Chapter 3

Affected Environment

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3 Affected Environment

This chapter describes the existing natural and human environment at Hunters Point Shipyard (HPS), defined as the affected environment. The affected environment is described by resource area: Transportation, Traffic, and Circulation; Air Quality and Greenhouse Gases (GHG); Noise; Land Use and Recreation; Visual Resources and Aesthetics; Socioeconomics; Hazards and Hazardous Substances; Geology and Soils; Water Resources; Utilities; Public Services; Cultural Resources; and Biological Resources. The region of influence (ROI) is also described for each resource area based on the physical extent of the resources that may be affected directly or indirectly by the proposed action and consideration of appropriate guidelines for resource and regulatory agencies or common professional practice. For some resources, such as Geology and Soils, the ROI is localized, while for others, such as Air Quality and GHG, it covers a larger region based on the relatively dispersive nature of the resource.

The affected environment description in this chapter represents the baseline condition for each environmental resource, which provides the basis for identifying and evaluating potentially significant environmental impacts that could be caused by the DoN's proposed disposal action and the city's proposed reuse.

As generally discussed in Chapter 2, the baseline used for the analysis of environmental impacts under NEPA reflects the conditions present at or about the time the EIS was initiated. For the purposes of this SEIS, the NEPA baseline represents the general conditions that existed at the time the Notice of Preparation (NOP) was published (August 2007). This 2007 baseline is also consistent with the baseline used for the *Candlestick Point – Hunters Point Shipyard Phase II Development Plan EIR*, which was approved by the SFRA and the San Francisco Planning Commission on 3 June 2010 and approved by the San Francisco Board of Supervisors on 13 July 2010. This baseline is considered conservative, as it would potentially result in a greater interval for environmental impact analysis than if a pre-closure baseline date was used. For certain resources, data were not available for 2007, so data from the closest available year were utilized as the baseline condition. For example, for the Hazards and Hazardous Substances resource baseline conditions were assumed to be as they existed from 2007 through 2009 during site cleanup operations. In addition, ambient baseline noise measurements at the project site were taken between 2007 and 2009.

This use of the 2007 baseline is different from the 2000 FEIS. The NEPA baseline considered in the 2000 FEIS was 1993 to reflect the condition of the shipyard before it was closed. In the case of closures of military installations, EIS documents often are initiated during the interval between full-scale military operations at the former military installation and commencement of the civilian redevelopment project being studied. However, the interval is temporary, constantly changing, and represents an administrative circumstance that may not provide a consistent and meaningful basis for measuring the environmental impacts of subsequent redevelopment. Thus, it can be appropriate to use the pre-closure conditions during full operations as a baseline to reflect the environmental impact of reuse. Therefore, in this SEIS, three important resource areas, Transportation, Traffic, and Circulation; Air Quality and GHG; and Noise resources utilize the 1993 shipyard operational condition as a baseline, in addition to the 2007 NEPA baseline, to provide analyses that are consistent with and comparable to the 2000 FEIS. For reference, the 1993 baseline condition analyses for Transportation, Traffic, and Circulation; Air Quality and GHG; and Noise are provided in Appendix M, 1993 Baseline Impacts Analysis.

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3.1 Transportation, Traffic, and Circulation

This section describes existing facilities and systems that make up the local and regional transportation network serving HPS. This description provides the basis for identifying and evaluating the potential impacts that could result from the DoN disposal action and the City and County of San Francisco's proposed reuse. Due to the cumulative nature of traffic impacts – which involve multiple interactions between all activities in a region, not just a single project – the impact assessment is based on projections for 2030 assuming all development currently planned has been implemented.

The transportation, traffic, and circulation analyses are based on information contained in the following documents:

- *Hunters Point Shipyard Reuse Final EIS/EIR* (2000 FEIR), SFRA and City and County of San Francisco Planning Department (File No. 1994.061E), dated 8 February 2000;
- *Candlestick Point-Hunters Point Shipyard Phase II Development Plan Transportation Study* (CP-HPS Transportation Study) Final Report, prepared by CHS Consulting, Fehr & Peers, and LCW Consulting, dated 9 November 2009;
- *Candlestick Point-Hunters Point Shipyard Phase II Development Plan Draft EIR*, SFRA (File No. ER06.05.07) and City and County of San Francisco Planning Department (File No. 2007.0946E), dated 12 November 2009; and
- *Candlestick Point-Hunters Point Shipyard Phase II Development Plan Project, Comments & Responses, Volume X: Comments & Responses (Appendices)*, SFRA (File No. ER06.05.07). City and County of San Francisco Planning Department (File No. 2007.0946E), and State Clearinghouse (No. 2007082168), dated 13 May 2010.

3.1.1 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 project site. These plans and policies include the San Francisco General Plan, the Better Streets Plan, the San Francisco Bicycle Plan, the San Francisco Bay Trail Plan, and the Transit-First Policy.

3.1.1.1 Federal

There are no federal transportation regulations applicable to the project site.

3.1.1.2 State

There are no state transportation regulations applicable to the project site.

3.1.1.3 Regional

There are no regional transportation regulations applicable to the project site.

3.1.1.4 Local

3.1.1.4.1 San Francisco General Plan

The Transportation Element of the City of San Francisco General Plan (General Plan) is composed of objectives and policies that relate to the nine aspects of the citywide transportation system: General, Regional Transportation, Congestion Management, Vehicle Circulation, Transit, Pedestrian, Bicycles,

Citywide Parking, and Goods Management. The Transportation Element contains the following objectives and policies that are directly pertinent to consideration of the proposed action:

- Use the transportation system as a means for guiding development and improving the environment. (Transportation Element Objective 2);
- 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. (Transportation Element Objective 2, Policy 2.1);
- Organize the transportation system to reinforce community identity, improve linkages among interrelated activities, and provide focus for community activities. (Transportation Element Objective 2, Policy 2.4);
- Improve bicycle access to San Francisco from all outlying corridors. (Transportation Element Objective 9);
- Where Bicycles are prohibited on roadway segments, provide parallel routes accessible to bicycles or shuttle services that transport bicycles. (Transportation Element Objective 9, Policy 9.2);
- 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. (Transportation Objective 11);
- 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. (Transportation Element Objective 14);
- Ensure that traffic signals are timed and phased to emphasize transit, pedestrian, and bicycle traffic as part of a balanced multimodal transportation system. (Transportation Element Objective 14, Policy 14.2);
- Improve transit operation by implementing strategies that facilitate and prioritize transit vehicle movement and loading. (Transportation Element Objective 14, Policy 14.3);
- 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. (Transportation Element Objective 14, Policy 14.4);
- 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. (Transportation Element Objective 14, Policy 14.7);
- 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. (Transportation Element Objective 18);
- 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. (Transportation Element Objective 18, Policy 18.2);
- 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. (Transportation Element Objective 18, Policy 18.4);
- Improve the city‘s pedestrian circulation system to provide for efficient, pleasant, and safe movement. (Transportation Element Objective 23);

- Widen sidewalks where intensive commercial, recreational, or institutional activity is present and where residential densities are high. (Transportation Element Objective 23, Policy 23.2);
- Maintain a strong presumption against reducing sidewalk widths, eliminating crosswalks, and forcing indirect crossings to accommodate automobile traffic. (Transportation Element Objective 23, Policy 23.3);
- Ensure convenient and safe pedestrian crossings by minimizing the distance pedestrians must walk to cross a street. (Transportation Element Objective 23, Policy 23.6);
- Improve the ambiance of the pedestrian environment. (Transportation Element Objective 24);
- Provide secure and convenient parking facilities for bicycles. (Transportation Element Objective 28);
- Provide secure bicycle parking in new governmental, commercial, and residential developments. (Transportation Element Objective 28.1);
- Provide parking facilities which are safe, secure, and convenient. (Transportation Element Objective 28, Policy 28.3);
- 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. (Transportation Element Objective 34);
- 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. (Transportation Element Objective 34, Policy 34.1);
- Permit minimal or reduced off-street parking for new buildings in residential and commercial areas adjacent to transit centers and along transit preferential street. (Transportation Element Objective 34, 34.3);
- Meet short-term parking needs in neighborhood shopping districts consistent with preservation of a desirable environment for pedestrians and residents. (Transportation Element Objective 35);
- Provide convenient on-street parking specifically designed to meet the needs of shoppers dependent upon automobiles. (Transportation Element Objective 35, Policy 35.1);
- Assure that new neighborhood shopping district parking facilities and other auto-oriented uses meet established guidelines. (Transportation Element Objective 35.2); and
- Make freeway and major surface street improvements to accommodate and encourage truck/service vehicles in industrial areas away from residential neighborhoods. (Transportation Element Objective 39).

The project site is relatively isolated from the rest of the city with limited connections to the broader transportation network. Existing pedestrian volumes and bicycle activity in the project vicinity are low throughout the day. Consistent with the objectives and policies of the General Plan, key goals of the proposed action are to prioritize walking, bicycling, and transit travel, making these attractive and practical transportation options.

3.1.1.4.2 Better Streets Plan

The *Better Streets Plan* (San Francisco Planning Department 2008a) focuses on creating a positive pedestrian environment through measures such as careful streetscape design and traffic calming measures to increase pedestrian safety.

3.1.1.4.3 San Francisco Bicycle Plan

The *San Francisco Bicycle Plan* (SFMTA 2009a) identifies near-term improvements that could be implemented within the next five years, as well as policy goals, objectives, and actions to support those improvements. It also includes long-term improvements and minor improvements that would be implemented to facilitate bicycling in San Francisco. The *San Francisco Bicycle Plan* includes five near-term and five long-term projects within the HPS project vicinity.

3.1.1.4.4 San Francisco Bay Trail Plan

The *2005 Gap Analysis Study* (ABAG 2005) prepared by ABAG, for the entire Bay Trail area, attempted to identify the remaining gaps in the Bay Trail System, classify the gaps by phase, county and benefit ranking, develop cost estimates for individual gap completion, identify strategies and actions to overcome gaps, and present an overall cost and timeframe for completion of the Bay Trail system. Within the project site, the *2005 Gap Analysis Study* proposes to connect existing Bay Trail segments that are located north and south of the project site by extending the trail along the waterfront of the Candlestick Point Recreation Area and through the project site along HPS. The proposed trail would then connect to the existing trail north of the project site along the India Basin shoreline. The *2005 Gap Analysis Study* also proposes an alternate, inland connection that is partially within the project site; the proposed trail travels east along Gilman Ave, continues north along Third St, and would ultimately connect to the existing waterfront portion of the trail near the India Basin via Yosemite Ave/Carroll Ave and Cargo Way.

3.1.1.4.5 Transit-First Policy

San Francisco's Transit-First Policy is a set of principles which underscore the city's commitment to giving priority to travel by transit, bicycle, and walking over travel by private automobile. All city boards, commissions, and departments are required by law to implement transit-first principles in concluding city affairs.

3.1.1.4.6 San Francisco Bay Plan

The San Francisco Bay Conservation and Development Commission (BCDC) has jurisdiction in the Coastal Zone of San Francisco Bay. The BCDC, through the San Francisco Bay Plan, has established a number of transportation-related policies including Policy No. 2 which relates to alternatives to additional bridges across the bay; Policy No. 3 relating to a preference for bridges over the bay rather than routes constructed on fill, clearance under bridges for vessels, and accommodating alternative modes of transportation as much as possible; and Policy No. 4 relating to providing bicycle and pedestrian access on the shoreline and on bridges and minimizing visual obstruction of bay views caused by transportation projects adjacent to the bay. The BCDC has permit authority over certain transportation-related projects and its Design Review Board reviews project designs, including bridges, subject to BCDC authority prior to Commission approval.

3.1.2 Operations Analysis Methodology

The existing operating characteristics of the street network in proximity to HPS were assessed based on data collected in 2007 and 2009. This analysis, described below, lays out both the existing transportation facilities and the current performance of those facilities.

3.1.2.1 Intersection Level of Service Methodology

The operating characteristics of signalized and unsignalized intersections are described by the concept of Level of Service (LOS). LOS is used to describe how efficiently an intersection operates. LOS ranges

from A (no major delays) to F (congestion and long delays). LOS A through D are considered excellent to satisfactory service levels, LOS E is undesirable, and LOS F conditions are unacceptable. Table 3.1.2-1 presents the LOS definitions for signalized and unsignalized intersections.

Table 3.1.2-1. LOS Definitions for Signalized and Unsignalized Intersections

Control/ LOS	*Description of Operations*	*Average Control Delay (seconds per vehicle)* [2]
Signalized		
A	Insignificant Delays: No approach phase is fully used and no vehicle waits longer than one red indication.	≤ 10.0
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.	> 55.0 and ≤ 80.0
F	Excessive Delays: Represents conditions at capacity, with extremely long delays. Queues may block upstream intersections.	> 80.0
Unsignalized		
A	No delay for STOP-controlled approach.	≤ 10.0
B	Operations with minor delays.	> 10.0 and ≤ 15.0
C	Operations with moderate delays.	> 15 and ≤ 25.0
D	Operations with some delays.	> 25.0 and ≤ 35.0
E	Operations with high delays and long queues.	> 35.0 and ≤ 50.0
F	Operations with extreme congestion, with very high delays and long queues unacceptable to most drivers.	> 50.0

Source: Transportation Research Board 2000.

3.1.2.2 Freeway and Ramp Level of Service Methodology

The LOS for a freeway section and on-/off-ramp junctions with the freeway are based on vehicle density (passenger cars per lane per mile) using the relationships presented in Table 3.1.2-2.

A ramp junction analysis is used to determine the operating conditions for ramp volumes merging with the freeway mainline traffic flow. Freeway ramps were evaluated using the *Highway Capacity Manual 2000* methodology (Transportation Research Board 2000) for ramp merge and diverge conditions. Service levels at the on- and off-ramps are determined based on density, as calculated using the freeway volumes and the ramp volumes at each study location.

Table 3.1.2-2. LOS Definitions for Freeway Mainlines and Ramp Junctions

LOS	*Maximum Density (Passenger Cars per Mile per Lane)*	
	Basic Freeway Sections	**Freeway Ramp Junctions**
A	< 11	< 10
B	> 11 to 18	> 11 to 20
C	> 18 to 26	> 20 to 28
D	> 26 to 35	> 28 to 35
E	> 35 to 45	> 35
F	> 45	Demand exceeds capacity

Source: Transportation Research Board 2000.

3.1.3 Existing Conditions Analysis

This section describes the transportation system that is used for traveling to and from HPS and the roadway network within the study area. The study area includes all aspects of the transportation network that may be measurably affected by the project. The region of influence (ROI) is defined by travel corridors and by facilities such as bus stops and transit stations. It generally covers US-101 and areas to the east bounded on the north by Cesar Chavez St and on the south by the San Francisco/San Mateo County boundary.

3.1.3.1 Regional Access

Travel to and from the project vicinity involves the use of regional transportation facilities, highways, and transit services that link San Francisco with other parts of the Bay Area and northern California. HPS is accessible by local streets with connections to and from regional freeways and highways in the state system.

The project vicinity is served by US-101, with freeway interchanges at the locations shown in Table 3.1.3-1. US-101 and I-280 merge approximately two miles north of Candlestick Point. North of the US-101/I-280 junction, US-101 merges with I-80 which leads to the Bay Bridge and the East Bay. Approximately two miles south of Candlestick Point, US-101 merges with I-380[1] near the San Francisco International Airport.

Figure 3.1.3-1 illustrates the locations of these regional highways in relation to HPS.

Table 3.1.3-1. Existing US-101 and I-280 On- and Off-Ramps

Description	*Northbound*		*Southbound*	
	On-Ramp	**Off-Ramp**	**On-Ramp**	**Off-Ramp**
US-101				
Harney Way and Alana Way/Beatty Ave	X	X	X	X
Third St/Bayshore Blvd/Hester Ave	X	X	X	X
Mansell St				X
Silliman St			X	X
Silver Ave		X		
Alemany Ave/Industrial St	X		X	X
Cesar Chavez St/Bayshore Blvd	X	X	X	X
I-280				
25th St/Indiana St/Pennsylvania Ave	X		X	X
Cesar Chavez St		X		

3.1.3.2 Local Roadway Network

The city is served by a grid of streets, some of which extend beyond city boundaries to connect to Daly City and San Mateo County. Major and secondary arterial roadways that provide access to HPS include Third St, Bayshore Blvd, Evans Ave, Innes Ave, and Cesar Chavez St. These roadways are briefly described below. Figure 3.1.3-2 shows the classification and location of local streets serving HPS.

Third St is the principal north/south arterial in the southeast part of San Francisco, extending from its interchange with US-101 and Bayshore Blvd to Market St in downtown. It is the main commercial street in the BVHP neighborhood and also serves as a through street and an access way to the industrial areas north and east of US-101. In the project vicinity, Third St has two travel lanes in each direction. On-street parking is generally permitted on one side of the street.

[1] I-380 is a 3.3-mile, east/west highway that connects I-280 in San Bruno with US-101 near the San Francisco International Airport.

Figure 3.1.3-1. Regional Roadway Network

Figure 3.1.3-2. Roadway Classification

The T-Third light rail operates in an exclusive median right-of-way, with the exception of the segment between Kirkwood and Thomas Avenues, where the light rail shares the travel lane with vehicles. In the General Plan, Third St is designated as a major arterial, a Transit Preferential Street (TPS), and a "route with significant truck traffic" for the segment between Jerrold Ave and Fourth St (Map 15 of the General Plan).

Bayshore Blvd is a north/south arterial that generally parallels US-101 with three travel lanes in each direction, separated by a median. The General Plan designates Bayshore Blvd as a major arterial, part of the Metropolitan Transportation System (MTS) Network, a Transit Preferential Street (other – secondary), and a Neighborhood Commercial Street. South of Arleta Ave, Bayshore Blvd is designated as a Transit Preferential Street (Primary – Transit Important). Bayshore Blvd is part of Bicycle Routes #25 and #5. The T-Third St light rail line runs along Bayshore Blvd between Hester Ave and Sunnydale Ave.

Evans Ave is an east/west arterial with two travel lanes in each direction that extends between Cesar Chavez St and Jennings St where it becomes Hunters Point Blvd. The General Plan identifies Evans Ave between Cesar Chavez St and Third St as a major arterial in the CMP Network and part of the MTS Network; between Third St and Jennings St it is identified as a secondary arterial and also part of the MTS Network. The General Plan also identifies Evans Ave as a "route with significant truck traffic" (Map 15). Evans Ave is part of Bicycle Route #68; and between Third and Jennings Streets, a bicycle lane is provided in each direction.

Innes Ave is an east/west arterial that provides direct access to HPS. It contains two travel lanes in each direction. The General Plan identifies Innes Ave as a secondary arterial and part of the MTS Network. It also identifies Innes Ave as a "route with significant traffic." Innes Ave is part of Bicycle Route #68.

Cesar Chavez St is a major east/west arterial between Douglass St to the west and the Port of San Francisco North Container Terminal, to the east of Third St. In the project vicinity, Cesar Chavez St generally has two or three travel lanes in each direction with a center median. West of Guerrero St, Cesar Chavez St has one lane in each direction. In the General Plan, Cesar Chavez St is identified as a major arterial in the Congestion Management Program (CMP) Network from Guerrero St to Third St, a secondary arterial east of Third St, and part of the MTS Network. It is also identified as a "route with significant truck traffic east of US-101" (Map 15 of the General Plan). Cesar Chavez St is part of Bicycle Route #60.

Secondary roadways include Cargo Way, Crisp Rd, Hunters Point Blvd, Industrial St, Ingalls St, Innes Ave (on HPS), Oakdale Ave, Palou Ave, and Silver Ave.

There are two access points into HPS: the North Gate (which now serves as the main gate) at the intersection of Innes Ave and Donahue St, and the South Gate (a secondary gate) on Crisp Rd. The South Gate is currently closed to traffic, except for emergencies. Evans and Innes Avenues (as far as the HPS entrance) are the only major arterial roadways directly serving HPS, with other major arterials also providing indirect access, as described previously.

Roadways within HPS that provide local circulation are Crisp Rd, Donahue St, Fisher Ave, Galvez Ave, I St, Lockwood St, Manseau St, Morrell St, Robinson St, and Spear Ave.

3.1.3.2.1 Truck Restrictions

The *San Francisco Transportation Code*, Section 501, restricts vehicles with a gross vehicle weight of more than 6,000 or more than 18,000 pounds from operating on identified streets. Within the project vicinity, this regulation was intended to discourage through truck traffic from using Third St or local residential streets to avoid congestion on the parallel freeways and to reduce the potential for conflicts between truck traffic and automobile traffic. Figure 3.1.3-3 illustrates the streets with truck restrictions.

