the *Treasure Island and Yerba Buena Island Redevelopment Plan Transportation Impact Study*. The Proposed Project would result in a net increase of 30,330 standard vehicle trips per day over existing conditions. URBEMIS2007 calculates the CO_2 emissions from motor vehicle trips based on trip generation and trip lengths. Vehicles associated with the Proposed Project (in excess of existing conditions) would emit approximately 48,299 MT CO_2e per year.

Mobile Source (Motor Vehicle) Emissions – Expanded Transit Service

The Proposed Project with Expanded Transit Service would result in reduced trip generation as a result of increased ferry and transit services provided with this mitigation measure. GHG emissions for this scenario were calculated in the same manner as the Proposed Project. The Proposed Project with Expanded Transit Service would result in a net increase of 25,466 standard vehicle trips per day over existing conditions, which would emit approximately 40,554 MT CO_2e per year.

[53] Off-road vehicle emissions associated with the construction of the Proposed Project were included in the Inventory as part of Construction-Related Activities.

Transit Service GHG Emissions – Proposed Project

Emissions from the Transit Hub are associated with increased public transport needed to serve the Proposed Project. GHGs are emitted from public buses when the vehicles are in transit and when the vehicles are idling at the curbside. The emissions are based on the net new miles and trips made by transit servicing the Proposed Project. The details of the net new transit service were provided by Fehr & Peers.

Bus emissions were estimated using emission factors for diesel buses generated by the EMFAC2007 model of ARB, daily vehicle bus trip generation provided by Fehr & Peers, and trip lengths estimated based on destinations.

The total amount of GHG emissions from the diesel transit service under the Proposed Project is estimated to be 972 MT of CO_2e per year. Additionally, there would be 120 daily alternatively fueled on-island shuttle trips generated by the Proposed Project. The type of alternative fuel has not been specified and for the purpose of this analysis was assumed to be compressed natural gas ("CNG") based on its ubiquity as an alternative bus fuel. GHG emissions from the alternative fueled shuttle busses are estimated to be approximately 258 MT of CO_2e per year.

Transit Service GHG Emissions – Expanded Transit Service

In addition to transit service to downtown Oakland, the Proposed Project with Expanded Transit Service would also provide additional SF Muni line 108 service to the Transbay Terminal and a new service line to the Civic Center area of San Francisco.

Although San Francisco uses carbon-free electricity to power its electric buses and trolleys, these vehicles do not and would not serve the Islands. While approximately 17 percent of the SFMTA non-electric bus fleet consist of hybrid buses that reduce fuel usage by 25 percent, as a conservative assumption, all new SFMTA bus trips were assumed to be diesel. Additionally, San Francisco transit buses use a 20 percent blend of biodiesel fuel (B20, 20 percent biodiesel, 80 percent petroleum diesel). Use of biodiesel reduces GHG emission based on a lifecycle analysis of fuel production. However exhaust emission of CO_2 from B20 have been demonstrated to be similar to that of standard diesel. Consequently, as a conservative analysis of GHG emissions, emissions from new SFMTA bus service under the Proposed Project with Expanded Transit Service are based on exhaust emissions only and are not based on life cycle considerations.[54,55]

[54] It is estimated however that the total lifecycle GHG emissions for biodiesel are 41 percent less than those from petroleum diesel.

[55] Hill, Jason, et.al., Environmental, *Economic and Energetic Costs and Benefits of Biodiesel and Ethanol Biofuels*, Proceedings of the National Academy of Science, June 2, 2006. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

The total amount of GHG emissions from the diesel transit service with Expanded Transit Service is estimated to be 1,906 MT of CO_2e per year. Similar to the Proposed Project with Base Transit Service, Expanded Transit Service would also generate 120 daily alternative-fueled on-island shuttle trips. GHG emissions from the alternative-fueled shuttle buses are estimated to be approximately 258 MT of CO_2e per year.

Ferry Service GHG Emissions – Proposed Project

Emissions from the proposed new ferry service were estimated using fuel consumption data provided by Elliot Bay Design Group specific to the types of ferries under consideration for the Proposed Project.[56] To be conservative, the analysis assumed t the engine and generator configuration with the maximum fuel consumption. The daily profile assumed 15 round trips with eight percent of the daily operations at commute speed, 10 percent of the daily operations at maneuvering speed, 15 percent of the daily operations at cruise speed, 25 percent of the daily operations at dock and 42 percent of the day idle (not in use) over a 24-hour period. Ferries were assumed to use shore power during idle time at the dock. The analysis used CCAR emission factors for CO_2, CH_4 and N_2O for diesel. GHG emissions from the ferry service are estimated to be approximately 3,245 MT of CO_2e per year.

Ferry Service GHG Emissions – Expanded Transit Service

The Proposed Project with Expanded Transit Service would increase ferry service from every 50 minutes (provided by a single ferry) under the Proposed Project to ferry service to San Francisco every 15 minutes (provided by three ferries). The same assumptions were used regarding times in mode for each ferry trip. GHG emissions for Expanded Transit Service were calculated in the same manner as the Proposed Project. Expanded Transit Service would result in approximately 9,737 MT CO_2e per year.

Total Annual GHG Emissions – Proposed Project

As shown in Table IV.H.3, on p. IV.H.36, using all the emission source categories quantified above, the total annual GHG emissions generated from the Proposed Project, with the design features related to energy use and transit, is approximately 70,028 MT CO_2e per year. The table shows that the majority of annual Proposed Project emissions is the result of vehicle use (69 percent), and is followed by amortized construction emissions (9 percent) and natural gas demand (7 percent).

[56] Elliot Bay Design Group, Memorandum to Wilson Meany Sullivan, August 15, 2009. A copy of this document is available for public review at the San Francisco Planning Department, 1650 Mission Street, Suite 400, in Case File No. 2007.0903E.

Total Annual GHG Emissions – Expanded Transit Service

As shown in Table IV.H.4, on p. IV.H.37, using all the emission source categories quantified above, the total annual GHG emissions generated from the Proposed Project with Expanded Transit Service with the design features related to energy use and transit is approximately 69,709 MT CO2e per year. The table reveals that the majority of annual Proposed Project emissions is the result of vehicle use (58 percent), followed by ferries, (14 percent), and amortized construction emissions (9 percent).

Project Impacts

Impact GHG-1: The Proposed Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. ***(Less than Significant)***

The Proposed Project construction activities would span approximately eighteen years and substantially increase residential density, provide new commercial services, construct new transit facilities, and improve existing utilities. Up to 8,000 new residential units would be built, increasing the existing on-site residential population by 16,830 in 2030. With the increased activity and population, the Proposed Project would contribute to annual long-term increases in GHG emissions. Increased GHG emissions would occur as a result of increased vehicle trips (mobile sources), new ferry and bus transit trips and increased energy use, water use, wastewater treatment, and solid waste disposal due to residential and commercial operations. Including construction related emissions and carbon sequestration, the Proposed Project would emit approximately 70,028 MT CO_2e per year while the Proposed Project with Expanded Transit Service would result in approximately 69,709 MT of CO_2e emissions per year. The recurring annual operational emissions of the Proposed Project would represent approximately 0.07 percent of the total 102.6 million MT CO_2e per year emitted in the Bay Area in 2007. These emissions are summarized in Tables IV.H.3 and IV.H.4, on pp. IV.H.36 and IV.H.37, for the Proposed Project and the Proposed Project with Expanded Transit Service, respectively.

As discussed above, BAAQMD is the only agency with jurisdiction over the Proposed Project that has adopted quantitative CEQA thresholds of significance for operational-related GHG emission impacts. The threshold of 4.6 MT CO_2e per year efficiency metric, based on the amount of a project's operational GHG emissions per year per capita of the service population, is appropriate for larger-scale mixed use projects such as the Proposed Project.