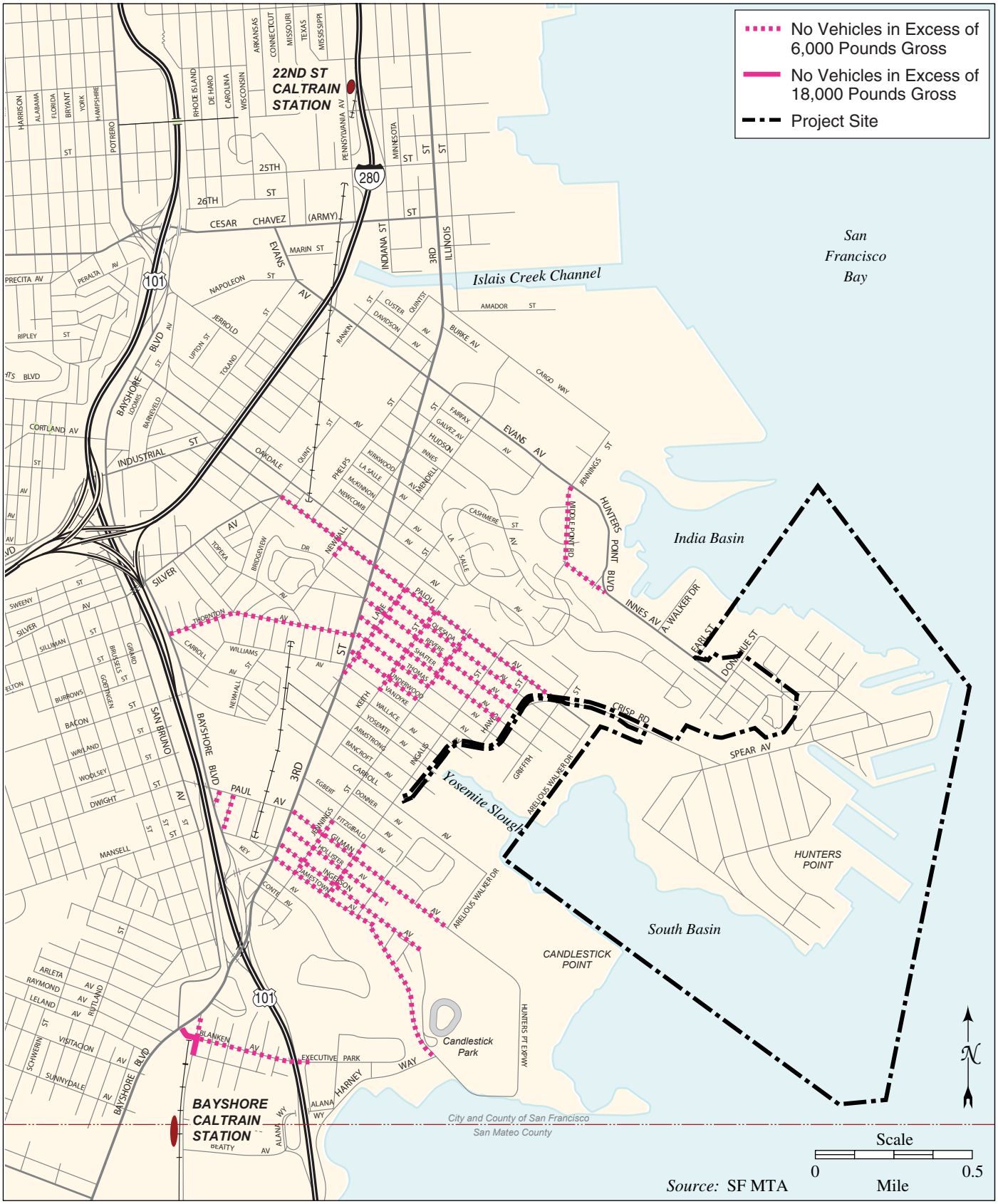


Figure 3.1.3-3. Existing Truck Restrictions

3.1.3.2.2 San Francisco Congestion Management Program (CMP)

The San Francisco CMP has identified US-101 and I-280 as part of the CMP roadway network, with a LOS standard of E. Of the freeway analysis segments on US-101 and I-280, only US-101 northbound, between the San Francisco-San Mateo county line and I-280 was identified operating at LOS F during the P.M. peak hour. The 2007 LOS Monitoring Report (SFCTA 2007) for the CMP roadway network indicates that during the A.M. peak period, US-101 northbound between Cortland St and the I-80 merge, as well as I-280 between Weldon St and the 6th St/Brannan St off-ramp operate at LOS E conditions. All other CMP roadway segments within the project vicinity operate at LOS D or better.

3.1.3.3 Traffic Operating Conditions

Existing traffic operating conditions for key freeway segments, ramps, and intersections in the study area were assessed based on various sources. Operating conditions were determined using existing intersection and roadway traffic count data collected in November and December 2007, and June 2009. Recent freeway and ramp volumes were obtained from Caltrans.

3.1.3.4 Existing Conditions Level of Service

Traffic conditions at 14 existing intersections were evaluated: five intersections within HPS and the remaining nine intersections located in the project vicinity. Figure 3.1.3-4 presents the study area analysis locations. In addition to intersections, three freeway mainline locations and 11 on- and off-ramps were analyzed.

3.1.3.4.1 Intersection Operations

Existing conditions on regional facilities and at local intersections were analyzed for the weekday A.M. (8:00 to 9:00 A.M.) and P.M. (5:00 to 6:00 P.M.) peak hours, and for Sunday (no football game) P.M. peak hour (4:00 to 5:00 P.M.) conditions. The weekday A.M./P.M. peak hours consider the current morning and evening commute periods. The Sunday P.M. peak hour would coincide with the time that afternoon football games typically end, and the majority of the spectators depart the stadium. No traffic counts are available at the five intersections within HPS for the Sunday afternoon peak, so the highest weekday morning peak conditions are used to estimate Sunday peak hour conditions, consistent with the Institution of Transportation Engineers Trip Generation Manual guidance. LOS calculations are provided in Table 3.1.3-2. Figure 3.1.3-5 shows the existing weekday A.M. and P.M. peak hour volumes for the study area intersections, and Figure 3.1.3-6 shows the estimated existing Sunday P.M. peak hour volumes.

During the weekday A.M./P.M., and Sunday P.M. peak hours, all study intersections operate at LOS D or better.

3.1.3.4.2 Freeway Mainline and Ramp Operations

The LOS for a freeway section is based on vehicle density (passenger cars per lane per mile). Caltrans' policy is to maintain freeway mainline and ramp operations at the LOS C/D threshold based on the *Guide for the Preparation of Traffic Impact Studies* (Caltrans 2002). However, Caltrans acknowledges that this may not always be feasible, and if an existing facility is operating at less than the appropriate target LOS, the existing service level should be maintained. All analysis segments experience LOS E or LOS F conditions during the commute periods. Existing operating conditions at the freeway mainline segments are provided in Table 3.1.3-3.

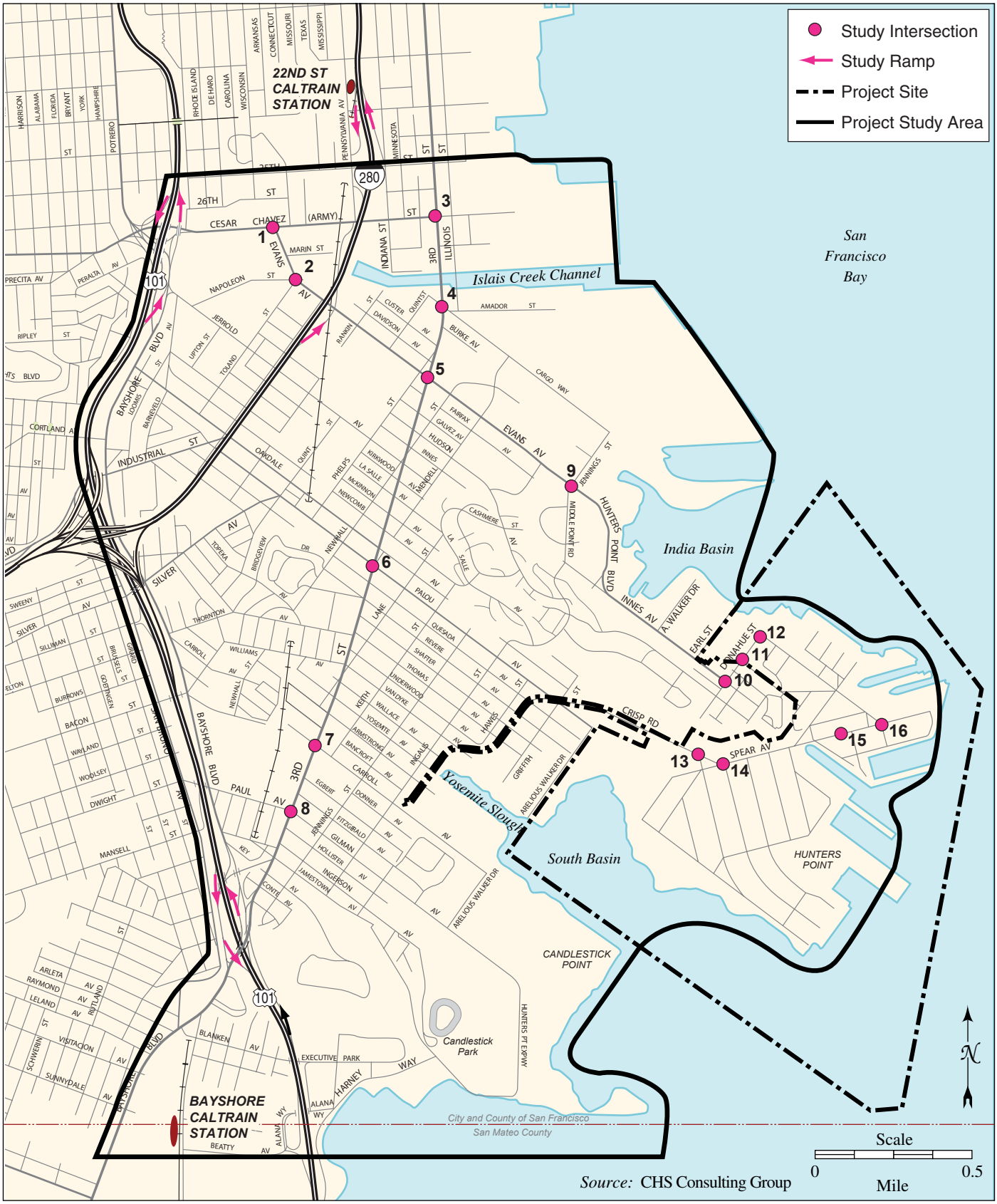
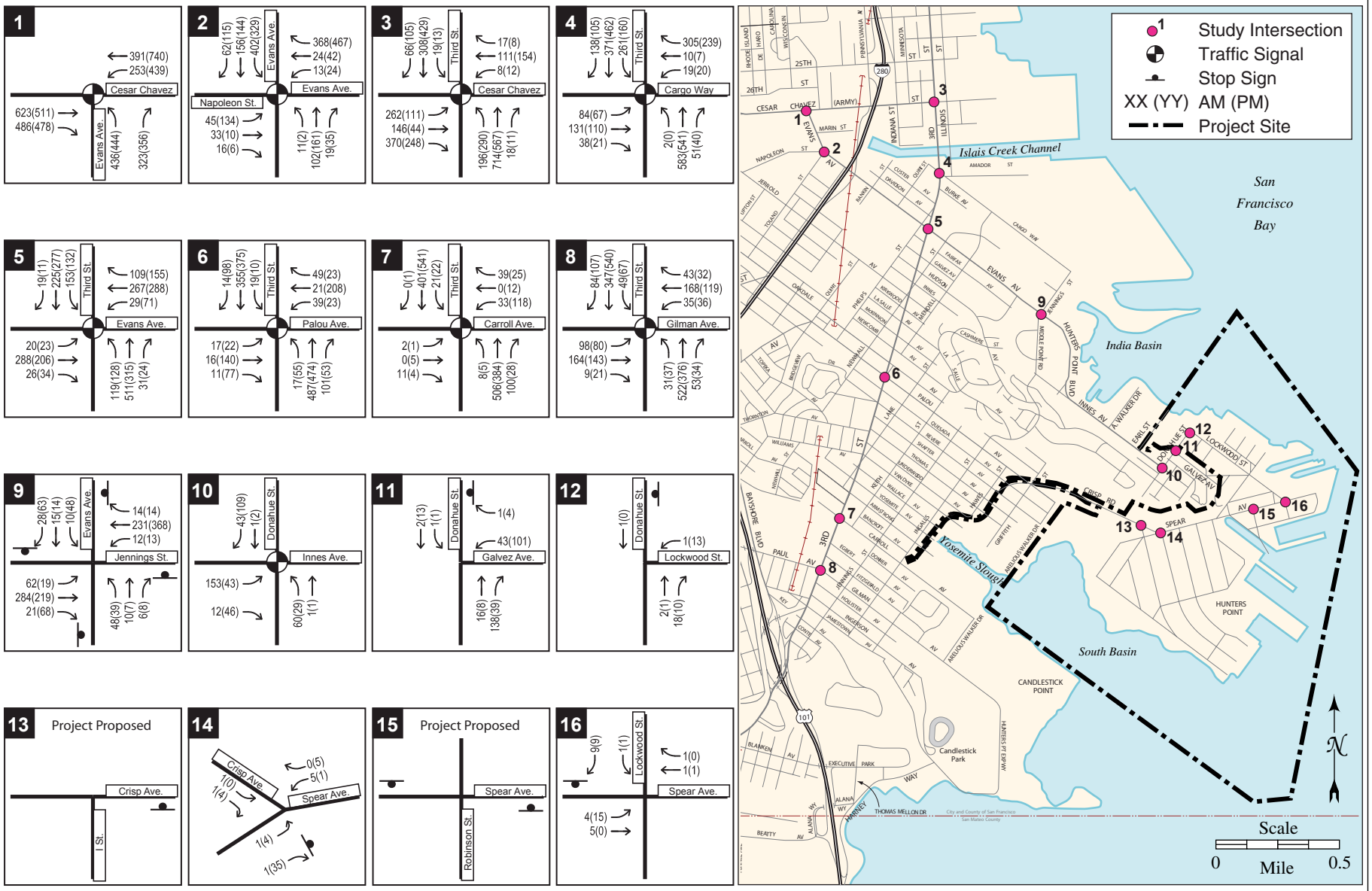
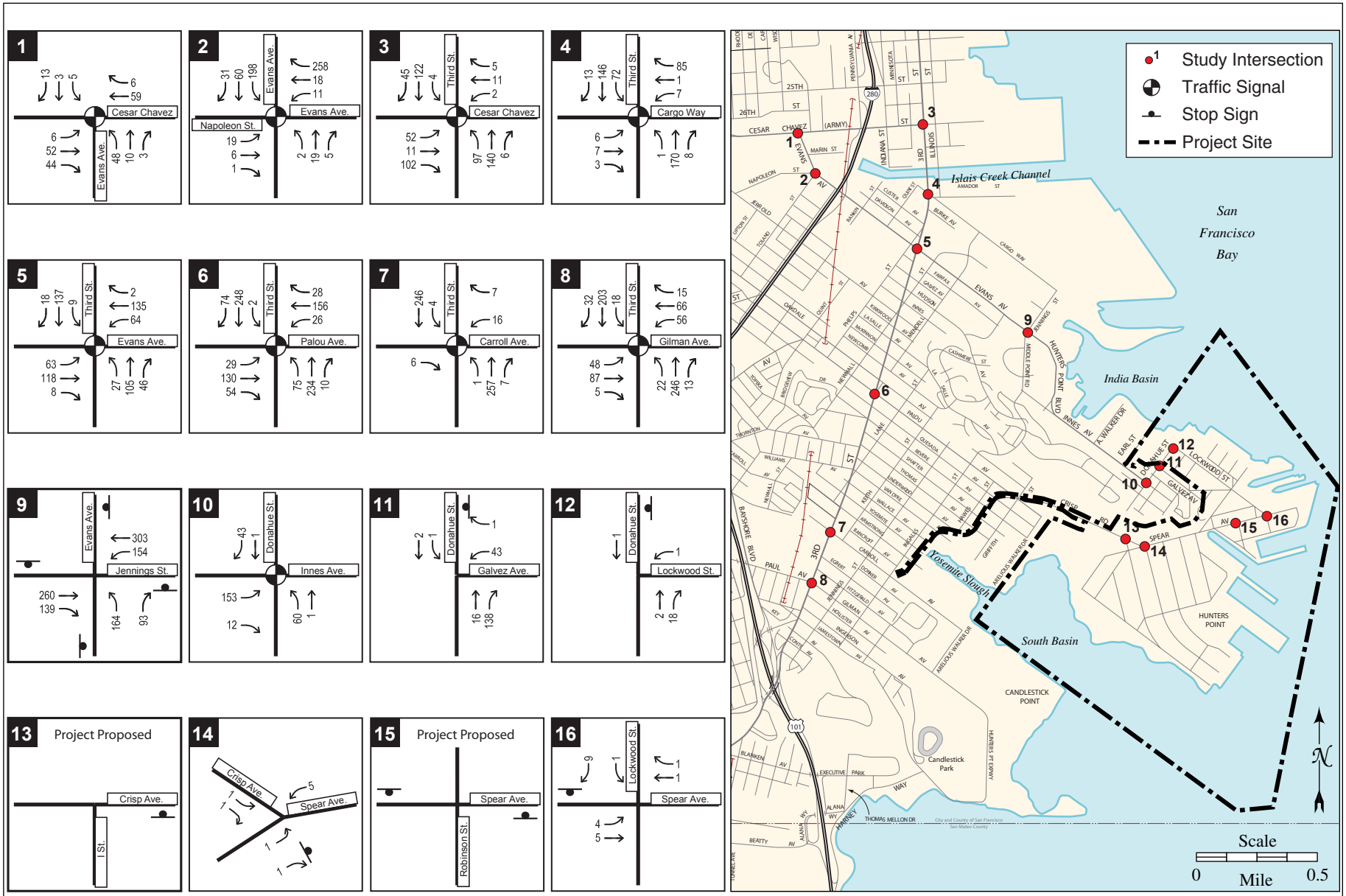


Figure 3.1.3-4. Existing Study Area Analysis Locations



Source: CHS, Hunters Point Shipyard Supplemental EIS

Figure 3.1.3-5. Existing Intersection Volumes - A.M. and P.M. Peak Hour



Source: CHS, Hunters Point Shipyard Supplemental EIS

Figure 3.1.3-6. Existing Intersection Volumes - Sunday P.M. Peak Hour

Table 3.1.3-2. Intersection LOS – Existing Conditions

Intersection		Traffic Control[5]	A.M. Peak Hour		P.M. Peak Hour		Sunday P.M. Peak Hour	
			Delay[3]	LOS[4]	Delay	LOS	Delay	LOS
City and County of San Francisco Streets								
#1002	Third St/Cesar Chavez St[1]	Signal	36.2	D	31.2	C	23.4	C
#1003	Third St/Cargo Way[1]	Signal	22.9	C	19.9	B	17.1	B
#1004	Third St/Evans Ave[1]	Signal	34.8	C	33.6	C	31.9	C
#1006	Third St/Palou Ave[1]	Signal	14.5	B	29.8	C	29.2	C
#1008	Third St/Carroll Ave[1]	Signal	11.9	B	14	B	9.2	A
#1009	Third St/Paul Ave/Gilman Ave[1]	Signal	27.1	C	24.2	C	21.1	C
#1016	Evans Ave/Cesar Chavez St[1]	Signal	21.1	C	21	C	14.6	B
#1048	Jennings St/Middle Point Rd/Evans Ave[1]	Signal	9.2	A	10.1	B	7.6	A
#1058	Evans Ave/Napoleon St/Toland St[1]	Signal	37.1	D	45.5	D	31.5	C
Hunters Point Shipyard Streets								
#110	lnnes Ave/Donahue St[2]	Signal	14.8	B	11.5	B	14.8	B
#111	Donahue St/Galvez Ave	TWSC	8.7	A	9.0	A	8.7	A
#112	Donahue St/Lockwood St[2]	TWSC	8.6	A	8.6	A	8.6	A
#113	Crisp Rd/I St[2]	TWSC	n/a	n/a	n/a	n/a	n/a	n/a
#114	Crisp Rd /Spear Ave[2]	TWSC	8.4	A	8.4	A	8.4	A
#115	Spear Ave/Robinson Ave[2]	TWSC	n/a	n/a	n/a	n/a	n/a	n/a
#116	Spear Ave/Lockwood St[2]	TWSC	8.4	A	8.4	A	8.4	A

Notes:
1. CHS Consulting Group, *et al*. 2009.
2. CHS Consulting Group, *et al*. 2010.
3. Delay in seconds per vehicle. For side street stop-controlled intersections, delay and LOS presented for worst approach.
4. LOS based on 2000 Highway Capacity Manual (Transportation Research Board 2000).
5. Signal = intersection is controlled by a traffic signal; TWSC = intersection is controlled by a stop-sign on the side street approach.

Sources: CHS Consulting Group, *et al*. 2009; CHS Consulting Group, *et al*. 2010.

Table 3.1.3-3. Freeway LOS – Existing Conditions

Screenline Location	Direction	A.M. Peak Hour		P.M. Peak Hour		Sunday P.M. Hour	
		LOS[1]	Density[2]	LOS	Density	LOS	Density
US-101 San Francisco County Line	NB	D	33.8	**E**	**42.3**	C	21.9
	SB	**E**	**43.0**	**E**	**36.0**	C	21.4
San Francisco/Oakland Bay Bridge	EB	D	34.6	**F**	**>45**	**E**	**40.9**
	WB	**F**	**>45**	**E**	**37.3**	D	33.9
I-280 south of US-101	NB	**E**	**39.1**	C	23.9	B	15.6
	SB	C	23.9	**F**	**>45**	D	27.0

Notes:
NB – northbound; SB – southbound; EB – eastbound; WB – westbound.
1. LOS based on 2000 Highway Capacity Manual (Transportation Research Board 2000).
2. Density of vehicles per segment.

Source: CHS Consulting Group, *et al*. 2009.

Existing operating conditions at the freeway ramp junctions are provided in Table 3.1.3-4. During the weekday A.M. and P.M. peak hours, all of the ramps currently operate at LOS D or better, with the exception of the #2 US-101 northbound on-ramp from Bayshore Blvd/Cesar Chavez St, #3 US-101 southbound off-ramp to Cesar Chavez St, #8 I-280 northbound off-ramp to Cesar Chavez St, and #10 southbound off-ramp to Pennsylvania Ave.

Table 3.1.3-4. Ramp LOS – Existing Conditions						
Freeway	***On-/Off-Ramp***			***Peak Hour***	***Density[1]***	***LOS[2]***
US-101	#1	NB Off-ramp	To Bayshore Blvd/Cesar Chavez St	A.M.	34.9	D
				P.M.	24.7	C
				Sunday	20.8	C
	#2	NB On-ramp	From Bayshore Blvd/Cesar Chavez St	A.M.	**>45**	**F**
				P.M.	19.6	B
				Sunday	26.1	C
	#3	SB Off-ramp	To Cesar Chavez St	A.M.	**>45**	**F**
				P.M.	**>45**	**F**
				Sunday	**37.5**	**E**
	#4	NB Off-ramp	To Third St/Bayshore Blvd	A.M.	24.4	C
				P.M.	27.8	C
				Sunday	18.6	B
	#5	NB On-ramp	From Third St/Bayshore Blvd	A.M.	23.5	C
				P.M.	26.4	C
				Sunday	18.9	B
	#6	SB Off-ramp	To Bayshore Blvd/Third St	A.M.	28.6	D
				P.M.	26.9	C
				Sunday	19.7	B
	#7	SB On-ramp	From Bayshore Blvd/Third St	A.M.	30.0	D
				P.M.	26.5	C
				Sunday	16.5	B
I-280	#8	NB Off-ramp	To Cesar Chavez St	A.M.	**>45**	**F**
				P.M.	28.4	D
				Sunday	19.2	B
	#9	NB On-ramp	From Indiana St/25th St	A.M.	33.4	D
				P.M.	27.4	C
				Sunday	18.4	B
	#10	SB Off-ramp	To Pennsylvania Ave/25th St	A.M.	23.6	C
				P.M.	**36.7**	**E**
				Sunday	27.0	C

Notes:
NB – northbound; SB – southbound; EB – eastbound; WB – westbound.
1. Density of vehicles per segment.
2. LOS based on 2000 Highway Capacity Manual (Transportation Research Board 2000).

3.1.3.5 Transit

Local transit service within the study area is provided by the San Francisco Municipal Railway (Muni) bus and light rail lines, which can be used to access regional transit operators. Service to and from the East Bay is provided by Bay Area Rapid Transit (BART), Alameda-Contra Costa Transit District (AC Transit), and ferries; service to and from the North Bay is provided by Golden Gate Transit buses and ferries; and service to and from the Peninsula and South Bay is provided by Caltrain, San Mateo County Transit District (SamTrans), and BART.

Figure 3.1.3-7 illustrates the Muni bus and light rail lines serving the study area. Table 3.1.3-5 summarizes the frequency of service for those Muni bus and light rail lines. Peak period service on most lines is at 15-minute-or-less headways between buses. The 54-Felton has headways between buses of 20 minutes and the 56-Rutland has headways of 30 minutes between buses.

Figure 3.1.3-7. Existing Transit Network

Table 3.1.3-5. Muni Lines Serving Project Study Area			
Route	***Frequency of Service (average time in minutes)***		
	A.M. Peak Period (7:00 to 9:00 A.M.)	**Midday Period (9:00 A.M. to 4:00 P.M.)**	**P.M. Peak Period (4:00 to 6:00 P.M.)**
9-San Bruno	7.5	10	7.5
9X-Bayshore Express	10	10	10
9AX-Bayshore "A" Express	10	—	10
9BX-Bayshore "B" Express	15	—	10
19-Polk	10	24	10
23-Monterey	15	20	14
24-Divisadero	8.5	10	10
28L-19th Ave	10	—	10
29-Sunset	10	15	10
44-O-Shaughnessey	6	15	7.5
48-Quintara-24th St	12	20	12
54-Felton	20	20	20
56-Rutland	30	30	30
T-Third LTR line	8.5	10	8.5

Notes:
Muni service has been changed since the analysis was prepared.
- Frequency of service changes occurred at: 9, 19, 23, 24, 44, and T.
- Line number changes occurred for: 9X, 9AX, and 9BX to 8X, 8AX, and 8BX.
- New line addition: 9L.

Source: SFMTA, Fehr & Peers 2009.

BART operates regional rail transit service connecting San Francisco with the East Bay and northern San Mateo County. BART provides service along Market and Mission Streets and near the western I-280 corridor in San Francisco. Transit connections can be made to the following BART stations from the project site: Civic Center Station via the 19-Polk bus from HPS; Balboa Park Station via the 29-Sunset from Candlestick Point; Glen Park Station via the 23-Monterey from the South Gate and the 44-O'Shaughnessy from Evans Ave near the North Gate; and the Embarcadero station via the T-Third light rail (LRT) line from Third St in the project vicinity. BART operates at service frequencies of three minutes in the peak periods for intra-San Francisco travel.

Caltrain provides rail passenger service on the Peninsula and the Santa Clara Valley lines between Gilroy and San Francisco. The Peninsula Corridor Joint Powers Board (JPB) – a joint powers agency consisting of San Francisco, San Mateo, and Santa Clara Counties – operates the service. The closest active Caltrain station to the study area is the Bayshore station in Brisbane at the San Mateo/San Francisco border, on Tunnel Ave just southeast of Bayshore Blvd. Not all trains stop at the Bayshore Station; during the peak commute periods, one train per hour in each direction stops at the Bayshore Station. There are no direct connections with other transit services. However, Muni and SamTrans can be accessed by walking two to three blocks to bus stops along Bayshore Blvd.

SamTrans, operated by the San Mateo County Transit District, provides bus service between San Mateo County and San Francisco. SamTrans operates five bus lines that serve San Francisco, including four routes into the downtown area. Only two routes – the 292 and 397 – serve the Bayview neighborhood along Bayshore Blvd; and only Route 292 operates during peak hours. Headways during the peak commute periods are approximately 20 minutes per line. There are no direct SamTrans services to Candlestick Point, except during football game days.[2]

[2] In 2008 SamTrans service to the stadium was taken over by Silverado Stages.

AC Transit is the primary bus operator for the East Bay, including Alameda and western Contra Costa Counties. AC Transit operates 37 routes between the East Bay and San Francisco, all of which terminate at the Transbay Transit Terminal, located on Mission St, between First and Fremont Streets. Most Transbay service is peak-hour and peak-direction (to San Francisco during the A.M. peak period and from San Francisco during the P.M. peak period) with headways of 15 to 30 minutes per route. To access Hunters Point, AC Transit riders must transfer at the Transbay Terminal to the T-Third LRT line and then to the 29-Sunset bus at Paul Ave.

The **Golden Gate Bridge, Highway, and Transportation District** provides bus service between the North Bay (Marin and Sonoma Counties) and San Francisco. Golden Gate Transit can be accessed from the study area via the T-Third LRT line, with a transfer at the Transbay Terminal.

The Golden Gate Bridge, Highway, and Transportation District also provides ferry service between the North Bay and San Francisco. Ferries operate between Larkspur and San Francisco and between Sausalito and San Francisco. The San Francisco terminal is at the Ferry Building, on The Embarcadero at Market St. Access to the Ferry Building would require travel on the T-Third LRT line to the Embarcadero station.

3.1.3.6 Bicycles

Existing bicycle facilities in the study area include routes that are part of the San Francisco Bicycle Network, and regional bicycle routes as a part of the San Francisco Bay Trail system. Bikeways are typically classified as Class I, Class II, or Class III facilities.[3] Class I bikeways are bike paths with exclusive right-of-way for use by bicyclists or pedestrians. Class II bikeways are bike lanes striped within the paved areas of roadways and established for the preferential use of bicycles. Class III bikeways are signed bike routes that allow bicycles to share travel lanes with motorized vehicles. Figure 3.1.3-8 presents the bicycle routes within the study area, as identified in the Official San Francisco Bike Route System. Figure 3.1.3-9 presents the existing Bay Trail facilities and the Bay Trail facilities proposed under the Bay Trail Plan (Refer to Section 3.4, Land Use and Recreation, for a further discussion of the Bay Trail and Bay Trail Plan).

In June 2009, the San Francisco Bicycle Plan was approved by the SFMTA Board. Near-term improvement projects on the existing bicycle network in the study area are noted below, and both near-term and long-term improvements are described in detail in the section 4.1.1.2.2.

Route #5: The easternmost north/south bicycle route that runs between Visitacion Valley and North Beach; it is a Class III facility along Third St and Illinois St, and a Class II facility along Bayshore Blvd (south of US-101), The Embarcadero, and much of San Bruno Ave. Since southbound Third St does not cross US-101 to connect with Bayshore Blvd, southbound Route #5 is routed onto Paul Ave (via Route #705) and San Bruno Ave (Route #25). Route #5 connects with a regional bicycle route in Brisbane.

Route #7: Class III bike route between Mariposa St and Carroll Ave, via Indiana St, Third St, Phelps St, Palou Ave, and Keith St. Route #7's southern terminus is at Keith St and Carroll Ave at the Bayview Playground. Wider travel lanes allow bicyclists to ride outside the vehicle travelway on sections of Indiana and Phelps Streets and on Keith St.

Route #25: A Class III facility that runs along San Bruno Ave, Bayshore Blvd, and Oakdale Ave in the BVHP area.

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

Figure 3.1.3-8. Existing San Francisco Bicycle Route Network

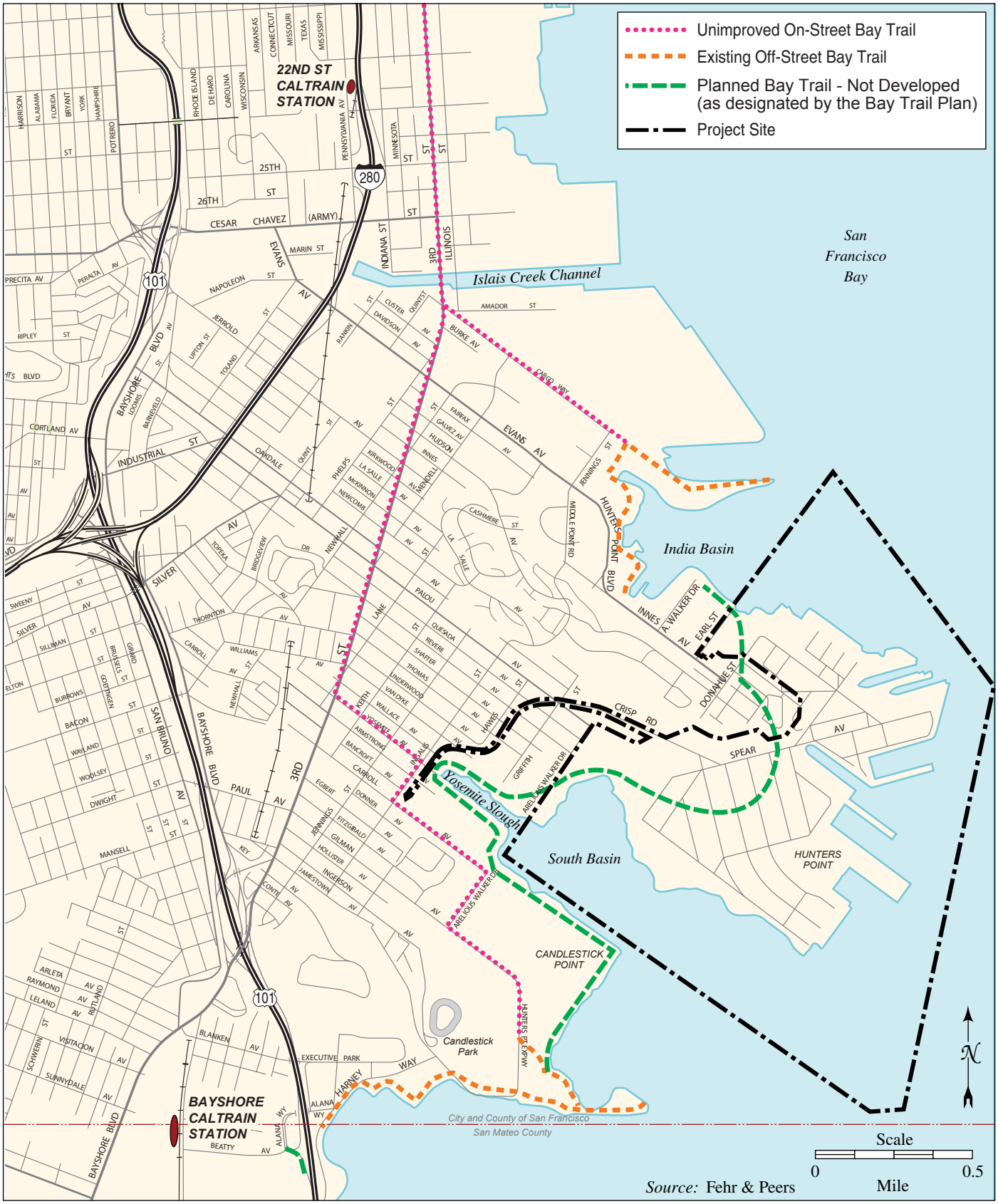


Figure 3.1.3-9. Existing San Francisco Bay Trail Plan Route

Route #60: A Class III facility along Cesar Chavez St between Bayshore Blvd and Mississippi St, and a Class II facility between Mississippi and Illinois Streets.

Route #68: Class II bike lanes run from the Innes gate at HPS north along Innes Ave, Hunters Point Blvd, and Evans Ave to Cesar Chavez St with Class II bike lanes on both sides of Evans Ave and Hunters Point Blvd between Innes Ave and Third St.

East-West Route #70: Class III facility that runs along Palou Ave, Silver Ave, and Monterey Blvd between the BVHP area and West Portal. The eastern terminus of this route is currently the Crisp Rd south gate to HPS at Griffith St and Palou Ave.

Route #170: Class II bicycle lanes on both sides of the street along Oakdale Ave between Third St and Bayshore Blvd.

Route #805: Class III facility that connects between Beatty Ave and Tunnel Ave (near the Bayshore Caltrain Station) in Brisbane and Third St and Carroll Ave. This route passes Candlestick Park stadium and the Candlestick Point State Recreation Area via Harney Way, Hunters Point Expressway, Gilman Ave, Arelious Walker Dr, and Carroll Ave.

Route #905: A Class III route that runs along Tunnel Ave south, east of Bayshore Blvd, that connects with regional bicycle routes to the south in Brisbane and South San Francisco.

Route #907: A Class II route that runs along Indiana St between Cesar Chavez St and the embankment at Islais Creek, where it dead-ends.

Route #925: A Class III route that runs along Blanken Ave between Tunnel Ave and Bayshore Blvd, connecting Routes #5 and #905.

The San Francisco Bay Trail is designed to create recreational pathway links to the various commercial, industrial, and residential neighborhoods that surround the San Francisco Bay. The trail connects points of historic, natural, and cultural interest and recreational areas such as beaches, marinas, fishing piers, boat launches, and over 130 parks and wildlife preserves totaling 57,000 ac (23,000 ha) of open space. At various locations, the Bay Trail consists of paved multi-use paths, dirt trails, bike lanes, sidewalks, or city streets signed as bike routes.

Within the study area, the Bay Trail has two discontinuous segments of existing, off-street pathways: one in the area of Candlestick Point and Harney Way, and another segment which partially surrounds India Basin. The Bay Trail currently bridges the gap between Islais Creek and Candlestick Point with an inland route that shares portions of Gilman Ave, Arelious Walker Dr, Carroll Ave, Ingalls St, Yosemite Ave, and Third St. An improved trail exists in the southern part of the Candlestick Point State Recreation Area where public access improvements have been made, but the northern section is unimproved within the project site. The trail starts northeast of the US-101 northbound Harney Way ramps. Portions of the Bay Trail are also improved to the northeast of the HPS within the India Basin Open Space and Shoreline Parks.

While the Bayview Hill and the Hunters Point hill are steep enough to pose challenges for bicyclists, the majority of the study area is relatively flat with limited changes in grades, facilitating bicycling within and through the area. East of Third St, there are active and inactive rail tracks within the roadways that could impede bicycle travel.

Bicycle activity in the study area is generally low. Weekday A.M. and P.M. peak period and Saturday midday period bicycle volume counts were conducted on Third St, Oakdale Ave, and Evans Ave. Hourly bicycle volumes ranged between 1 and 30 bicyclists per hour (Appendix D – CP-HSP DEIR [SFRA 2009]), with the greatest number of bicyclists on Third St and on Oakdale Ave. More bicyclists were observed on weekdays than weekends.

3.1.3.7 Pedestrians

Pedestrian facilities within the project vicinity vary between the areas on the east side of Third St and the industrial land uses surrounding the Caltrain rail corridor on the west side of Third St. On the west side of Third St, many of the commercial facilities surrounding the railroad mainline have partial or no sidewalks. Several of the streets in this area have active and inactive railroad tracks and many of the former industrial and storage buildings in the area retain large raised freight loading/unloading platforms abutting the street.

On Third St and on the residential streets immediately surrounding Third St, most of the streets have sidewalks on both sides. In the light manufacturing areas surrounding Yosemite Slough some streets do not have sidewalks and are frequently obstructed by illegally parked vehicles and/or vehicles loading. The extent, condition, and usability of the sidewalks generally decrease closer to Yosemite Slough (within the project vicinity). There are also gaps in the sidewalk network on Innes Ave approaching HPS.

3.1.3.8 Existing Game Day Conditions

The additional traffic added to the transportation network following a football game at Candlestick Park results in substantial congestion on local streets between parking facilities and the freeway, and on the freeways, particularly where game day traffic merges with other traffic already on the freeway.

3.1.3.8.1 Football Game Frequencies

Candlestick Park currently serves as the home of the San Francisco 49ers football team. The existing Candlestick Park stadium typically hosts up to 12 games per year, including eight regular season games, typically two pre season games, and for teams that qualify for playoffs, typically two post-season games. Professional football games on the west coast are typically scheduled for 1:00 P.M. (Pacific Time) on Sundays, from September through early December. The post-season runs into January and games can be played on either Saturday or Sunday. The typical duration of a football game is approximately three hours.

3.1.3.8.2 Pre-Game and Post-Game Conditions

Ingress and Egress Routes

Vehicles access Candlestick Park by several routes, depending on the level of congestion and the vehicles' point of origin. Most vehicles arriving from the south (San Mateo and Santa Clara Counties, as well as traffic from Alameda County using the San Mateo or Dumbarton Bridges) use northbound US-101 and enter the site via the Harney Way exit. Vehicles from the north coming from either I-280 or US-101 use the Silver Ave, Paul Ave, Bayshore Blvd/Third St or the Alana Way/Beatty Ave exits to reach the north access routes (Carroll Ave, Gilman Ave, and Jamestown Ave) to the stadium. In order to accommodate peak inbound and outbound traffic volumes generated by the largest special events at Candlestick Park, traffic lanes on Harney Way and on the roadway surrounding the Candlestick Park parking lot (Jamestown Ave Extension, Hunters Point Expressway and part of Gilman Ave) are reversed on event days. Overhead Lane Use Control Signals are used to designate the direction of each lane.

Traffic Operations

Pre-Game Conditions: For a typical Sunday football game starting at 1:00 PM, vehicle arrival is spread over about six hours with approximately 40 percent of the vehicles arriving between one and two hours prior to the game start time, and 60 percent within the other five hours prior to the game. Since the arrival is spread out over a period of time, the game-related traffic does not substantially affect traffic flow on the study area freeways. During a recent Sunday football game, some localized congestion was observed at US-101 northbound upstream of the Harney Way exit, as vehicles queued up from Harney Way and on US-101 southbound upstream of the Alana Way/Beatty Ave exit. The vehicles accessing the stadium from Third St contribute to congestion and queues on the local residential streets, including Third St, Gilman Ave, Carroll Ave and Jamestown Ave. In September 2009, a pedestrian bridge was installed on Hunters Point Expressway at the location of the pedestrian crossing to the State Park parking lots. Since installation of the pedestrian bridge, pre-game traffic conditions improved.

Post-Game Conditions: Immediately following the end of the game, most spectators attempt to leave the stadium parking facilities, although depending on the game outcome, some patrons leave early to avoid congestion and a portion remain for tailgate parties. Typical clearance times for each of the egress routes following a sell-out football game vary; however, congestion and queues in the vicinity of the stadium generally clear up approximately one and a half to two hours following the end of the game.

On US-101 northbound, stadium traffic generally does not have difficulty merging with the freeway mainline traffic, as northbound US-101 traffic volumes approaching Harney Way are generally lower than the southbound volumes. However, as stadium traffic merges with I-80 eastbound traffic leaving downtown San Francisco, congestion and queues extend upstream from the Bay Bridge to the US-101/I-280 merge. This congestion persists long after all congestion and queues dissipate in the vicinity of Candlestick Point.

The surge of vehicles exiting the parking facilities results in queues on the internal roadways and at access roads to Third St and the on-ramps to US-101. The queues on Jamestown Ave, Gilman Ave, and Carroll Ave are mainly constrained by the capacity of the intersections of the respective street at Third St. The traffic signals on Third St are timed to prioritize transit movements along Third St, including the T-Third light rail, which results in limited capacity for cross-traffic.

Transit Services

Muni and Tri-Delta Transit[4] and numerous private charter bus operators provide game day special services to Candlestick Park. BART, AC Transit, and Caltrain do not provide any special game day services. SamTrans, Golden Gate Transit, and the Santa Clara Valley Transportation Authority have historically provided transit service to Candlestick Park; however, they have recently stopped providing this service, which will instead be provided by private charter companies.

Pedestrian Circulation

The number of pedestrians in the vicinity of the stadium is highest during post-game conditions with spectators exiting the stadium at once. The primary pedestrian flows are towards the internal and off-site parking areas east of the stadium, and towards the parking areas along Harney Way and Tunnel Ave in the Little Hollywood neighborhood, and to the off-site lot along Jamestown Ave and T-Third line on Third St.

[4] Tri-Delta Transit provides one special game day bus to Candlestick Park from eastern Contra Costa County, with stops in Brentwood, Antioch, and Pittsburg.

The two pedestrian overcrossings, one crossing Jamestown Ave at Harney Way, and one crossing the drop-off loop (connecting with Jamestown Ave approximately 350 feet north of Harney Way), are too narrow to accommodate the surge of pedestrians leaving the stadium. These uncontrolled crossings often result in conflicts between pedestrians and vehicles, and police occasionally control these crossings. In September 2009, a pedestrian bridge was installed on Hunters Point Expressway at the location of the at-grade pedestrian crossing to the State Park parking lots.

Parking Conditions

Game day parking demand for football games at the existing stadium is accommodated within off-street surface parking lots and on-street parking adjacent to the neighborhood and to the west in the Little Hollywood neighborhood. Game day parking demand varies depending on attendance levels, and maximum demand occurs during sell-out games. Parking for football games is provided within stadium parking lots, on state park land, and in satellite parking lots. A total of 18,880 off-street parking spaces are provided for a typical football game. Approximately 48 percent of the off-street parking spaces are in the stadium parking lot (9,110 spaces for autos, buses, recreational vehicles, limousines, press and players), 23 percent are located in state park land lots (5,470 spaces), and 29 percent are located in satellite parking lots (4,300 spaces). In addition to the satellite parking lots, there are a number of parking spaces in private lots that are generally restricted for use by residents, customers, employees of private businesses, or public agencies; however, some of the spaces are made available to the public on football game days. The 49ers estimate that up to 3,000 spaces are available on private land for game day parking.