Although, the adopted 2010 BAAQMD CEQA Guidelines specifically state that they are not recommending a significance threshold relative to construction-related emissions of GHG's, the Guidelines do state that a lead agency should quantify construction related emissions and makes a determination of significance relative to them. For this reason amortized construction emissions were included in the inventory for the purposes of threshold comparison.

The resulting emissions for the Proposed Project and the Proposed Project with Expanded Transit Service can be divided by a service population calculated as the sum of 16,820 additional net new residents and 2,600 net new employees for a total service population of 19,420. This results in service population emissions of 3.6 MT/yr/service population for both the Proposed Project and the Proposed Project with Expanded Transit Service. Because service population-based emissions would be less than the BAAQMD significance threshold of 4.6 MT/year/service population, the Proposed Project and the Proposed Project with Expanded Transit Service would both have a less-than-significant impact with respect to emissions of GHG.

Impact GHG-2: The Proposed Project would not conflict with applicable plans, policies or regulations of an agency with jurisdiction over the Proposed Project adopted for the purpose of reducing the emissions of GHGs. *(Less than Significant)*

The analysis of Proposed Project emissions in the GHG emission inventory assumed certain Proposed Project design features. The land use mixes and basic land plan design included in the Project Description, presented in Chapter II, are fundamental aspects of the Proposed Project and include certain features assumed in the GHG emissions inventory, such as providing neighborhood-serving retail; providing automobile and transit connections between the Islands, San Francisco and the East Bay; providing for transportation and open space corridors; and integrating land use patterns with a multimodal street network that facilitates walking and cycling for internal trips and transit for trips of greater distance. Other Proposed Project features assumed in the GHG emission inventory are at a more conceptual design stage, such as landscape plans and plans related to energy efficiencies in building design.

With respect to consistency with AB 32 and its Climate Change Scoping Plan, this analysis acknowledges that BAAQMD derived the per-capita efficiency threshold that was applied in Impact GHG-1 from emission levels required to be met in order to achieve AB 32 goals.[57] Therefore, these quantitative thresholds also may be used to assess whether or not the Proposed Project would conflict with AB 32. Because the Proposed Project and the Proposed Project with Expanded Transit Service would emit GHG emissions less than the service population-based efficiency thresholds of the BAAQMD, which were derived based on AB 32 attainment goals, the Proposed Project would also not conflict with AB 32 and its associated planning efforts.

The City has also implemented several measures that require local government action, such as a Green Building Ordinance, a Zero Waste strategy, a Construction and Demolition Debris Recovery Ordinance, and a solar energy generation subsidy program, to realize meaningful reductions in GHG emissions. These programs (and including others not listed) collectively comprise San Francisco's GHG reduction strategy and continue San Francisco's efforts to reduce the City's greenhouse gas emissions to 20 percent below 1990 levels by the year 2012, a goal

[57] BAAQMD, *CEQA Guidelines Update Proposed Thresholds of Significance*, May 3, 2010, p. 11.

outlined in the City's 2004 Climate Action Plan. The City's GHG reduction strategy also furthers the State's efforts to reduce statewide GHG emissions as mandated by AB 32. Given that the City has adopted numerous GHG reduction strategies recommended in the AB 32 Scoping Plan, that the Proposed Project would be required to comply with these strategies as more particularly described in the summary of local requirements in "Regulatory Framework," above on p.IV.H.19 – IV.H.24, and that the City's GHG reduction strategy has produced measurable reductions in GHG emissions, the Proposed Project would not conflict with either the state or local GHG reduction strategies and would not result in a significant cumulative impact.

Improvement Measures

Improvement Measure I-GHG-1

While the Proposed Project would not result in a significant impact with regard to GHG emissions, BAAQMD Guidance encourages Lead Agencies to incorporate best management practices for the purposes of reducing construction-related GHG emissions. The following measures should be considered for implementation by the project sponsors and their contractors:

- Use of alternatively fueled (e.g., biodiesel, electric) construction equipment for at least 15 percent of the fleet;
- Use of local building materials for at least 10 percent of construction materials; and
- Recycling or reusing at least 50 percent of construction and demolition wastes.