In addition to the off-street parking, nearby on-street parking is heavily used by football fans, particularly in the Little Hollywood neighborhood across from the stadium. During game day parking surveys, within the area bounded by US-101, Bayshore Blvd and the County line, all on-street parking spaces were occupied (compared with 60 percent on a non-football Sunday), resulting in an inconvenience for residents. In the area northwest of the stadium, bounded by Third St, Jamestown Ave, Giants Dr/Arelious Walker Dr, and Carroll Ave, on-street parking is about 86 percent occupied, compared to about 70 percent on a non-game Sunday; the increased occupancy rate is primarily due to reduced parking supply caused by game day parking prohibitions.

During game days, parking restrictions are implemented to increase traffic capacity in and out of the facility and to reduce congestion. On game days parking is prohibited between 10:00 A.M. and 6:00 P.M. on one or both sides of the following streets: Carroll Ave, Gilman Ave, Ingerson Ave, Jamestown Ave, Paul Ave, and Third St.

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3.2 Air Quality and Greenhouse Gases

The following describes the existing conditions of the project site area as they relate to air quality, greenhouse gases (GHGs), and climate change; and the applicable regulations that govern these resources. This section is organized by discussions of air quality followed by GHGs.

3.2.1 Background

3.2.1.1 Air Quality

The project site is located in the City and County of San Francisco, which is within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB also comprises all of Alameda, Contra Costa, Marin, Napa, San Mateo, and Santa Clara Counties; the southern half of Sonoma County; and the southwestern portion of Solano County. Ambient air quality is influenced by climatological conditions, topography, and the quantity and type of pollutants released in an area. The major determinants of transport and dilution of a given pollutant are wind, atmospheric stability, and terrain.

3.2.1.1.1 Climate, Topology, and Meteorology

The regional climate in the SFBAAB is classified as Mediterranean, characterized by mild, dry summers; mild moderately wet winters (about 90 percent of the annual total rainfall is received in the November-April period); moderate daytime onshore breezes; and moderate humidity. The climate is dominated by a strong, semi-permanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Climate is also affected by the moderating effects of the adjacent oceanic heat reservoir. In summer, when the high-pressure cell is strongest and farthest north, fog forms in the morning, and temperatures are mild. In winter, when the high-pressure cell is weakest and farthest south, occasional rainstorms occur.

The project site is located in the San Francisco Peninsula (Peninsula) climatological subregion that extends northwest from San Jose to the Golden Gate. The Santa Cruz Mountains run up the center of the Peninsula, creating an area of warmer temperatures and fewer foggy days to the east where the ridgeline blocks the marine layer. In San Francisco, the mean maximum summer temperatures are in the mid 60s degrees Fahrenheit (°F), while mean minimum temperatures during the winter months are in the high 30s to low 40s °F. Annual average wind speeds range from 4 to 9 knots throughout the Peninsula with prevailing winds from the west, although local wind patterns are often influenced greatly by local topographic features.

In summer, air flow along the Pacific coastline is drawn into the interior through the Golden Gate and over the lower portions of the Peninsula. This channeling of winds through the Golden Gate produces a jet that sweeps eastward and widens downstream to produce southwest winds at Berkeley and northwest winds at San Jose. Wind speeds are locally stronger in areas where air is channeled through narrow openings such as the Golden Gate or San Bruno Gap. For example, the average wind speed at the San Francisco International Airport from 3:00 P.M. to 4:00 P.M. in July is about 17 knots, compared with only about 9 knots at San Jose and less than 6 knots at the Farallon Islands (SFRA 2009).

The sea breeze often commences along the Pacific coastline in late morning and it may be observed first only through the Golden Gate. Later in the day the layer deepens and intensifies while spreading inland to the Central Valley. As the breeze intensifies and deepens it flows over the lower hills farther south along the Peninsula. This process frequently can be observed as a bank of stratus "rolling over" the coastal hills on the west side of the bay. The depth of the sea breeze depends in large part upon the height and strength of the inversion. The generally low elevation of this stable layer of air prevents marine air

from flowing over the coastal hills. It is unusual for the summer sea breeze to flow over terrain exceeding 2,000 ft (610 m) in elevation.

In winter, the Bay Area experiences periods of storminess and moderate to strong winds conversely with periods of stagnation with very light winds. Episodes of winter stagnation are characterized by outflow from the Central Valley, nighttime drainage flows in coastal valleys, weak onshore flows in the afternoon, and otherwise light and variable winds.

Onshore winds from the west dominate at the project site location such that emissions from the project site would be dispersed eastward over the Bay.

3.2.1.2 Greenhouse Gases and Climate Change

The following summarizes the leading scientific evidence on climate change and general effects associated with emissions of GHGs.

3.2.1.2.1 Overview of GHGs and Climate Change

Greenhouse gases are gases that trap heat in the atmosphere by absorbing infrared radiation. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative environmental, economic, and social consequences across the globe.

Greenhouse gas emissions occur from natural processes and human activities. Water vapor is the most important and abundant GHG in the atmosphere; however, human activities produce only a very small amount of the total atmospheric water vapor. The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The main source of GHGs from human activities is the combustion of fossil fuels, including crude oil and coal. Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride. With the addition of nitrogen trifluoride, seven GHGs are regulated by the State of California.

Each GHG is assigned a global warming potential (GWP), which is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, CH_4 has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis (Intergovernmental Panel on Climate Change 2007). To simplify GHG analyses, total GHG emissions from a source are often expressed as CO_2 equivalent (CO_2e). CO_2 equivalents are calculated by multiplying the emissions of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. While CH_4 and N_2O have much higher GWPs than CO_2, CO_2 is emitted in such higher quantities that it is the overwhelming contributor to CO_2e from both natural processes and human activities.

3.2.1.2.2 Scientific Assessment of Climate Change

Recent observed changes due to global warming include rising temperatures, shrinking glaciers and sea ice, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges. International, national, and state organizations have independently confirmed these findings (Intergovernmental Panel on Climate Change 2007; USGCRP 2009; and California Energy Commission [CEC] 2009).

The most recent *California Climate Change Scenarios Assessment* predicts that temperatures in California will increase between 3 to 10.5°F by 2100, based upon low and high GHG emission scenarios (CEC 2009). Predictions of long-term negative environmental impacts due to global warming include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems including the potential loss of species, and a substantial reduction in winter snow pack. In California, predictions of these effects include exacerbation of air quality problems, a reduction in municipal water supply from the Sierra snowpack, a rise in sea level that would displace coastal businesses and residences, an increase in wild fires, damage to marine and terrestrial ecosystems, and an increase in the incidence of infectious diseases, asthma, and other human health problems (CEC 2009). A discussion of sea level rise predictions is provided in Section 3.9, Water Resources, of this SEIS.

3.2.2 Regulatory Framework

Air quality within the Bay Area is maintained and improved through the efforts of various government agencies. These agencies work independently and jointly to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of other programs. This section also summarizes key rules and regulations that would apply to proposed GHG emissions.

3.2.2.1 Air Quality

3.2.2.1.1 Federal

The U.S. Environmental Protection Agency (USEPA) is responsible for implementing national air quality programs. The USEPA enforces the federal *Clean Air Act* (CAA) and its associated National Ambient Air Quality Standards (NAAQS), as shown in Table 3.2.2-1. The NAAQS represent maximum acceptable concentrations that generally may not be exceeded more than once per year, except for annual standards, which may never be exceeded. The CAA also requires each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP) with focus on areas that do not attain the NAAQSs. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The USEPA must review all SIPs to determine whether they conform to the mandates of the CAA and its amendments and to determine whether implementing the SIPs would achieve air quality goals. If the USEPA determines a SIP to be inadequate, a Federal Implementation Plan that imposes additional control measures may be prepared for the nonattainment area. Failure to submit an approvable SIP or to implement the plan within the mandated time frame may result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin. Proposed sources of pollution must comply with all applicable requirements of the CAA and USEPA.

Table 3.2.2-1. National and California Ambient Air Quality Standards

Pollutant	*Averaging Time*	*California Standards*	*National Standards* [a]	
			Primary [b,c]	**Secondary** [b,d]
Ozone (O_3)	1-hour	0.09 ppm (180 µg/m^3)	— [e]	— [e]
	8-hour	0.07 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	Same as primary
Carbon monoxide (CO)	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	—
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	—

Table 3.2.2-1. National and California Ambient Air Quality Standards				
Pollutant	***Averaging Time***	***California Standards***	***National Standards*** [a]	
			Primary [b,c]	**Secondary** [b,d]
Nitrogen dioxide (NO_2)	Annual	0.03 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary
	1-hour	0.18 ppm (339 µg/m^3)	0.10 ppm [f] (188 µg/m^3)	—
Sulfur dioxide (SO_2)	Annual	—	0.03 ppm	—
	24-hour	0.04 ppm (105 µg/m^3)	0.14 ppm (367 µg/m^3)	—
	3-hour	—	—	0.5 ppm (1,300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)	—
PM_{10}	Annual	20 µg/m^3	—	—
	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
$PM_{2.5}$	Annual	12 µg/m^3	15 µg/m^3	Same as primary
	24-hour	—	35 µg/m^3	Same as primary
Lead	Rolling 3-month average	—	0.15 µg/m^3	Same as primary
	Quarterly average	—	1.5 µg/m^3	Same as primary
	30-day average	1.5 µg/m^3	—	—

Notes:

a. Standards other than the 24-hour PM_{10}, 24-hour $PM_{2.5}$, and those based on annual averages are not to be exceeded more than once a year.
b. Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.
c. Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than three years after that states implementation plan is approved by the USEPA.
d. Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
e. USEPA revoked the 1-hour ozone standard of 0.12 ppm in all areas, although some areas have continuing obligations under that standard.
f. 1-hour NO2 standard, is the three-year average of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations.

The following describes each of the criteria pollutants identified in Table 3.2.2-1.

- **Ozone** (O_3) is a gas that is not directly emitted into the atmosphere but formed when reactive organic gases (ROG) and nitrogen oxides (NO_x), both as byproducts of combustion, undergo photochemical reactions in the presence of sunlight. ROG can also originate from the evaporation of chemical solvents or fuels. Ozone concentrations are generally highest during the summer months when maximum solar insolation and warm temperatures are conducive to ozone formation. Because of the reaction time involved in forming ozone, peak concentrations are often found many miles downwind of their precursor emissions. As a result, O_3 is known as a regional pollutant, which has concentrations that are homogeneously spread throughout an airshed.

  Ozone precursor emissions of ROG and NO_x have decreased in the SFBAAB since 1975 and are projected to continue to decline through 2020, due to the implementation of stricter emissions controls on motor vehicles, oil refinery fugitive emissions, and ROG emissions from industrial coatings and solvent operations. In concert, peak 1-hour and 8-hour O_3 concentrations within the SFBAAB have declined by nearly 18 percent during the last 20 years (ARB 2009).

- **Carbon Monoxide** (CO) is a colorless, odorless gas produced by the incomplete combustion of fuels, primarily from transportation sources. Wood-burning stoves, incinerators, and other

industrial processes represent other sources of CO. Concentrations of CO tend to be the highest during winter mornings, when light winds and surface-based inversions trap the pollutant at ground levels. Since the primary source of CO occurs from motor vehicles operating at slow speeds, the highest ambient CO concentrations are generally found near congested transportation corridors and intersections. In contrast to O_3, which has regional impacts, the impacts of CO are localized in nature.

- **Nitrogen Dioxide** (NO_2) is a brownish, highly reactive gas that is present in all urban environments. The major human-made NO_2 sources are combustion devices, such as boilers or turbines, and internal combustion engines, such as automobile or generator engines. Combustion devices emit primarily nitrogen oxide (NO), which reacts through oxidation in the atmosphere to form NO_2. Nitrogen oxide and NO_2 are collectively referred to as NO_x. As NO_2 is formed and depleted by photochemical reactions in the atmosphere, NO_2 concentrations in a particular geographical area may not be representative of the local NO_x emissions sources.
- **Sulfur dioxide** (SO_2) is a colorless, extremely irritating gas or liquid. It enters the atmosphere as a pollutant mainly as a result of burning sulfur contained in fuel oils and coal and from chemical processes occurring at chemical plants and refineries. Sulfur dioxide is subsequently converted to sulfates (SO_4) in the atmosphere and, like O_3, has peak annual concentrations in the summer months.
- **Respirable Particulate Matter** (PM_{10}) and **Fine Particulate Matter** ($PM_{2.5}$) consist of extremely small, suspended particles or droplets 10 microns and 2.5 microns or smaller in diameter, respectively. Some sources of particulate matter, like pollen, forest fires, and windblown dust, are naturally occurring. However, in populated areas, most particulate matter is caused by road dust, combustion products, abrasion of tires and brakes, and construction activities. Particulate matter can also be formed in the atmosphere by chemical conversion of NO_x, SO_2, and ROG.
- **Lead** (Pb) occurs in the atmosphere as particulate matter. Historically, the combustion of leaded gasoline was the primary source of airborne lead in the Bay Area, though the use of leaded gasoline is no longer permitted for on-road motor vehicles. Other sources of lead include the manufacturing and recycling of batteries, paint, ink, ceramics, ammunition, and secondary lead smelters.

National Emission Standards for Hazardous Air Pollutants (NESHAP) Regulations

Title III of the CAA Amendments of 1990 required USEPA to develop standards that will mandate the maximum achievable control technology for all major sources of Hazardous Air Pollutants (HAPs). A "major" source for HAPs is defined as any stationary source that emits more than 10 tons per year (tpy) of any of the regulated HAPs or 25 tpy of a combination of the HAPs. USEPA has promulgated a number of National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations (40 CFR 63). Additionally, under the Urban Air Toxics Strategy, USEPA identified a list of 33 HAPs that were judged to pose the greatest potential threat to public health in the largest number of urban areas. USEPA has implemented NESHAPs that apply to non-major HAP area sources.

Mobile Source Air Toxics (MSAT) Program

The USEPA is developing new regulations to reduce Mobile Source Air Toxics (MSAT) generated by highway vehicles and nonroad equipment. In February 2007, USEPA finalized a rule for refiners to reduce benzene from mobile sources. The rule will limit the benzene content of gasoline and reduce toxic emissions from passenger vehicles and gas cans. USEPA will be developing additional regulations to reduce air toxic emissions from nonroad equipment.

General Conformity Rule

Section 176(c) of the CAA, as articulated in the USEPA General Conformity Rule, states that a federal agency cannot issue a permit or support an activity unless the agency determines that it would conform to the most recent USEPA-approved SIP. This means that projects using federal funds or requiring federal approval in nonattainment or maintenance areas must not: 1) cause or contribute to any new violation of a NAAQS; 2) increase the frequency or severity of any existing violation; or 3) delay the timely attainment of any standard, interim emission reduction, or other milestone. According to Section 93.153(c)(2)(xiv) of the General Conformity Rule, transfers of ownership, interests, and titles in land, facilities, and real properties are exempted from this rule (USEPA 2010).

3.2.2.1.2 State

The California Air Resources Board (ARB) is responsible for the coordination and administration of both federal and state air pollution control programs within California and for implementing the *California Clean Air Act* (CCAA). The CCAA required the ARB to establish the California Ambient Air Quality Standards (CAAQS) (see Table 3.2.2-1). The CAAQS represent state maximum acceptable pollutant concentrations that are not to be equaled or exceeded. In general, the CAAQS are as stringent as or more stringent than the NAAQS. The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The CCAA specifies that local air districts could focus particular attention on reducing emissions from transportation and area-wide emission sources and it gives districts the authority to regulate indirect sources of emissions.

3.2.2.1.3 Regional

The Bay Area Air Quality Management District (BAAQMD) is responsible for regulating stationary sources of air emissions within the SFBAAB. The BAAQMD has developed air quality plans designed to reduce emissions to a level that would bring the SFBAAB into attainment of the ambient air quality standards. Control measures for stationary sources proposed in the air quality plans and adopted by the BAAQMD are incorporated into the BAAQMD Rules and Regulations (BAAQMD 2010).

The BAAQMD has prepared a series of attainment plans that comply with the requirements of the CAA and CCAA. The SFBAAB is designated as a marginal nonattainment area for the 8-hour ozone standard. The BAAQMD released the Draft 2010 Clean Air Plan (BAAQMD 2010), which updates the previous 2005 Bay Area Ozone Strategy. This plan defines control strategies to: 1) reduce emissions and decrease ambient concentrations of harmful pollutants; 2) safeguard public health by reducing exposure to air pollutants that pose the greatest health risk, with an emphasis on protecting the communities most heavily impacted by air pollution; 3) reduce GHG emissions to protect the climate; and 4) reduce PM emissions and concentrations in anticipation of future $PM_{2.5}$ planning requirements.

Although the BAAQMD is responsible for regional air quality planning efforts, it does not have the authority to directly regulate the air quality issues associated with plans and new development projects within the SFBAAB. However, the BAAQMD has prepared the BAAQMD CEQA Guidelines (BAAQMD 2010) for local agencies to use when preparing air quality impact analyses. Although these guidelines do not directly apply to actions taken by the DoN, they were taken into consideration in the analysis as the DoN has not established air quality significance thresholds.

BAAQMD Regulation 11, Hazardous Materials, Rule 2 - Asbestos Demolition, Renovation, and Manufacturing.

The purpose of this rule is to limit emissions of asbestos, a Toxic Air Contaminant (TAC), from structural demolition/renovation activities. Some buildings proposed for demolition may include building materials

that contain asbestos. If this is the case, these demolition activities are required to comply with the requirements of the Rule. The rule requires the BAAQMD to be notified of proposed demolition/renovation activities and to survey these structures for the presence of regulated asbestos-containing materials (RACM). The rule also includes notification requirements for any intent to disturb RACM; emission control measures; and RACM removal, handling, and disposal techniques.

3.2.2.1.4 Local

San Francisco General Plan

The goal of the Air Quality Element of the *San Francisco General Plan* is to reduce the levels of air pollutants and protect and improve public health, welfare, and quality of life for local residents. The *General Plan* designates policies that: 1) reduce mobile sources of air pollution through implementation of the transportation element of the *General Plan*; 2) decrease air quality impacts of development through coordination of land use and transportation decisions; 3) improve air quality by increasing public awareness; 4) minimize particulate matter emissions from road and construction sites; and 5) link the positive effects of energy conservation and waste management to emission reductions.

City of San Francisco Health Code

CONSTRUCTION DUST CONTROL

San Francisco Health Code Article 22B, Construction Dust Control, requires preparation of a site-specific dust control plan for construction projects proposed within 1,000 ft (305 m) of sensitive receptors (residence, school, childcare center, hospital or other health-care facility or group-living quarters). This plan must include a number of equivalent measures to minimize visible dust. These measures include all of the dust control measures presented in the 1999 BAAQMD Guidelines, in addition to increased watering frequency, monitoring, recordkeeping, third-party verification, and community outreach requirements that go beyond those in the BAAQMD guidelines.

AIR QUALITY ASSESSMENT AND VENTILATION REQUIREMENT FOR URBAN INFILL RESIDENTIAL DEVELOPMENTS

The *San Francisco Health Code* Article 38 requires an air quality assessment to evaluate the impact of $PM_{2.5}$ emissions from roadway traffic to a proposed residential development site. Article 38 applies to newly constructed buildings containing ten or more dwelling units located within the Potential Roadway Exposure Zone, and that have been determined to have a $PM_{2.5}$ concentration at the proposed site greater than 0.2 $\mu g/m^3$ attributable to Local Roadway Traffic Sources (DPH 2008). If the assessment indicates that the contribution of roadway emissions to the proposed site is greater than 0.2 $\mu g/m^3$ of $PM_{2.5}$, Section 3807 requires development in such areas to implement installation of a ventilation system that would remove 80 percent of ambient $PM_{2.5}$ from habitable areas within the residential units.

3.2.2.2 GHGs

3.2.2.2.1 Federal

Federal agencies on a national scale address emissions of GHGs by reporting and meeting reductions mandated in federal laws, Executive Orders (EOs), and agency policies. The following summarizes these mandates.

EO 13423

Executive Order 13423: *Strengthening Federal Environmental, Energy, and Transportation Management* was signed by President Bush on 24 January 2007. The EO instructs federal agencies to conduct their

environmental, transportation, and energy-related activities in an environmentally, economically and fiscally sound, integrated, continuously improving, efficient, and sustainable manner. The EO requires federal agencies to meet specific goals to improve energy efficiency and reduce GHG emissions by annual energy usage reductions of 3 percent through the end of fiscal year (FY) 2015, or by 30 percent by the end of fiscal year 2015, relative to the baseline energy use of the agency in FY 2003.

EO 13514

Executive Order 13514: *Federal Leadership in Environmental, Energy, and Economic Performance* was signed by President Obama on 5 October 2009. This EO expands on the energy reduction and environmental performance requirements identified in EO 13423 and adds requirements for the reporting and reduction of GHG emissions. The goal of EO 13514 is "to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of GHGs a priority for Federal agencies." Federal agencies are required to meet a series of deadlines critical to achieving the GHG reduction goals of the EO.

Final Mandatory Reporting of GHG Rule

The USEPA issued the *Final Mandatory Reporting of Greenhouse Gases Rule* on 30 October 2009 (USEPA 2009a). The rule requires suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities with stationary sources that emit 25,000 metric tons (mt) or more per year of CO_2e emissions to collect emissions activity data and submit annual emissions reports to the USEPA beginning with year 2010 operations. The rule does not apply to mobile source emissions of GHGs.

Council on Environmental Quality (CEQ) Draft NEPA Guidance on Consideration of Effects of GHG Emissions and Climate Change

On 18 February 2010 the CEQ proposed for the first time draft guidance on how federal agencies could evaluate the effects of climate change and GHG emissions for NEPA documentation (CEQ 2010). Specifically, if a proposed action emits 25,000 mt or more of CO_2e on an annual basis, agencies could consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. CEQ does not propose this reference point as an indicator of a level of GHG emissions that may significantly affect the quality of the human environment, but notes that it serves as a minimum standard for reporting emissions under the CAA.

In the analysis of the direct effects of a proposed action, the CEQ proposes that it would be appropriate to: 1) quantify cumulative emissions over the life of the project; 2) discuss measures to reduce GHG emissions, including consideration of reasonable alternatives; and 3) qualitatively discuss the link between such GHG emissions and climate change. However, the CEQ states that it is not currently useful for the NEPA analysis to attempt to link specific climatological changes or environmental impacts to proposed GHG emissions, as such direct linkage is difficult to isolate and to understand. CEQ will receive public comment on this guidance for 90 days.

3.2.2.2.2 State

In response to the challenge of climate change, California has taken a leadership role by committing to reduce its GHG emissions to 1990 levels by 2020 (about a 30 percent reduction based on a business-as-usual scenario for 2020) and to 80 percent below 1990 levels by 2050. The discussion below provides a brief overview of the state climate change rules and regulations that would apply to the project alternatives. However, none of the requirements identify a NEPA or BAAQMD threshold for GHG emissions that would result in a significant impact to climate change.

Assembly Bill 32 (AB 32)

The *California Global Warming Solutions Act of 2006*, widely known as AB 32, requires the ARB to develop and enforce regulations that will reduce statewide GHG emissions to 1990 levels by 2020. The bill sets a timeline for the ARB to adopt a Scoping Plan that will to map out how the state will achieve this target, including regulatory, voluntary, and market-based mechanisms beginning in 2012. California will have to reduce GHG emissions by about 30 percent below business-as-usual predictions of year 2020 GHG emissions to achieve this goal. GHG emissions limits and reduction measures adopted in 2011 become enforceable.

3.2.2.2.3 Regional

Bay Area Air Quality Management District

The BAAQMD recently updated its Environmental Planning Guidelines, which includes recommended significance thresholds, assessment methodologies, and mitigation strategies for GHG emissions. BAAQMD's Board of Directors adopted these revised thresholds in June 2010. The Guidelines include three different criteria that could be used for determining the significance of mixed-use development's operational GHG emissions. One option would include a numeric "bright line" threshold of 1,100 metric tons CO_2e per year for operational emission sources including residential and non-residential building energy use, mobile source emissions, area source emissions, and indirect emissions associated with water usage. 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 tons per service population per year for operational emissions. The third option is compliance with a qualified Climate Action Plan (CAP) that includes enforceable measures to reduce GHG emissions consistent with AB 32 goals.

3.2.2.2.4 Local

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 (SFCAP): Local Actions to Reduce Greenhouse Emissions*. Although the San Francisco Board of Supervisors has not formally committed the city to perform the actions addressed in the CAP, it is a blueprint for GHG emission reductions and several of the actions are now in progress.

3.2.3 Existing Conditions

3.2.3.1 Air Quality

Existing air quality at a given location can be described by the concentrations of various pollutants in the atmosphere. Pollutants are defined as two general types: 1) criteria pollutants and 2) toxic compounds. Criteria pollutants have national and/or state ambient air quality standards as shown in Table 3.2.2-1. In California, the ARB is responsible for enforcing both the federal and state air pollution standards. Toxic air contaminants are chemicals that have been determined to represent some level of cancer or non-cancer (acute or chronic) health risks to the general public. Units of concentration for both types of pollutants are generally expressed in parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$).

3.2.3.1.1 Monitoring Station Data and Attainment Area Designations

The SFBAAB has instances of recorded violations of the NAAQS and CAAQS for O_3, CO, PM_{10}, and $PM_{2.5}$ over the last 30 years. Since the early 1970s, substantial progress has been made toward controlling these pollutants. Emissions and ambient concentrations of CO decreased in the SFBAAB with the introduction of the catalytic converter in 1975, and with subsequent improvements in motor vehicle engine technology and the introduction of oxygenated fuel. No violations of the NAAQS and CAAQS for CO have been recorded in the Bay Area since 1991. The Bay Area is in attainment for all national and state standards except those for O_3 and $PM_{2.5}$. In addition, the SFBAAB does not meet the state standard for PM_{10}.

The BAAQMD operates many air quality monitoring stations throughout the Bay Area. The closest monitoring station to the project site location is the San Francisco-Arkansas St monitoring station, which is located approximately three miles to the north of the project site on Potrero Hill. Air quality data recorded at this station from 2006 through 2008 show that during this period: 1) the state 24-hour PM_{10} standard was exceeded five times; 2) the PM_{10} annual average was above the state standard of 20 $\mu g/m^3$; and 3) the national 24-hour standard for $PM_{2.5}$ was exceeded eight times. All other pollutant levels monitored at this location during this time period were below their applicable standards.

3.2.3.1.2 Toxic Air Contaminants

TACs include a diverse group of air pollutants that can adversely affect human health. They are not fundamentally different from the criteria pollutants, but they have not had ambient air quality standards established for them for reasons such as insufficient dose-response data and their association with particular workplace exposures rather than general environmental exposure. The health effects of TACs can result from either acute or chronic exposure; many types of cancer are associated with chronic TAC exposures, but TAC exposures can also cause other adverse health effects, such as asthma and respiratory irritations. Consequently, the BAAQMD has established both cancer and non-cancer health risk thresholds for TAC emissions. At the federal level, some of these TACs regulated by the state are also regulated under federal NESHAP and MSAT regulations

Significant sources of TACs in the environment include industrial processes, such as petroleum refining, chemical manufacturing, electric utilities, metal mining/refining and chrome plating; commercial operations, such as gasoline stations, dry cleaners and boilers and/or emergency generators; and vehicular operations, particularly diesel-powered trucks and off-road equipment. The ARB has determined that the 10 compounds which pose the greatest known health risk in California, based primarily on ambient air quality data, are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchloroethylene, and diesel particulate matter (DPM). Asbestos, which occurs at the project site in some buildings proposed for demolition and within the bedrock and soils of the site, is also a known carcinogen.

Diesel Particulate Matter

Diesel particulate matter occurs from the combustion of diesel fuels in engines and it consists of a mixture of fine particles (also known as soot) and attached TACs that can penetrate deeply into the lungs, where they can contribute to a range of health problems. In 1998, the ARB identified DPM from diesel-powered engines as a TAC based on its potential to cause cancer and other adverse health effects. Diesel exhaust is a complex mixture that includes hundreds of individual constituents, many of which are known carcinogens. However, the ARB uses DPM as a surrogate to measure exposure from the mixture of chemicals that make up diesel exhaust.

Based on receptor modeling techniques, the ARB estimated the background DPM concentrations in the SFBAAB in 2000 would produce approximately 500 cancer cases per million people, which reflects a drop of approximately 36 percent from 1990 estimates (ARB 2009). The BAAQMD also reports that combining the ARB estimates of the population-weighted average ambient DPM concentration in the SFBAAB for 2003 with the cancer potency factor adopted by California Environmental Protection Agency's (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) results in a background cancer risk of about 500 to 700 in one million from this pollutant (BAAQMD 2007). Most of these cancer risks occur in proximity to businesses and freeways, where diesel trucks operate.

Naturally Occurring Asbestos

Asbestos is the common name for a group of naturally occurring fibrous silicate minerals that can separate into thin but strong and durable fibers. Naturally occurring asbestos, which the ARB identified as a TAC in 1986, is found in many parts of California and commonly associated with serpentine rock (serpentinite).

As described in Sections 3.7, Hazards and Hazardous Materials and 3.8, Geology and Soils, Franciscan serpentinite and mélange (a mixed assemblage of rock types including serpentinite, shale, chert, sandstone, and greenstone) form most of the bedrock underlying the project site. Both rock types are known to contain small amounts of chrysotile asbestos. Serpentinite has been mapped in Parcels A, B, C, and G of the project site and may underlie portions of the proposed roadway. Mélange occurs throughout the Hunters Point shear zone, which underlies parts of the project site parcels, but has not been mapped separately. Chrysotile is a naturally occurring asbestos mineral that can be a human health hazard if it becomes airborne. The other serpentine minerals found in serpentinite do not form fibrous crystals and are not asbestos minerals.

Exposure to airborne asbestos poses a potential health hazard. The issues related to naturally occurring asbestos and naturally occurring metals-containing materials at the project site are addressed in Section 3.7 of this SEIS.

3.2.3.1.3 Odors

Typically, odors are regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache). Quality and intensity are two properties of any odor. The quality of an odor indicates the nature of the smell experience. For instance, a "flowery" or "sweet" smell describes the quality of the odor. Intensity refers to the strength of the odor and it depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases, and the odor intensity weakens and eventually becomes so low that detection or recognition is difficult. At some point during dilution, the concentration of the odorant falls below a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

3.2.3.1.4 Regional Emissions Inventory

A wide range of emission sources from dense population centers, heavy vehicular traffic, and industry influence air quality within the SFBAAB. Air pollutant emissions are generated by stationary (or point), area wide, and mobile sources. Stationary sources are usually associated with large manufacturing and industrial facilities, such as fossil fuel-fired power plants or large boilers that provide industrial process heat. Area wide sources consist of many smaller point sources that are widely distributed in space, such as residential and commercial water heaters, painting/coating operations, agricultural operations, landfills, and the use of consumer products (such as hair spray). Mobile sources include on-road motor vehicles

and other transportation sources, including aircraft, ships, trains, and self-propelled construction equipment. Air pollutants can occur from natural sources such as fine dust particles suspended in the air by high winds.

With the assistance of the BAAQMD, the ARB compiles inventories of CO, ROG, NO_x, PM_{10}, and $PM_{2.5}$ emissions for the SFBAAB. Table 3.2.3-1 presents a summary of the most recent year of emissions data for the SFBAAB and San Francisco County.

Table 3.2.3-1. San Francisco Bay Area Air Basin and San Francisco County Criteria Pollutant Emissions Inventory for 2008 (Tons/Day - Annual Average)

	CO	***ROG***	***NO_x***	***SO_x***	***PM_{10}***	***$PM_{2.5}$***
SFBAAB						
Total Emissions	1,748	378	448	62	212	81
On-Road Motor Vehicle Emissions	1,542	183	381	15	20	16
San Francisco County						
Total Emissions	148	34	79	15	17	7.5
On-Road Motor Vehicle Emissions	142	18	74	15	4.6	4.1

Note: Natural sources are excluded from this inventory.
Source: ARB 2009.

3.2.3.2 Greenhouse Gases

3.2.3.2.1 GHG Emission Inventories

In 2004, humans worldwide produced 26.8 billion metric tons of CO_2e (mt CO_2e; UNFCCC 2009). In 2004, the U.S. emitted about 7 billion mt CO_2e, or about 24 mt CO_2e per person per year (USEPA 2008). Over 80 percent of the GHG emissions in the United States comprise CO_2 emissions from energy-related fossil fuel combustion. In 2004, California emitted 0.492 billion mt CO_2e, or about 7 percent of the US emissions. 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 it relies on substantial out-of-state energy generation.

The effects of GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on global atmospheric GHG concentrations or climate change. Therefore, the impact of proposed GHG emissions to climate change is also discussed in the context of cumulative impacts in Chapter 5 of this SEIS.

3.3 Noise

3.3.1 Background

This section discusses existing and future sources of noise and vibration on and around the project site.

Sources used to prepare this analysis include the *San Francisco General Plan* (General Plan) *Environmental Protection Element* (San Francisco Planning Department 2010), the *Bayview DEIR San Francisco 49ers Stadium Operational Noise Study*, prepared by Wilson, Ihrig & Associates (Appendix I1 of the CP-HPS DEIR [SFRA 2009]), and the *Federal Transit Administration's Transit Noise and Vibration and Impact Assessment* methodology (FTA 2006). This analysis was also prepared by measuring and modeling existing and future noise levels within the project site and at surrounding locations. Traffic information contained in the traffic impact analyses, prepared by LCW Consulting, Fehr & Peers Associates, and CHS Consulting Group, was used to prepare the noise modeling for vehicular sources (CHS Consulting Group, *et al.* 2010 and 2009). All construction activity estimates were based on the September 2009 *MACTEC Engineering Construction Phasing Plan*.

3.3.1.1 Acoustic Terminology and Definitions

Sound is created when vibrating objects produce pressure variations that move rapidly outward into the surrounding air. The main characteristics of these air pressure waves are amplitude, which is experienced as a sound's loudness, and frequency, which is experienced as a sound's pitch. The standard unit of sound amplitude is the decibel (dB), representing a measure of the physical magnitude of the pressure variations relative to the human threshold of perception. The human ear's sensitivity to sound amplitude is frequency-dependent, as the human ear is more sensitive to sounds in the mid-frequency range than to sounds with much lower or higher frequencies. Most "real world" sounds (e.g., a dog barking, a car passing, etc.) are complex mixtures of many different frequency components, each having different amplitudes. When the average amplitude of such sounds is measured with a sound level meter, it is common for the instrument to apply adjustment factors to each of the measured sound's frequency components. These factors account for the differences in perceived loudness of each of the sound's frequency components relative to those to which the human ear is most sensitive.

Because the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) compensates for frequencies in a manner approximating the sensitivity of the human ear. In reporting measurements to which A-weighting has been applied, an "A" is appended to dB (dBA) to make this clear. In some cases, however, it is useful to know the actual average sound amplitude without application of the A-weighting factors. This type of averaging is called C-weighting and its result is reported in C-weighted decibels (dBC). Finally, since environmental sound levels usually vary greatly over time, it is often useful to know the degree of variability at a particular location over any measurement period. This variability is specified in terms of statistical sound levels (L_n), where n is the percentage of time these levels are exceeded during the measurement period. For example, L_{10}, L_{50}, and L_{90} are descriptors that represent the sound level exceeded 10 percent of the time, 50 percent of the time, and 90 percent of the time, respectively, during a measurement, while L_{min} and L_{max} represent the minimum and maximum sound levels during the measurement period. Note that L_{90} is at the quieter end of the scale, while L_{10} is at the louder end of the scale.

Noise is the term generally given to the intrusive, "unwanted" aspects of sound. Many factors influence how a sound is perceived and whether it is considered harmful or disruptive to an individual or a community. These factors include the primary physical characteristics of a sound (e.g., amplitude, frequency, duration, etc.), but also secondary acoustic and non-acoustic factors that can influence

perception regarding the degree to which it is intrusive and disruptive. Table 3.3.1-1 lists representative noise levels for various environmental situations.

Table 3.3.1-1. Representative Environmental Noise Levels

Common Outdoor Activities	*Noise Level (dBA)*	*Common Indoor Activities*
	—110—	Rock Band
Jet Fly-over at 1,000 ft (300 m)	—105—	
	—100—	
Gas Lawnmower at 3 ft (1m)	—95—	
	—90—	
	—85—	Food Blender at 3 ft (1m)
Diesel Truck traveling 50 mph at 50 ft (15m)	—80—	Garbage Disposal at 3 ft (1m)
Noisy Urban Area during Daytime	—75—	
Gas Lawnmower at 100 ft (30m)	—70—	Vacuum Cleaner at 10 ft (3m)
Commercial Area	—65—	Normal Speech at 3 ft (1 m)
Heavy Traffic at 300 ft (91m)	—60—	
	—55—	Large Business Office
Quiet Urban Area during Daytime	—50—	Dishwasher in Next Room
	—45—	
Quiet Urban Area during Nighttime	—40—	Theater, Large Conference Room (background)
Quiet Suburban Area during Nighttime	—35—	
	—30—	Library
Quiet Rural Area during Nighttime	—25—	Bedroom at Night, Concert Hall (background)
	—20—	
	—15—	Broadcast/Recording Studio
	—10—	
	—5—	
Lowest Threshold of Human Hearing	—0—	Lowest Threshold of Human Hearing

Source: Caltrans 1998.

All quantitative descriptors used to measure environmental noise exposure recognize a positive correlation between the high acoustical energy content of a sound (i.e., its loudness and duration) and the disruptive effect it is likely to have as noise. Because environmental noise fluctuates over time, most such descriptors average the sound level over the time of exposure. Some measures add "penalties" during the times of day when intrusive sounds would be more disruptive to listeners. The rating scales of L_{eq}, L_{min}, and L_{max} are measures of ambient noise, while the L_{dn} and Community Noise Equivalent Level (CNEL) are measures of community noise. L_{eq} is the average A-weighted sound level measured over a given time interval. L_{eq} can be measured over any time period, but is typically measured for 1-minute, 15-minutes, 1-hour, or 24-hour periods. L_{dn} is another average A-weighted sound level measured over a 24-hour time period, adjusted to account for some individuals' increased sensitivity to noise levels during the evening and nighttime hours. L_{eq}, L_{min}, and L_{max}, as well as L_{dn} and CNEL are all applicable to this analysis and defined as follows:

The most commonly used noise descriptors for environmental exposures are:

- L_{eq}, the equivalent-energy noise level, is the average acoustic energy content of noise over any chosen exposure time. The L_{eq} is the constant noise level that would deliver the same acoustic energy to the ear as the actual time-varying noise over the same exposure time. L_{eq} is not adjusted based on the time of day during which the noise occurs.
- L_{dn}, the day-night average noise level, is a 24-hour average L_{eq} with a 10 dBA "penalty" added to noise during the hours of 10:00 P.M. to 7:00 A.M. to account for increased nighttime noise sensitivity. Because of this penalty, the L_{dn} would always be higher than its corresponding 24-

hour L_{eq} (e.g., a constant 60 dBA noise over 24 hours would have a 60 dB L_{eq}, but a 66.4 dBA L_{dn} accounting for the penalty applied from 10:00 P.M. to 7:00 A.M.).

- CNEL, the Community Noise Equivalent Level, is a 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 P.M. to 10:00 P.M. and a 10 dBA "weighting" added to noise during the hours of 10:00 P.M. to 7:00 A.M. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA-24 hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
- SEL, the sound exposure level (also known as the single noise event level), is the constant noise level that would deliver the same acoustic energy to the ear of a listener during a one-second exposure as the actual time-varying noise would deliver over its entire time of occurrence. SEL is typically used to characterize the effects of short-duration noise events (e.g., aircraft fly-overs or train pass-bys).

Noise levels from a source decline as distance to the receptor increases. Other factors, such as the weather and reflecting or shielding structures, also may intensify or reduce the noise level at a location. Sound waves reflect off of hard surfaces, but are partially absorbed by softer or irregular surfaces. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., where the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., where the area between the source and receptor is unpacked earth or has vegetation, including grass). Noise from stationary or point sources (such as construction equipment) is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Generally, if a noise source is completely enclosed or completely shielded with a solid barrier located close to the source, an 8 dBA noise reduction can be expected; if the enclosure or barrier is interrupted, noise would be reduced by only 5 dBA. The exterior-to-interior reduction of newer residential units and office buildings is generally 30 dBA or more.

3.3.1.2 Fundamentals of Environmental Ground-borne Vibration

Vibrating objects in contact with the ground radiate energy through the ground. If the object is massive or close enough to an observer, the ground vibrations are perceptible. Vibration magnitude is measured in vibration decibels (VdB) relative to a 1 micro-inch-per-second reference level. Background vibration levels in most inhabited areas are usually 50 VdB or lower, well below the threshold of perception (i.e., typically about 65 VdB). In most cases, when vibration is perceptible to people in their homes or workplaces, the source is within the same building (i.e., operation of HVAC equipment, movement of other occupants, slamming of doors, etc.). The outdoor sources most commonly responsible for producing perceptible vibration are heavy construction equipment, steel-wheeled trains, and motor vehicle traffic on rough roads (if the roadway is smooth, the vibration from traffic is rarely perceptible). At about 100 VdB, vibration levels are strong enough to begin to cause structural damage in fragile buildings.

3.3.1.3 Health and Welfare Effects of Environmental Noise

3.3.1.3.1 San Francisco Noise Ordinance

The San Francisco Noise Ordinance (Section 2900) makes the following declaration with regard to community noise levels and the World Health Organization (WHO) Guidelines (WHO 1999) (additional provisions of the San Francisco Noise Ordinance that pertain to the proposed action are given below in Section 3.3.2, Regulatory Framework):

It shall be the policy of San Francisco to maintain noise levels in areas that have existing healthful and acceptable levels of noise and to reduce noise levels, through all practicable means, in those areas of San Francisco where noise levels are above acceptable levels as defined by the WHO Guidelines on Community Noise.

3.3.1.3.2 World Health Organization Noise Exposure Recommendations

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 would suggest 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 important in the effective ability to fall asleep.

Other potential health effects of noise identified by WHO include decreased performance on complex cognitive tasks, such as reading, attention, 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 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). Noise can also disrupt speech intelligibility at relatively low levels; for example, in a classroom setting, a noise level as low as 35 dBA can disrupt clear understanding. Finally, noise can cause annoyance, and can trigger emotional reactions such as 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.

According to WHO, an adverse effect of noise is defined as:

> … a change in the morphology and physiology of an organism that results in impairment of functional capacity, or an impairment of capacity to compensate for additional stress, or increases the susceptibility of an organism to the harmful effects of other environmental influences … [including] any temporary or long-term lowering of the physical, psychological or social functioning of humans or human organs.

WHO exposure recommendations to avoid adverse effects from noise are summarized in Table 3.3.1-2.

Table 3.3.1-2. WHO Guideline Values for Community Noise in Specific Environments

Specific Environment	*Critical Health Effect(s)*	*L_{eq} (dBA)*	*Exposure Time (hours)*	*L_{max} (dB)*
Outdoor residential area	Serious annoyance, daytime and evening Moderate annoyance, daytime and evening	55 50	16 16	— —
Dwelling, indoors Inside bedrooms	Speech intelligibility and moderate annoyance, daytime and evening; Sleep disturbance, nighttime	35 30	16 8	 45
School class rooms, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	during class	—
School playground outdoor	Annoyance (external source)	55	during play	—
Public addresses, indoors and outdoors	Hearing impairment	85	1	110
Outdoors in parks and nature preserves[a]	Disruption of tranquility	*		

Note:
a. Existing quiet outdoor areas should be preserved, and the ratio of intruding noise to natural background sound should be kept low.
Source: WHO 1999.

3.3.2 Regulatory Framework

3.3.2.1 Federal

3.3.2.1.1 U.S. Environmental Protection Agency

The federal *Noise Control Act of 1972* addressed the issue of noise as a threat to human health and welfare, particularly in urban areas. In response to the Act, the USEPA published *Information of Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (USEPA Levels). Table 3.3.2-1 summarizes USEPA recommendations for noise-sensitive areas. Ideally, the yearly average L_{eq} should not exceed 70 dBA to prevent measurable hearing loss over a lifetime, and the L_{dn} should not exceed 55 dBA outdoors and 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas. In addition to the identified noise levels to protect public health, the USEPA Levels identify an increase of 5 dBA as an adequate margin of safety relative to a baseline noise exposure level of 55 dBA L_{dn} before a noticeable increase in adverse community reaction would be expected.

Table 3.3.2-1. Summary of Noise Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety

Effect	*Level*	*Area*
Hearing Loss	L_{eq}(24 hr) < 70 dBA[a]	All areas.
Outdoor activity interference and annoyance	L_{dn} < 55 dBA	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
Outdoor activity interference and annoyance	L_{eq}(24 hr) < 55 dBA	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	L_{dn} < 45 dBA	Indoor residential areas.
Indoor activity interference and annoyance	L_{eq}(24 hr) < 45 dBA	Other indoor areas with human activities such as schools, etc.

Note:
a. Yearly average-equivalent sound levels in decibels; the exposure period that results in hearing loss at the identified level is a period of forty years.

Source: USEPA 1974.

The USEPA does not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no reason to suspect that there would be risk from any of the identified health or welfare effects of noise.

3.3.2.1.2 Federal Transit Administration

The Federal Transit Administration (FTA) developed a methodology and significance criteria to evaluate noise impacts from surface transportation modes (i.e., passenger cars, trucks, buses, and rail) in *Transit Noise Impact and Vibration Assessment* (FTA 2006). The incremental noise impact criteria included the FTA Guidelines, as presented in Table 3.3.2-2, are based on USEPA Levels and subsequent studies of annoyance in communities affected by transportation noise. The scientific rationale for the choice of these criteria is also explained in the FTA Guidelines. Starting from the USEPA definition of minimal noise impact as a 5 dBA change from an established protective ambient level, the FTA extended these incremental impact criteria to higher baseline ambient levels. As baseline ambient levels increase,

smaller and smaller increments are allowed to limit increases in community annoyance, such as in residential areas with a baseline ambient noise level of 50 dBA L_{dn} a 5 dBA increase in noise levels would be acceptable, while at 70 dBA L_{dn} only a 1 dBA increase would be allowed.

Table 3.3.2-2. Federal Transit Administration Impact Criteria for Noise-Sensitive Uses

Residences and Buildings Where People Normally Sleep[a]		***Institutional Land Uses with Primarily Daytime and Evening Uses[b]***	
Existing L_{dn} (dBA)	*Allowable Noise Increment (dBA)*	*Existing Peak Hour L_{eq} (dBA)*	*Allowable Noise Increment (dBA)*
45	8	45	12
50	5	50	9
55	3	55	6
60	2	60	5
65	1	65	3
70	1	70	3
75	0	75	1
80	0	80	0

Notes:
a. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
b. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material.
Source: FTA 2006.

The FTA has also developed criteria for judging the significance of vibration produced by transportation sources and construction activity, as shown in Table 3.3.2-3.

Table 3.3.2-3. Groundborne Vibration Impact Criteria for General Assessment

Land Use Category	***Impact Levels (VdB; relative to 1 micro-inch/second)***		
	Frequent Events[a]	*Occasional Events[b]*	*Infrequent Events[c]*
Category 1: Buildings where vibration would interfere with interior operations	65[d]	65[d]	65[d]
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

Notes:
a. "Frequent Events" is defined as more than 70 vibration events of the same source per day.
b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
c. "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.
d. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define the acceptable vibration levels.
Source: FTA 2006.

Under Federal Highway Administration (FHWA) regulations, noise abatement must be considered for new highway construction and highway reconstruction projects when the noise levels approach or exceed the noise-abatement criteria. For residential, school, and other noise-sensitive locations, these criteria indicate that the L_{eq} during the noisiest 1-hour period of the day should not exceed 67 dBA at the exterior or 52 dBA within the interior. For commercial purposes, the exterior L_{eq} should not exceed 72 dBA.

3.3.2.1.3 Federal Aviation Administration

Federal Aviation Administration (FAA) regulations (i.e., Part 150, Airport Noise Compatibility Planning) prescribe the methodology governing the development, submission, and review of airport noise exposure maps and noise compatibility programs. The noise exposure maps use average annual L_{dn} or CNEL contours around the airport as the primary noise descriptor. To the FAA, all land uses are considered compatible when aircraft noise effects are less than 65 dB L_{dn} or CNEL. At higher noise exposures, increasing restrictions are applied to development within the aircraft noise contours, depending on the noise-sensitivity of the land use and the degree of noise attenuation required in the structures' interior spaces. As shown in Figure 3.3.2-1, the project site is well outside the San Francisco International Airport's 65 dBA CNEL noise contour.

3.3.2.2 State

3.3.2.2.1 Governor's Office of Planning and Research

The Governor's Office of Planning and Research *General Plan Guidelines 2003* (GP Guidelines) promotes use of L_{dn} or CNEL for evaluating the compatibility of various land uses with respect to their noise exposure. The designation of a level of noise exposure as "normally acceptable" for a given land use category implies that the interior noise levels would be acceptable to the occupants without the need for any special structural acoustic treatment. The GP Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels. The GP Guidelines provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the USEPA Levels influenced the recommendations of the GP Guidelines, most importantly in the choice of noise exposure metrics (i.e., L_{dn} or CNEL) and in the upper limits for the "normally acceptable" outdoor exposure of noise-sensitive uses (i.e., no higher than 60 dBA L_{dn}/CNEL for residential, which is obtained when the 5 dBA margin of safety is added to the baseline noise exposure level of 55 dBA, which the USEPA believes is completely adequate to protect public health and welfare).

3.3.2.2.2 Title 25 (California Noise Insulation Standards)

The *California Noise Insulation Standards* (25 CCR 1092) establishes uniform minimum noise insulation performance standards for new hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings. Specifically, Title 25 states that interior noise levels attributable to exterior sources should not exceed 45 dBA L_{dn} or CNEL (the same levels that the USEPA recommends for residential interiors) in any habitable room of new dwellings. Acoustical studies must be prepared for proposed multiple unit residential and hotel/motel structures where outdoor L_{dn} or CNEL would be 60 dBA or greater. The studies must demonstrate that the design of the building would reduce interior noise to 45 dBA L_{dn} or CNEL or lower. Dwellings are to be designed so that interior noise levels would meet this standard for at least 10 years from the time of the building permit application. Interior noise levels can be reduced through the use of noise insulating windows and by using sound isolation materials when constructing walls and ceilings. This is achieved by using noise insulating windows and/or sound isolation materials when constructing walls and ceilings.

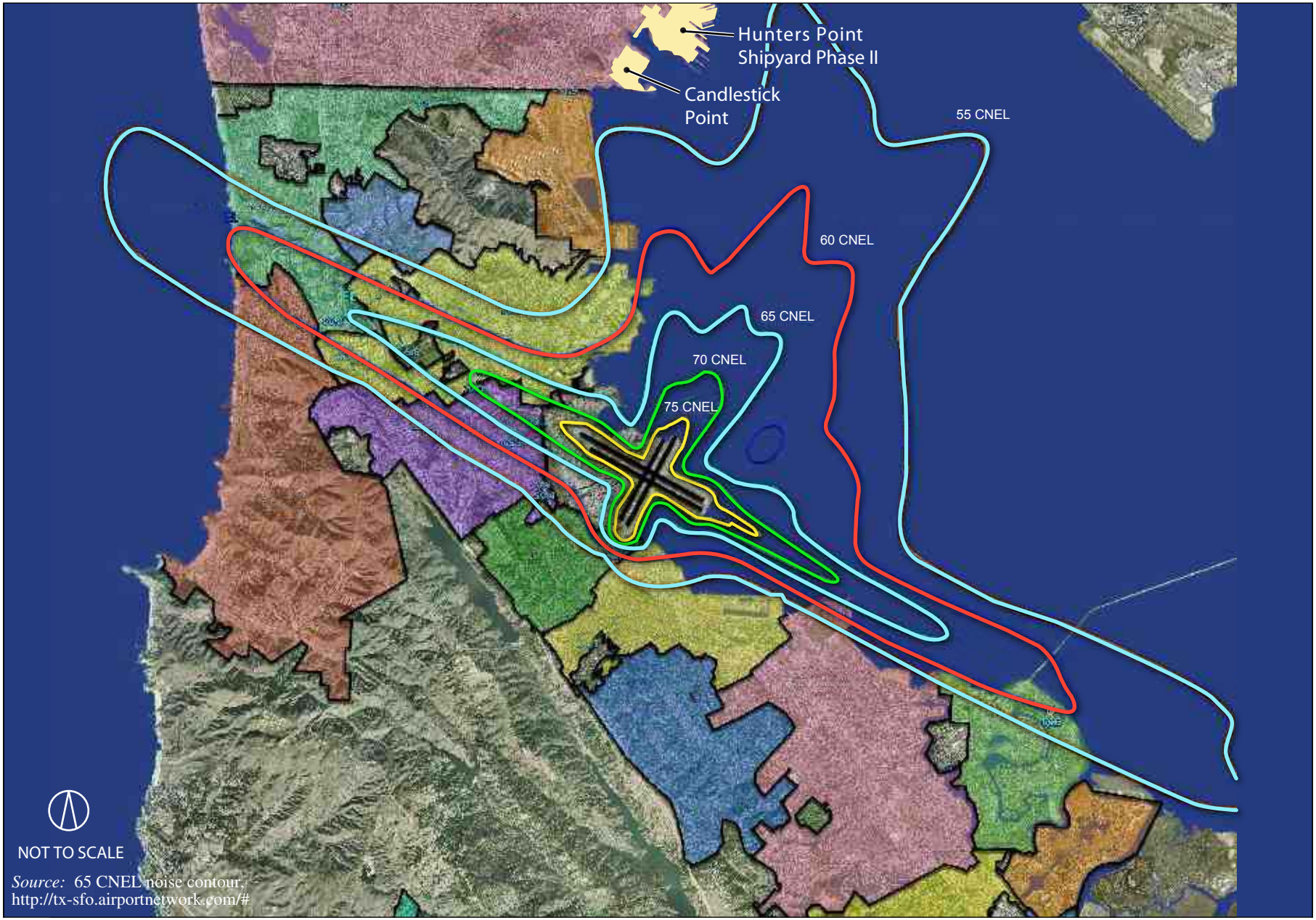


Figure 3.3.2-1. San Francisco International Airport Noise Contours

3.3.2.3 Local

3.3.2.3.1 San Francisco General Plan

The General Plan provides long-term guidance and policies for maintaining and improving the quality of life and the man-made and natural resources of the community. The Environmental Protection Element of the General Plan is concerned primarily with avoiding or mitigating the adverse effects of transportation noise. However, many of the Objectives of the Transportation Noise section could be applicable to noise from other sources (including noise from crowds, public address systems, and concert noise from a stadium):

Objective 10 Minimize the impact of noise on affected areas.

Objective 11 Promote land uses that are compatible with various transportation noise levels.

3.3.2.3.2 San Francisco Noise Ordinance (Article 29, San Francisco Police Code)

As noted above in Section 3.3.1.3.1, San Francisco Noise Ordinance, the Noise Ordinance specifically recognizes that adverse effects on a community can arise from noise sources such as transportation, construction, mechanical equipment, entertainment, and human and animal behavior (San Francisco Noise Ordinance Article 29, San Francisco Police Code, Section 2900).

The following policies are included to address and limit disruptive noise intrusions from these sources.

Waste Disposal Services (Section 2904)

The Noise Ordinance limits noise from waste disposal services mechanical or hydraulic devices to 75 dBA when measured from 50 ft (15 m). This maximum noise level does not apply to the noise associated with crushing, impacting, dropping, or moving garbage on the truck, but only to the truck's processing system.

Construction (Sections 2907 and 2908)

The Noise Ordinance limits noise from powered construction equipment to a level of 80 dBA at a distance of 100 ft (30 m) or an equivalent level at some other distance. This does not apply to impact tools – provided they are equipped with appropriate noise control features recommended by the manufacturers and approved by the Director of Public Works or the Director of Building Inspection – nor to construction equipment used in connection with emergency work. Additionally, construction activities are generally prohibited between the hours of 8:00 P.M. and 7:00 A.M. if the noise created would be in excess of the ambient noise level by 5 dBA at the nearest property line, although exceptions to these limits can be made in certain cases by the Director of Public Works or the Director of Building Inspection.

Noise Limits (Section 2909)

The Noise Ordinance limits noise from sources defined as "any machine or device, music or entertainment or any combination of same" located on residential or commercial/industrial property to 5 dBA or 8 dBA, respectively, above the local "ambient" at any point outside of the property plane of a residential, commercial/industrial or public land use, respectively, containing the noise source. An additional low-frequency criterion applies to noise generated from a licensed place of entertainment, specifically that no associated noise or music should exceed the low-frequency ambient noise level by more than 8 dBC.

The Noise Ordinance limits noise from a fixed "source" from causing the noise level measured inside any sleeping or living room in any dwelling unit located on residential property to 45 dBA between the hours of 10:00 P.M. to 7:00 A.M. or 55 dBA between the hours of 7:00 A.M. to 10:00 P.M. with windows open except where building ventilation is achieved through mechanical systems that allow windows to remain closed.

Variances (Section 2910)

The Noise Ordinance gives the Directors of Public Health, Public Works, Building Inspection, the Entertainment Commission, or the Chief of Police authority to grant variances to noise regulations over which they have jurisdiction. The Department of Public Health (DPH) has jurisdiction over sources specified in Noise Limits (Section 2909), the Department of Building Inspection (DBI) and Department of Public Works (DPW) over sources specified in Construction (Sections 2907 and 2908), and the Director of the Entertainment Commission may enforce noise standards associated with licensed places of entertainment.

3.3.3 Existing Conditions

3.3.3.1 Existing Noise Levels and Noise-Sensitive Uses in the Project Vicinity

The project site is located in the southeastern area of San Francisco and extends east to San Francisco Bay. The project consists of Hunters Point Shipyard (HPS), which contains many structures associated with ship repair, storage, and former DoN uses, most of which are vacant, as well as approximately 100 artists located in studios on Parcels A and B. The ground surface across the entire project site is relatively flat with elevations ranging from approximately 0 to +20 ft (6 m) (San Francisco City Datum [SFCD]). Maximum ground surface elevation near the project site is on Bayview Hill (west of Candlestick Point), which reaches an elevation of approximately 400 ft (122 m) (SFCD). To the north of HPS, there is a bluff that forms the end of a ridge (Hunters Point Hill) extending to the northwest almost to Third St. The bluff is currently being developed with residential uses by Lennar Urban (HPS Phase I). The ridge serves to shield a portion of an existing residential neighborhood further north from any existing or future noise sources on HPS. To the northwest of HPS, the land is generally flat and largely residential. There are also light industry and warehouse land uses to the west and northwest of the project site, in the vicinity of and north of Carroll Ave, but these uses are not generally considered to be noise sensitive. Candlestick Point, which primarily contains the existing San Francisco football stadium, the Candlestick Point State Recreation Area (CPSRA), a recreational vehicle park, and the Alice Griffith Public Housing, is adjacent to the project site and relevant with respect to noise generation.

3.3.3.1.1 Noise-Sensitive Uses

The City and County of San Francisco has defined noise-sensitive uses as land uses and/or receptors of residences of all types, including schools, hospitals, convalescent facilities, rest homes, hotels, motels, and places of worship. Sensitive uses from a noise perspective include places where there is a reasonable expectation that individuals could be sleeping, learning, worshipping, or recuperating. Existing noise-sensitive uses near the project site include residential areas of Bayview Hunters Point (BVHP), and Hunters Point Phase I residential uses. Schools near the project site include Bret Harte Elementary School, Bret Harte Nursery and School-Age Children's Center, Kipp Bayview Academy, S.R. Martin College Preparatory School, Muhammad University of Islam, Malcom X Academy Elementary School, and Dr. George Washington Carver Elementary School. Additionally, residential uses developed within the project site and intended for occupation during subsequent construction phases would be considered noise-sensitive uses for the purposes of this SEIS.

3.3.3.1.2 Community Ambient Noise Levels 2009

Measurements in 2009

Long-term 24-hour ambient noise measurements were taken at six locations in the residential neighborhoods north and west of the project site for a total of six days in 2009. The long-term ambient noise measurements were conducted over the course of three days in January 2009, first by recording A-weighted community noise levels. In July 2009, the C-weighted community noise levels were measured at the same locations over the course of three days. Both the A-weighted and C-weighted measurements were taken for three consecutive 24-hour periods at each location during the respective measurement times and were recorded using Larson Davis digital sound level meters that satisfy the American National Standards Institute for general environmental noise measurement instrumentation. The Saturday-Sunday-Monday period was chosen for the three-day measurements because those are the days when a football game would most likely to be played at the proposed stadium and also when concerts would most likely occur. To obtain the measurements, the microphone was positioned at a height of 12 ft (4 m) above the ground. The locations of these measurements are indicated as N1 through N6 on the aerial photo in Figure 3.3.3-1.

Table 3.3.3-1 contains a summary of the L_{dn} measurements by location for each 24-hour period of the survey. Hourly data were recorded for L_{eq} and L_n descriptors (the latter being the levels exceeded n percent of the time, where n = 90, 50, 10, and 1). The existing ambient noise measurement data indicate variable conditions, with some areas quieter than others. From Table 3.3.3-1 it can be seen that the measured L_{dn} ranges from 58 dBA to 67 dBA, with the highest level measured at N1 (likely due to a higher level of truck traffic there than at the other locations). Weekend noise levels were lower (by 1 to 4 dBA) on Sunday than on Saturday, while Monday noise levels were generally similar to those on Saturday. With most L_{dn} values (i.e., except those at N3 and N6) near or greater than 65 dBA L_{dn}, the ambient noise levels in the study area are generally higher than in San Francisco's western residential neighborhoods (i.e., Richmond or Sunset Districts), but lower than those in Downtown or South of Market Areas. It was observed that N3 and N6 had less traffic than the other locations measured, which would explain why these locations are quieter than the others.

Table 3.3.3-1. Existing Day-Night Noise Levels (Ldn)

Location ID	***Measurement Location Description***	***Saturday 10 Jan 2009***	***Sunday 11 Jan 2009***	***Monday 12 Jan 2009***
N1	Residential area along Carroll Ave north of Arelious Walker Dr	67	63	67
N2	Residential area along Revere Ave between Ingalls St and Jennings St	64	63	65
N3	Residential area along Donahue St between Kirkwood Ave and Jerrold Ave	62	58	59
N4	Residential area along Kiska Rd between Reardon Rd and Ingalls St	65	65	66
N5	Residential area along Hawes St near Hunters Point Blvd	65	62	64
N6	Residential area along Jamestown Ave at Hawes St	60	59	60

Note:
Measurements include the effects of all noise sources influential at or near each location during each designated measurement period; traffic noise is likely the dominant influence at all locations and during all periods, but other sources (e.g., aircraft, trash pickup, etc.) also contribute to the totals.
Source: Appendix I1 of the CP-HPS DEIR, SFRA 2009.

Table 3.3.3-2 presents a summary of the range of existing A-weighted ambient background (L_{90}) levels at times when a football game would usually occur (i.e., weekend afternoons, 3:00 P.M. to 6:00 P.M., and Monday evenings, 6:00 P.M. to 9:00 P.M.).

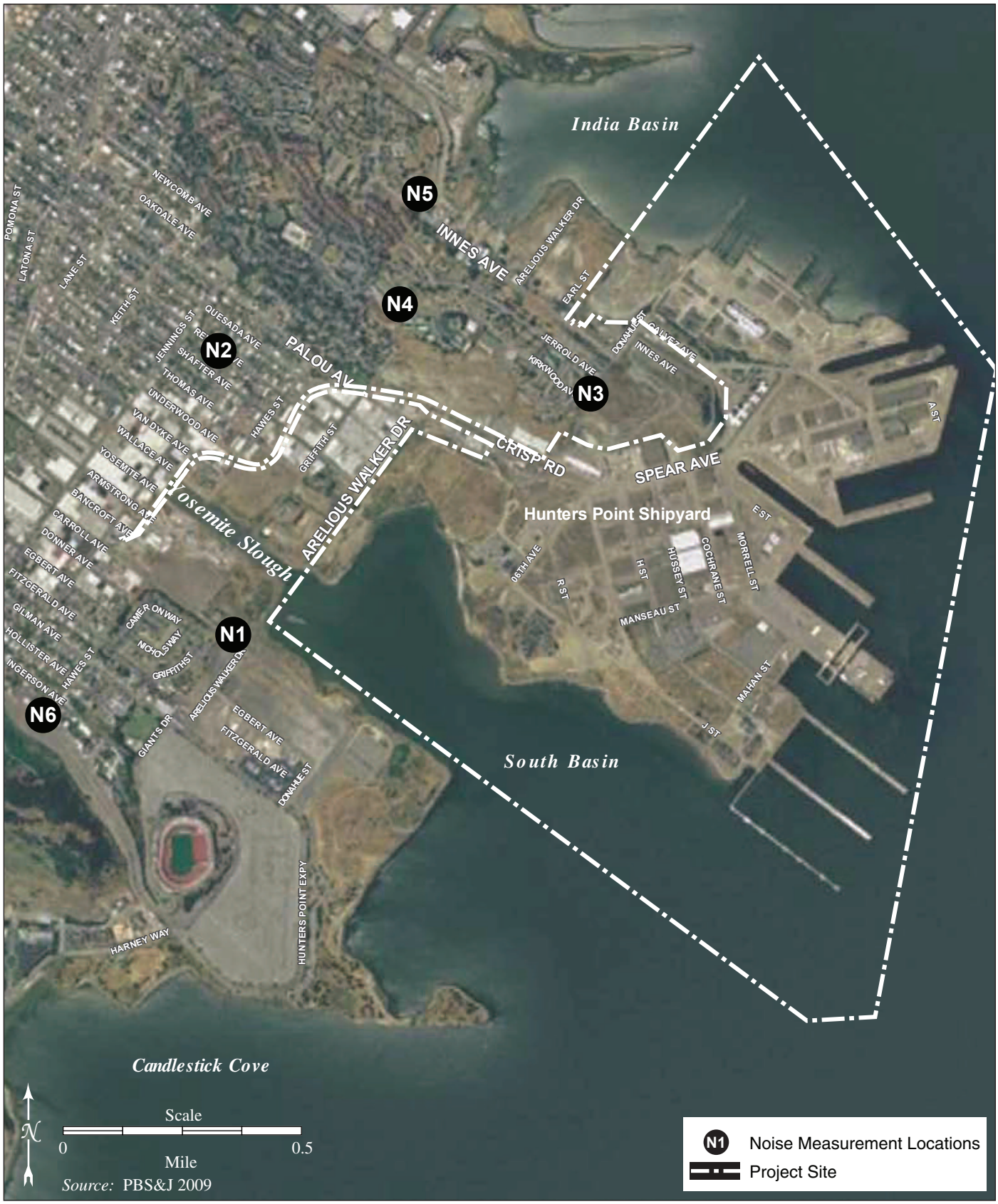


Figure 3.3.3-1. Long Term Ambient Noise Measurement Locations

Table 3.3.3-2. Existing A-Weighted Background Noise Levels (L90)				
Location ID	***Measurement Location Description***	***Saturday 10 Jan 2009***	***Sunday 11 Jan 2009***	***Monday 12 Jan 2009***
N1	Residential area along Carroll Ave north of Arelious Walker Dr	45 to 46	45 to 49	43 to 47
N2	Residential area along Revere Ave between Ingalls St and Jennings St	48 to 49	47 to 50	45 to 49
N3	Residential area along Donahue St between Kirkwood Ave and Jerrold Ave	42 to 45	43 to 45	41 to 43
N4	Residential area along Kiska Rd between Reardon Rd and Ingalls St	45 to 48	42 to 43	44 to 45
N5	Residential area along Hawes St near Hunters Point Blvd	47 to 50	44 to 46	43 to 48
N6	Residential area along Jamestown Ave at Hawes St	47 to 50	49 to 50	46 to 48

Note:
Measurements include the effects of all noise sources influential at or near each location during each designated measurement period; traffic noise is likely the dominant influence at all locations and during all periods, but other sources (e.g., aircraft, trash pickup, etc.) also contribute to the totals.
Source: Appendix I1 of the CP-HPS DEIR, SFRA 2009.

Table 3.3.3-3 presents a similar summary of the C-weighted background levels at night during times when a concert at the proposed stadium would likely occur (7:00 P.M. to midnight).

Table 3.3.3-3. Existing C-Weighted Background Noise Levels (L90) at Night			
Location ID	***Description***	***Range***	***Median***
N1	Residential area along Carroll Ave north of Arelious Walker Dr	58 to 63	60
N2	Residential area along Revere Ave between Ingalls St and Jennings St	55 to 62	58
N3	Residential area along Donahue St between Kirkwood Ave and Jerrold Ave	53 to 60	56
N4	Residential area along Kiska Rd between Reardon Rd and Ingalls St	55 to 64	59
N5	Residential area along Hawes St near Hunters Point Blvd	56 to 64	60
N6	Residential area along Jamestown Ave at Hawes St	—	—

Note:
Measurements include the effects of all noise sources influential at or near each location during each designated measurement period; traffic noise is likely the dominant influence at all locations and during all periods, but other sources (e.g., aircraft, trash pickup, etc.) also contribute to the totals.
Source: Appendix I1 of the CP-HPS DEIR, SFRA 2009.

Traffic Noise Levels Along Major Project Site Access Routes

Short-term traffic noise measurements (i.e., 15 minutes each) were taken at five near-curbside locations along the main project site access routes during the weekday P.M. peak commute period, as shown in Table 3.3.3-4. The locations of these measurements are indicated as T1 through T5 on the aerial photo in Figure 3.3.3-2.

Figure 3.3.3-2. Short Term Ambient Noise Measurement Locations

Table 3.3.3-4. Existing Peak-Hour Traffic Noise Measurements (Leq)					
Noise Receptor	***Land Use Description***	***Noise Level***			***Primary Noise Source***
		L_{eq}	L_{min}	L_{max}	
T1	Candlestick Condos	66.8	60.5	87.3	Traffic along Candlestick, and US-101
T2	Residences along Hunters Point Blvd	67.8	47.1	86.3	Traffic along Hunters Point Blvd
T3	Residences along Palou Ave between Jennings and Ingalls	65.8	51.6	86.4	Traffic along Palou Ave
T4	Vacant lot along Carroll Ave across from Alice Griffith Neighborhood Park residences.	64.8	46.9	88.0	Traffic along Carroll Ave
T5	Residences along Gilman Ave, across from Bret Hart Elementary School	61.4	52.4	78.9	Traffic along Gilman Ave

Note:
Noise measurements taken on May 20, 2009, between the hours of 3:00 P.M. and 6:00 P.M. for 15 minutes each.
Noise measurement data sheets are available in Appendix I2 of the CP-HPS DEIR (Short-Term Noise Measurements) (SFRA 2009).
Source: Appendix I2 of the CP-HPS DEIR, SFRA 2009.

In addition to short-term measurements, traffic noise L_{eq} (peak hour) and L_{dn} at the setbacks of the residential uses, adjacent to the major access routes and other streets likely to carry substantial project traffic volumes was calculated using the Federal Highway Administration (FHWA) Traffic Noise Model. The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, truck mix, distance from roadway to receptor and site environmental conditions. The average vehicle noise rates (i.e., energy rates) utilized in Traffic Noise Model replicate the latest measurements of average vehicle noise rates for all vehicle classes. Traffic volumes utilized as data inputs in the noise prediction model were provided through the traffic analysis prepared for this SEIS. The General Plan regards noise levels less than or equal to 60 dBA L_{dn} as "satisfactory, with no special noise insulation requirements" for residential uses (refer to Section 3.3.2, Regulatory Framework). The average daily noise levels along these roadway segments are presented in Table 3.3.3-5. As shown, all roadways modeled were below the 60 dBA L_{dn} noise level, except for 3rd St and Bayshore Blvd.

Table 3.3.3-5. Modeled Existing Traffic Noise Levels at Residential Setbacks			
Roadway	***Land Use***	***Setback Distance (ft from centerline)***	***L_{dn} ****
Innes north of Carroll Ave	Residential	30	53.3
3rd south of Carroll Ave	Residential	40	**62.8**
Caesar west of 3rd Street	Residential	60	59.
Palou Ave east of 3rd St	Residential	40	56.8
Ingalls north of Carroll Ave	Residential	30	56.7
Carroll Ave east of 3rd St	Residential	60	52.6
Gilman Ave east of 3rd St	Commercial	40	57.7
Jamestown Ave north of Harney Way	Residential	60	51.4
Harney Way west of Jamestown Ave	Residential	80	52.6

Notes:
a. Noise model data sheets are available in Appendix I3 of the CP-HPS DEIR (Traffic Noise Model Output) (SFRA 2009).
b. ***Bold indicates exceedance of 60 dBA.**
Source: Appendix I3 of the CP-HPS DEIR, SFRA 2009.

Football Game Noise Levels Measured Near the Existing Stadium

Noise measurements were taken near the existing Candlestick Park stadium, outside the Jamestown Condominiums on the west side of Jamestown Ave, during a football game on Sunday, 23 December

2007. The noise level near a stadium with a football game in progress is highly variable. Most of the peak noise events were associated with game activities (e.g., pre-game ceremonies, crowd cheering, music, and announcements on the public address system, etc.). The highest game-related peak noise (L_{max}) was in the upper 60s to mid 70s dBA, but it was more often lower. Audible game-related noise events were fairly frequent but of short duration. The average noise level (L_{eq}) during the portion of the game that was monitored was in the mid 60s dBA, while the background level (L_{90}) was in the upper 50s dBA. Also, game activity was not the only source of peak noise events. Candlestick Park is under major approach/departure routes to/from San Francisco International Airport. Aircraft overflights happened a few times during the monitoring period and, although their L_{max} were not as large as that of the highest game noise events, their audible duration was longer, pushing the SEL level into the low to mid 70s dBA.

3.3.3.1.3 Community Ambient Noise Levels in 2000 FEIS

In 1993, the noise environment of the South Bayshore planning area was dominated by transportation noise sources, with highway traffic and aircraft overflights being the major contributors. Commuter rail operations and limited freight service contribute to background noise levels in areas adjacent to the CalTrain tracks.

No measurements of noise levels at HPS were made in 1992. However, the Environmental Protection Element of the General Plan, adopted in 1974, indicates that background L_{dn} levels at HPS are about 55 dB. Adjacent residential and commercial areas have somewhat higher background noise levels, with average L_{dn} levels of about 60 dB.

3.3.3.1.4 Other Baseline Noise Measurements

Noise monitoring was conducted along Third St in the BVHP area in July 1997 (FTA and San Francisco Planning Department 1998). The noise data indicate existing noise exposure to be relatively high along the Third St corridor due to traffic on Third St and other heavily traveled arterials. The L_{dn} for the segment of the Third St corridor between the U.S. 101 overcrossing and Thomas Ave was estimated at between 70 and 77 dBA. The L_{dn} for the Third St segment between Thomas Ave and Jerrold Ave was estimated at between 73 and 76 dBA. Noise at buildings one row behind Third St was assumed to be 10 dB lower than along Third St (FTA and San Francisco Planning Department 1998).

3.4 Land Use and Recreation

3.4.1 Background

This section summarizes existing land uses at HPS and in the project vicinity. Also provided is a discussion of the applicable land use plans and policies that dictate the disposal and reuse of the project site.

3.4.2 Regulatory Framework

The following subsections discuss the regulatory framework that would affect disposal and reuse of HPS. Although the project site is located within the City and County of San Francisco, the local government does not have any current jurisdictional authority over land use on the project site because it is a federal military facility. Land use and development within the project vicinity are governed by federal, state, regional, and local plans, policies, and regulations. Subsequent to disposal, planning and regulatory control over HPS would be exercised by many government agencies, including the City and County of San Francisco, and regional, state, and federal agencies. Agencies that would have jurisdiction over HPS and a description of the responsibilities of each agency with respect to approval and implementation of disposal and reuse are discussed below. For informational purposes, this section also describes citywide planning initiatives and programs that continue to shape the underlying goals and implementation strategies of the redevelopment alternatives.

3.4.2.1 Federal

3.4.2.1.1 Coastal Zone Management Act of 1972

In 1972, Congress passed the *Coastal Zone Management Act* (CZMA) to "preserve, protect, develop, and where possible, to restore or enhance, the resources of the nation's coastal zone for this and succeeding generations" and to "encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone" (16 USC 1452, Section 303[1] and [2]).

Section 307(c)(3)(A) of the CZMA states that "any applicant for a required federal license or permit to conduct an activity, in or outside the coastal zone, affecting any land or water use or natural resource of the coastal zone of that state shall provide a certification that the proposed activity complies with the enforceable policies of the state's approved program and that such activity would be conducted in a manner consistent with the program." To participate in the coastal zone management program, a state is required to prepare a program management plan for approval by the National Oceanic and Atmospheric Administration Office of Coast and Ocean Resource Management. Once the National Oceanic and Atmospheric Administration Office of Coast and Ocean Resource Management has approved a plan and its enforceable program policies, a state program gains "federal consistency" jurisdiction. This means that deferral actions (e.g., a project requiring federally issued licenses or permits) that occur within a state's coastal zone must be found to be consistent with state coastal policies before the federal action can occur.

California has a federally approved Coastal Management Program, which includes the California Coastal Act. The program established the BCDC as the coastal management and regulatory agency responsible for governing coastal resources within San Francisco Bay. In accordance with its role in implementing CZMA, the BCDC is responsible for conducting federal consistency reviews for projects along the San Francisco Bay segment of the California coastal zone.

The coastal management plan for the east side of San Francisco consists of the *McAteer-Petris Act* (California *Public Resources Code* Section 66600 *et seq.*), the *San Francisco Bay Plan* (Bay Plan) (BCDC 1969, amended 2006), the *San Francisco Bay Area Seaport Plan* (Seaport Plan) (BCDC and MTC 1996), and local management programs, all discussed below. The coastal management plan, in conjunction with other BCDC laws and regulations, forms the BCDC's management program for complying with CZMA.

Under the approved coastal management program, 55 ac (22 ha) in the southeast portion of HPS are designated as a "Port" Priority Use Area in the Bay Area Seaport Plan, which is further discussed in Section 3.4.2.2.

3.4.2.2 State

3.4.2.2.1 State Lands Commission

The Public Trust

The Public Trust governs the use of tide and submerged lands, including certain former tide and submerged lands that have been filled. Public trust lands are required to be used for public trust purposes, which include navigation, fisheries, waterborne commerce, natural resource protection, and water-related uses that attract the public to use and enjoy the waterfront (California State Lands Commission, Public Trust Policy 2001). In addition, public trust lands generally may not be sold into private ownership. However, under limited circumstances, the California Legislature may authorize by statute the termination of the trust. One way to accomplish this is through an exchange of lands, in which lands of equal or greater value and usefulness to the trust are added to the trust.

Today, the California State Lands Commission holds title to most un-granted tide and submerged lands in California and monitors grants by the California Legislature of tide and submerged lands to cities and counties (California *Public Resources Code*, Division 6).

Most of the historic tide and submerged lands within San Francisco's city limits have been granted by the state, either to private parties or to the city and other public agencies. Lands granted to public entities such as the city are generally subject to the public trust, and are also subject to any additional terms and conditions provided in the granting statute (often called the "statutory trust"). In San Francisco, a number of grants of tidelands to the city were made over the years, the most substantial being the 1968 Burton Act, which granted all of the tide and submerged lands that were still held by the state at that time. The Burton Act grant did not include lands that were then in federal ownership, such as HPS. The State Lands Commission, in cooperation with the California Attorney General, monitors granted lands for compliance with the public trust and the applicable granting statutes.

Hunters Point Shipyard Phase II Public Trust Lands

The *Hunters Point Shipyard Public Trust Exchange Act* was enacted in 2003. It authorized and approved an exchange by the SFRA of public trust lands within HPS when conveyed by the DoN, whereby trust lands that met specified criteria in this Act and that were not useful for public trust purposes could be freed from the public trust and conveyed into private ownership, provided that certain other lands were made subject to the public trust through a land exchange. Exchanges under this Act require the approval of the California State Lands Commission.

Senate Bill 792 (SB 792), signed by the Governor on 11 October 2009, repeals the *Hunters Point Shipyard Conversion Act of 2002*, the *Hunters Point Shipyard Public Trust Exchange Act*, and *Public Resources Code* Section 5006.8 (which authorized a trust exchange at Candlestick Point), and

consolidates the key provisions of those statutes into a statute covering both the Candlestick Point area and HPS. In addition to authorizing a trust exchange, the statute authorizes a reconfiguration of CPSRA coupled with improvements within the park and the provision of an ongoing source of park operation and maintenance funding.

3.4.2.2.2 Bay Conservation and Development Commission

BCDC functions as the state coastal management agency for San Francisco Bay, having jurisdiction over areas subject to tidal action up to the mean high tide line and including sloughs, marshlands lying between the mean high tide and 5 ft (1.5 m) above mean sea level, tidelands, and submerged lands. Its shoreline band jurisdiction includes areas 100 ft (30 m) inland and parallel to the mean high tide line. BCDC uses the Bay Plan and the Seaport Plan as the long-range planning and implementation documents for the coastal zone management program.

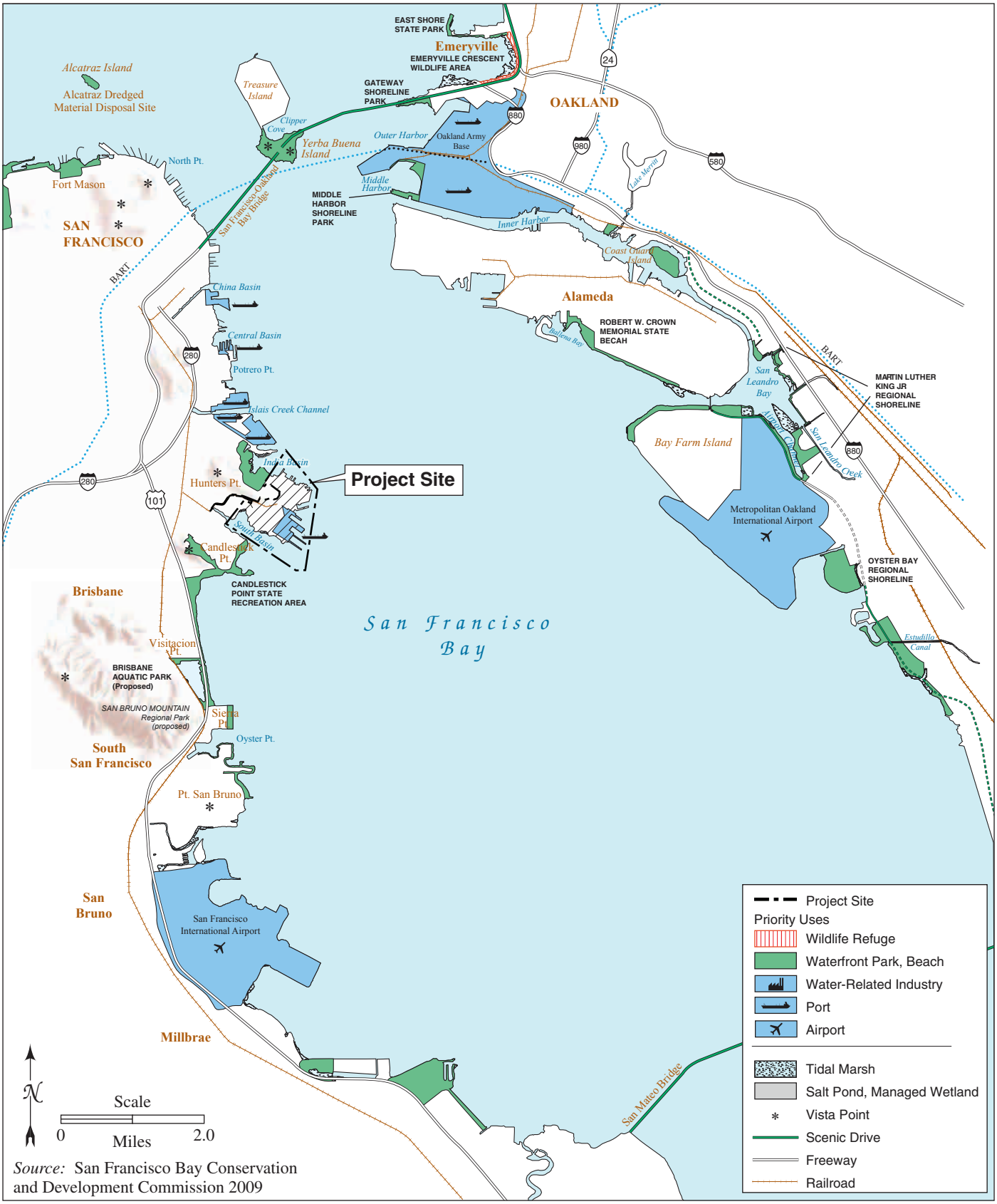
BCDC has the authority to issue or deny permits for the placement of fill, extraction of materials, or substantial changes in use of land, water, or structures within its jurisdiction, and to enforce policies aimed at protecting the bay and its shoreline.

San Francisco Bay Plan

The Bay Plan was adopted by the BCDC and amended through 2002. The Bay Plan includes policies that protect San Francisco Bay's economic and natural resources, including the designation of shoreline regional priority use areas. The Bay Plan stipulates that priority use areas should be reserved for regionally important, water-oriented uses requiring shoreline sites or historically located on shoreline sites, such as ports, water-related industry, water-related recreation, airports, and wildlife refuges. The Bay Plan contains policies that apply to specific uses as well as criteria for the use and development of each designated site.

As shown on Figure 3.4.2-1, the Bay Plan designates a portion of HPS as a "Port" Priority Use Area. The Bay Plan indicates that San Francisco is planning to develop a large community park along the south shore of HPS that would connect with the CPSRA in the Candlestick Point area, coordinated with the proposed redevelopment of the stadium area and HPS. For the Hunters Point community, the Bay Plan refers to the Seaport Plan and calls for developing a shoreline park integrated with the CPSRA in the Candlestick Point area, consistent with the San Francisco Redevelopment Plan. Further, there is the potential for a water trail camping site, and that some fill may be needed. The relationship of the proposed action to the "Port" Priority Use Area designation in the Bay Plan is discussed under the Seaport Plan.

Recreation-related objectives and policies of the Bay Plan that are relevant to reuse of HPS emphasize the creation of diverse and accessible water-oriented recreational facilities, such as marinas, launch ramps, beaches, and fishing piers. The Bay Plan states that such facilities should be provided to meet the needs of a growing and diversifying population, and should be well distributed around the bay and improved to accommodate a broad range of water-oriented recreational activities for people of all races, cultures, ages, and income levels. Recreational facilities, such as waterfront parks, trails, marinas, live-aboard boats, non-motorized small boat access, fishing piers, launching lanes, and beaches, should be encouraged and allowed by the BCDC, provided they are located, improved and managed consistent with BCDC policies. Waterfront parks should emphasize hiking, bicycling, riding trails, picnic facilities, swimming, environmental, historical and cultural education and interpretation, viewpoints, beaches, and fishing facilities.



Source: San Francisco Bay Conservation and Development Commission 2009

Figure 3.4.2-1. San Francisco Bay Plan Land Use Designations

Bay Area Seaport Plan

The Seaport Plan is a joint planning effort by BCDC and the MTC (BCDC and MTC 1996). The Seaport Plan constitutes the maritime element of MTC's *Regional Transportation Plan*, which is discussed in Section 3.1, Transportation, and is incorporated into BCDC's Bay Plan, where it is the basis of the port policies. The Seaport Plan contains policies for future Bay Area maritime development, based on projected future needs for marine terminals. The shoreline areas designated use in the Seaport Plan for Port of San Francisco mirror the "Port" use designations in the Bay Plan.

The Seaport Plan assigns a "Port" use designation to an area within HPS. Bay Plan policies accompanying the "Port" use designation at Hunters Point state that 55 ac (22 ha) designated south of Manseau St "should remain designated for "Port" Priority Use and future development of two break-bulk berths"[1] (BCDC and MTC 1996). Findings of the Seaport Plan note that the area most likely for marine terminal development includes Drydock 4, South Pier, the Re-Gunning Pier, and the waterfront area along South Basin.

The Port of San Francisco recently updated a 2001 study *Maritime Cargo Market and Warehouse Analysis* (CBRE Consulting and Martin Associates 2009). The report identifies the Port of San Francisco as the only break-bulk facility in the Bay Area. Annual cargo at the Port of San Francisco peaked in 2006 with 250,000 tons, and declined to 150,000 tons of cargo in 2007. Break-bulk at Pier 80 is primarily imported steel, which is sensitive to the world economy. The report suggests that Pier 80 marketing efforts diversify from break-bulk into wind turbine components, autos, and fruit. The analysis suggests that the projected demand for break-bulk facilities is not greater than its current or projected supply at Pier 80. This indicates that policies for break-bulk cargo "Port" Priority Uses for HPS no longer reflect the current economic climate and realistic land use options.

San Francisco Bay Area Water Trail Plan

The *San Francisco Bay Area Water Trail Plan* (Water Trail Plan) recommends policies and procedures that define how the water trail will take shape over time. These policies and procedures guide trail planning, development, and management on organizational, programmatic, and project-specific levels (BCDC 2007). The Water Trail Plan provides seven overarching principals to guide how agencies and organizations involved in the water trail should address trail needs and issues. The plan establishes a water trail backbone of existing and planned access points on the bay for non-motorized small boats that are intended as launches, open to the public, and do not have conditions that would preclude inclusion in the trail.

No existing or planned launch and destination sites were identified within the project site. However, two existing launch sites were identified near HPS (Figure 3.4.2-2). One is located in India Basin Shoreline Park north of the project site and one in the CPSRA, south of the project site.

3.4.2.2.3 Association of Bay Area Governments

San Francisco Bay Trail Plan

The Association of Bay Area Governments (ABAG) is the comprehensive planning agency for the San Francisco Bay region. ABAG's mission is to strengthen cooperation and coordination among local governments. ABAG has adopted the *San Francisco Bay Trail Plan* (Bay Trail Plan) (ABAG 1989).

1 Break-bulk cargo is a shipping term for any loose material that must be loaded individually, not in shipping containers or in bulk as with oil or grain.

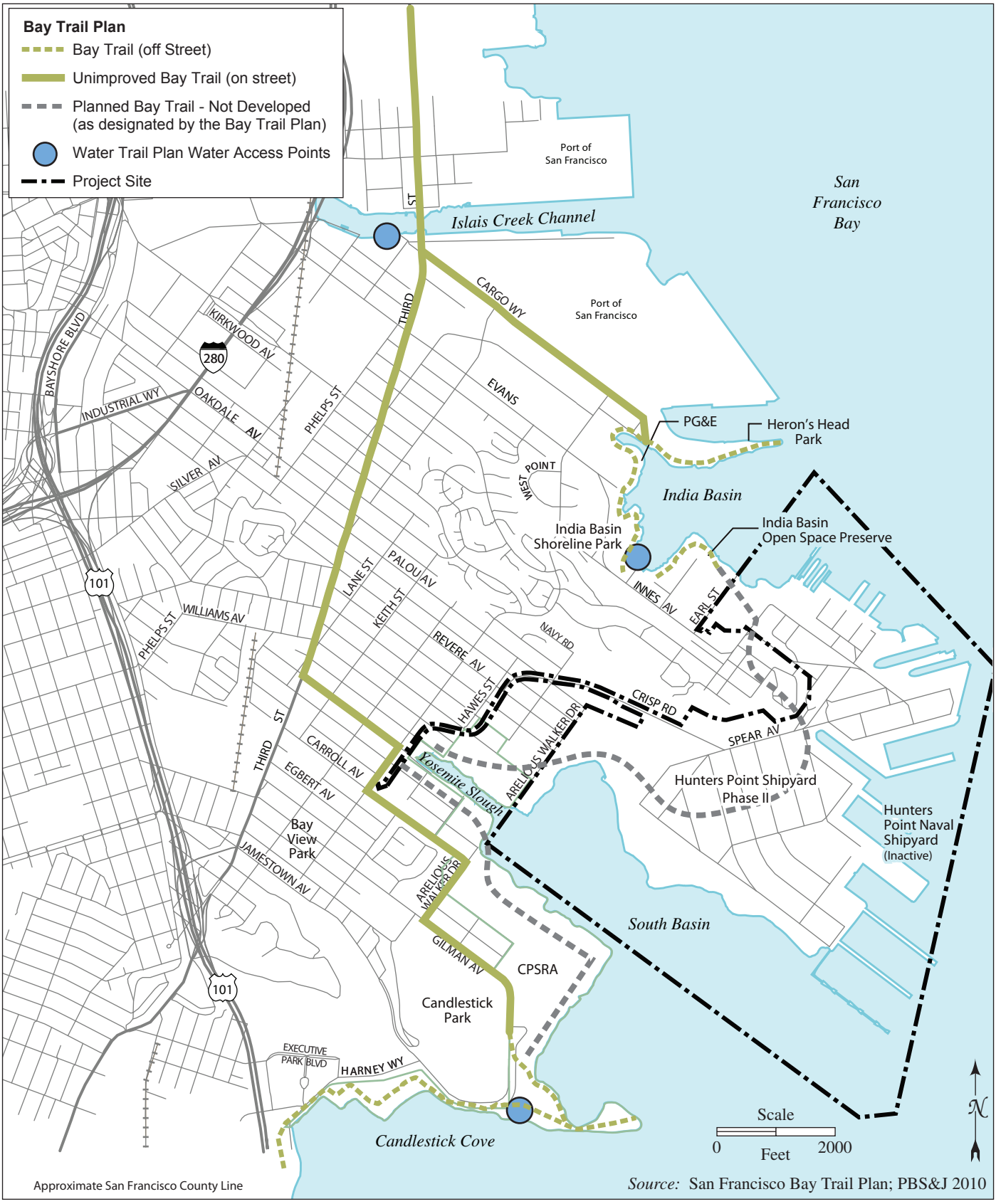


Figure 3.4.2-2. San Francisco Bay Trail Plan Route and Proposed Bay Trail Route (as designated by the Bay Trail Plan)

California Senate Bill 100 authorized the ABAG to "develop and adopt a plan...for a continuous recreational corridor which will extend around the perimeter of San Francisco and San Pablo bays" (ABAG 1989). ABAG adopted the Bay Trail Plan in 1989 and administers it throughout the bay region. The Bay Trail is a multipurpose recreational trail that, when complete, would encircle San Francisco and San Pablo bays with a continuous 400-mile (mi) (644-kilometer [km]) network of bicycling and hiking trails. It would connect the shoreline of all nine Bay Area counties, link 47 cities, and cross the major bridges in the region. To date, approximately 290 mi (467 km) of the alignment have been completed (ABAG 2008a).

In general, the policies of the Bay Trail Plan emphasize siting and developing trails that connect to existing park and recreation facilities, link to existing and proposed transportation systems, and avoid impacts on environmentally sensitive areas. Specific policies of the plan relevant to HPS address trail alignment, trail design, and environmental protection.

Maps provided in the Bay Trail Plan illustrate the existing Bay Trail in the vicinity of HPS as an off-street path from Harney Way north around the CPSRA. The Bay Trail Plan also illustrates a planned future trail around South Basin, Yosemite Slough, and through HPS (Figure 3.4.2-2). The proposed Bay Trail alignment within the project site, as designated by the Bay Trail Plan, would be realigned under the proposed action and alternatives evaluated in Section 4.4. Public access along the shoreline in the project vicinity is not continuous, as the Bay Trail currently ends near Gilman Avenue within Candlestick Point and picks up again north of the project site near India Basin. Much of the shoreline along the HPS property and portions of Candlestick Point are not currently accessible to the public.

The *2005 Gap Analysis Study* prepared by ABAG, for the entire Bay Trail area, attempted to identify the remaining gaps in the Bay Trail system, classify the gaps by phase, county and benefit ranking, develop cost estimates for individual gap completion, identify strategies and actions to overcome gaps, and present an overall cost and timeframe for completion of the Bay Trail system. The *2005 Gap Analysis Study* proposes to connect existing Bay Trail segments that are located north and south of the HPS by extending the trail along the waterfront of CPSRA and along HPS. The proposed trail would then connect to the existing trail north of the HPS along the India Basin shoreline.

The Gap Analysis Study also proposes an alternate, inland connection that is outside of HPS, with the proposed trail traveling east along Gilman Avenue, continuing north along Third Street that would ultimately connect to the existing waterfront portion of the trail near the India Basin via Yosemite Ave/Carroll Ave and Cargo Way (ABAG 2005).

3.4.2.3 Local

HPS, once disposed, would be located within the jurisdictional boundaries of the City and County of San Francisco. As discussed below, upon disposal, HPS would be controlled primarily by San Francisco policies, plans, and regulations, while portions of the site also would be subject to additional regulations and policies of other local agencies.

3.4.2.3.1 City and County of San Francisco

San Francisco General Plan

The General Plan, adopted by the Planning Commission and the Board of Supervisors, is both a strategic and long-term document. The General Plan is the city's collective vision for the future of San Francisco, and is comprised of a series of elements, each of which deal with a particular topic, that applies citywide. The General Plan contains the following elements: Air Quality, Arts, Commerce and Industry, Community Facilities, Community Safety, Environmental Protection, Housing, Recreation and Open

Space, Transportation, and Urban Design. The General Plan does not include a separate Land Use Element; rather, land use policies are dispersed throughout the other elements of the General Plan, as well as in the various Area Plans of the document. These Area Plans identify specific localized goals and objectives for a neighborhood or district of the city. The *Hunters Point Shipyard Area Plan* (HPS Area Plan) guides future development of HPS, while the *Bayview Hunters Point Area Plan* (BVHP Area Plan) and the *Candlestick Point Subarea Plan* guides the future development of the BVHP district and Candlestick Point, respectively. The General Plan addresses land use at the HPS by reference to the HPS Redevelopment Plan, which is discussed below.

Hunters Point Shipyard (HPS) Area Plan

The project site is federal land located outside of the city jurisdiction. The HPS Area Plan (San Francisco Planning Department 2010) was adopted by Planning Commission Resolution 18098 on 3 June 2010. The purpose of the HPS Area Plan is to outline broad General Plan objectives and policies to meet both the Bayview community's desire to redevelop HPS in accordance with the Conceptual Framework and Proposition G (see below for description). The maps and figures provided in the HPS Area Plan and the HPS Redevelopment Plan serve as the General Plan maps for HPS. While the HPS Redevelopment Plan and associated Design for Development Document provide the specific land use plan and design controls for HPS, the intent of the HPS Area Plan is to distill planning principles that are reflected in these plans, and that relate back to other elements of the General Plan and provide broad planning parameters. Land uses designated for the project site in the HPS Area Plan include shoreline open space, multi-use (stadium, R&D, and open space), residential, R&D, as well as arts related, commercial, and retail uses. The current HPS Area Plan is not enforceable at the project site while HPS is still owned by and under the jurisdiction of the federal government.

The HPS Area Plan sets the following objectives for the project site:

Objective 1 Realize the full potential of the underutilized HPS by creating a complete and thriving new neighborhood intimately connected to the Bayview and the rest of the city, in a way that fully realizes its shoreline location and acts as an economic catalyst for the rest of the Bayview.

Objective 2 While developing HPS, assure appropriate treatment of archeological resources and resources important to native populations as unique, irreplaceable records of the past, and of ongoing cultural significance.

Objective 3 Create a diverse and exciting urban neighborhood that is engaging, comfortable, and has convenient access to amenities, optimizes its waterfront setting and reflects San Francisco built form and character in a contemporary way.

Objective 4 Include transportation improvements that are inherently multi-modal, are seamlessly connected to the Bayview and the rest of the city, and provide residents with the ability to meet daily needs without having to drive.

Objective 5 Create jobs for economic vitality.

Objective 6 In creating a new neighborhood, produce tangible economic community benefits, and ensure that the new development acts as a catalyst for further economic and community development throughout the Bayview and the city.

Objective 7 Create a world class system of open space that includes a significant portion of the overall HPS, enables improvements to the shoreline, enhances access, provides a wide range of recreational and ecological restoration opportunities, and is seamlessly integrated with the existing neighborhood.

Bayview Hunters Point (BVHP) Area Plan

HPS is not within the boundaries of the BVHP Area Plan (San Francisco Planning Department 1995, amended 2010). However, because of the project site's proximity and significance to the Bayview community, the BVHP Area Plan reflects the reuse of HPS, including the increase in proposed housing and the possible location of a new football stadium. The BVHP Area Plan is an adopted component of the General Plan that serves as a guide to the future development of the BVHP district. This plan, based on many years of continued citizen input, seeks to provide guidelines for realizing BVHP's growth potential in a manner that is in the best interest of the local residents and the city as a whole. The BVHP Area Plan was amended on 3 June 2010 by Resolution 18098. The BVHP Area Plan includes sections on Land Use, Transportation, Housing, Industry, Urban Design, Recreation and Open Space, Community Facilities and Services, and Public Safety and Energy. Themes discussed throughout the BVHP Area Plan deal with the need to provide economic development and jobs, particularly for the local population; eliminating health and environmental hazards, including reducing land use conflicts; providing additional – particularly affordable – housing; providing additional recreation, open space, and public service facilities; and better addressing transportation deficiencies by offering a wider range of transportation options.

Proposition G

Proposition G, provided in Appendix E, Proposition G – Bayview Jobs, Parks and Housing Initiative, of this SEIS, was approved by San Francisco voters in June 2008. As discussed in Chapter 1 (Purpose and Need), Proposition G encourages the development of Candlestick Point and HPS with a mixed-use project including park and open-space improvements, approximately 10,000 homes for sale or rent, about 700,000 gross square feet (gft^2) (65,030 m^2) of retail uses; about 2,150,000 gft^2 (199,735 m^2) of "green" office, science and technology, research and development, and industrial uses; an arena; and a site for a new football stadium.

Proposition G sets project objectives (provided in Section 1.1, Purpose and Need for Action) pertaining to population, housing, and employment and permits the sale, conveyance, or lease for non-recreational purposes of the parkland that is under the jurisdiction of the San Francisco Recreation and Parks Commission and located within the boundary of Candlestick Point, including the property currently used in connection with the existing stadium and related parking areas. In addition, Proposition G allows the construction, maintenance, and use for non-recreational purposes of structures on such property. Proposition G repealed Propositions D and F. Proposition G proposed that new zoning be established along with a land use program for Candlestick Point and HPS.

Hunters Point Shipyard Redevelopment Plan

The project site is governed by the HPS Redevelopment Plan, which was adopted by the Board of Supervisors on 14 July 1997 and amended on 3 August 2010 (SFRA 1997b, amended 2010). The HPS Redevelopment Plan sets forth the objectives and the basic land use controls and specific redevelopment activities within the project site.

The proposed redevelopment of HPS as described in the HPS Redevelopment Plan is consistent with the General Plan, the BVHP Area Plan, and the HPS Area Plan as adopted and amended by the San Francisco Planning Commission on 3 June 2010, and is in conformity with the eight Priority Policies of Section 101.1 of the *San Francisco Planning Code (Planning Code).*

The HPS Redevelopment Plan designates several mixed-use districts for the project site including: Shipyard North Residential, Shipyard Village Center Cultural, Shipyard R&D, Shipyard South Multi-Use, and HPS Shoreline Open Space. The HPS Redevelopment Plan contemplates development of a range of uses under the broad categories of residential; institutional; retail sales and services; office and industrial;

civic, arts, and entertainment; parks and recreation; multi-media and digital arts; and athletic and recreational facilities. Allowable land uses within each district would be all those that are consistent with the character of the district as follows:

Shipyard North Residential District: This district would accommodate a waterfront-oriented residential neighborhood. The principal designated land use in this district is residential. Related uses include local-serving businesses, family child-care services, small professional offices, and recreation facilities.

Shipyard Village Center Cultural District: This district would accommodate a mixed-use community with a range of housing types, retail uses, and cultural and educational facilities designed to comprise a village that would serve the community in the surrounding districts. This district would provide space dedicated for artists and arts-related uses as well as community-serving retail, business, service, and office uses.

Shipyard R&D District: This district would provide a diverse array of commercial and institutional operations for new R&D firms. This district would allow for an integration of various uses including light industrial and manufacturing as well as neighborhood-commercial and community uses.

Shipyard South Multi-Use District: This district would provide space for a sports stadium, related uses, and regional-serving athletic facilities. This district would also include R&D, office, and light industrial uses. If the stadium is developed, retail uses would include stadium-related and community-serving commercial and retail uses. If the stadium is not developed, this district would include a mix of uses, including neighborhood-serving retail, business, and office uses comparable to the Shipyard R&D District, as well as potential residential uses.

Shipyard Shoreline Open Space District: This district would provide public recreation access to the San Francisco Bay waterfront along the eastern and southern waterfront of the project site, including regional serving open spaces, a viewing area of the water and historic shipyard facilities, the Bay Trail, and restorative habitat areas.

The HPS Redevelopment Plan, along with other plan documents, including the *HPS Phase 2 Design for Development*, establishes the standards for development at the project site. The development standards in the HPS Redevelopment Plan includes, but is not limited to: building type, size, and height restrictions; the number of buildings that can be constructed; the number of residential units; office development limitations; development fee and exactions; building retention and rehabilitation standards; and a street plan.

San Francisco Planning Code

The Planning Code, (ordinances enacted through Ordinance 252-10, approved 22 October, 2010) incorporates by reference the City's Zoning Maps and sets forth specific, objective standards that define the range of allowable physical characteristics of proposed development, such as the floor area ratio, the height and bulk of buildings, and the land uses and zoning controls permitted within zoning districts. The San Francisco Planning Department is the agency responsible for implementing the Planning Code.

Zoning in San Francisco generally consists of two layers of districts as outlined in the Planning Code. Use Districts, which are the base zoning districts, prescribe which land uses are permitted and most development standards (except height and bulk). In addition, the Planning Code identifies Height and Bulk Districts are mapped separately from the Use District, and prescribe the height and bulk of buildings. On top of the Use Districts and Height and Bulk District, Special Use Districts are mapped in some instances to address particular issues for targeted areas; Special Use Districts provide controls that supersede some or all of the underlying Use District to meet certain goals.

Section 249.51 of the Planning Code designate the HPS Phase 2 Special Use District and the HP Height and Bulk district for the project site. The provisions of the Planning Code that would otherwise apply in the Hunters Point Shipyard Phase 2 Special Use District are superseded by the HPS Redevelopment Plan and the *HPS Phase 2 Design for Development* except as provided under Section 249.51.

The Sustainability Plan

The San Francisco Board of Supervisors endorsed the *Sustainability Plan* on 21 July 1997 (Resolution No. 692-97) as a non-binding guideline for policy and practice in the city. As such, the Board of Supervisors has not committed the city to perform the actions addressed in the plan. Rather, the *Sustainability Plan* serves as a blueprint, with many of its individual proposals requiring further development and public comment.

The plan contains short-term (five-year) and long-term objectives and specific actions and is divided into fifteen topic areas including air quality, biodiversity, energy and climate change, hazardous materials, parks and open space, solid waste, transportation, water and wastewater, environmental justice, and risk management.

3.4.3 Existing Conditions

3.4.3.1 Project Site

HPS is located in the southeast corner of San Francisco, approximately six miles south of downtown San Francisco (Figure 3.4.3-1). The property is bounded on the north by India Basin; on the east and south by San Francisco Bay; on the southwest by South Basin; and on the west by the BVHP neighborhoods of San Francisco (Figure 3.4.3-1). HPS is comprised largely of flat landfill peninsula and is surrounded on three sides by water. HPS is on the waterfront in the southeastern portion of the city.

HPS served as a working naval shipyard between 1941 and 1974. The DoN ceased operations at HPS in 1974 and officially closed the base in 1988. Much of HPS is currently comprised of mostly vacant buildings and unused infrastructure. The existing structures at HPS reflect its history as a heavy industrial naval shipyard. Until its deactivation in 1974, HPS was used for military related and industrial activities, with ancillary storage, administration, and institutional uses. Military family housing and bachelor quarters were also located at HPS. The project site contains many vacant structures associated with industrial land uses including ship repair, storage and trucking, light manufacturing, construction storage and shops, laboratories, scrap metal recycling, and other former DoN uses dating largely from the World War II era (SFRA 2000). The project site also includes drydocks, quay walls, piers, and wharves, as well as repair berths. The quay wall at Point Avisadero, North and South Piers, and the Re-gunning Pier are the primary berthing areas, and the smaller drydocks were used historically for submarine maintenance.

The site is vacant with the exception of several buildings (Buildings 104, 116, 117, and 125) that are currently leased and occupied as artists' studios by approximately 100 tenant-artists; and Building 606, which is subleased from the SFRA to the SFPD for special operations including a crime lab (Figure 3.4.3-2).

Primary access to the southern portion of the site is provided by two streets (Spear Avenue and Fischer Avenue). Crisp Road, on the northern side of Hunters Point Hill, historically provided a third access point to the southern portion of HPS, but currently does not allow through access. Access to the northern portion of the site is provided by three additional streets (Innes Avenue, Galvez Avenue, and Robinson Street). The project site is fenced and access to HPS is restricted except at Inness Avenue, which is not controlled. Tenants and contractors obtain access through the DoN security offices.

The project site is located in the HPS Phase 2 Special Use District and the HP Height and Bulk District, which were established by Ordinance 208-10 on 3 August 2010. HPS is located within an area currently zoned as "Hunters Point SFRA District" on the Zoning Map. However, The Zoning Map was amended on 3 August 2010 (Ordinance 207-10). The City will update the Zoning Map to reflect these amendments and provide new zoning designations.

The General Plan and HPS Area Plan provide broad land use objectives for development of future land uses at the project site. The HPS Redevelopment Plan and associated *Design for Development* document provide specific land use plans and design controls for the redevelopment of HPS. However, current city zoning and land use plans and policies are not enforceable while HPS is still owned by and under the jurisdiction of the federal government.

There are no existing public open-space areas and no existing recreational facilities at HPS.

3.4.3.2 Project Vicinity

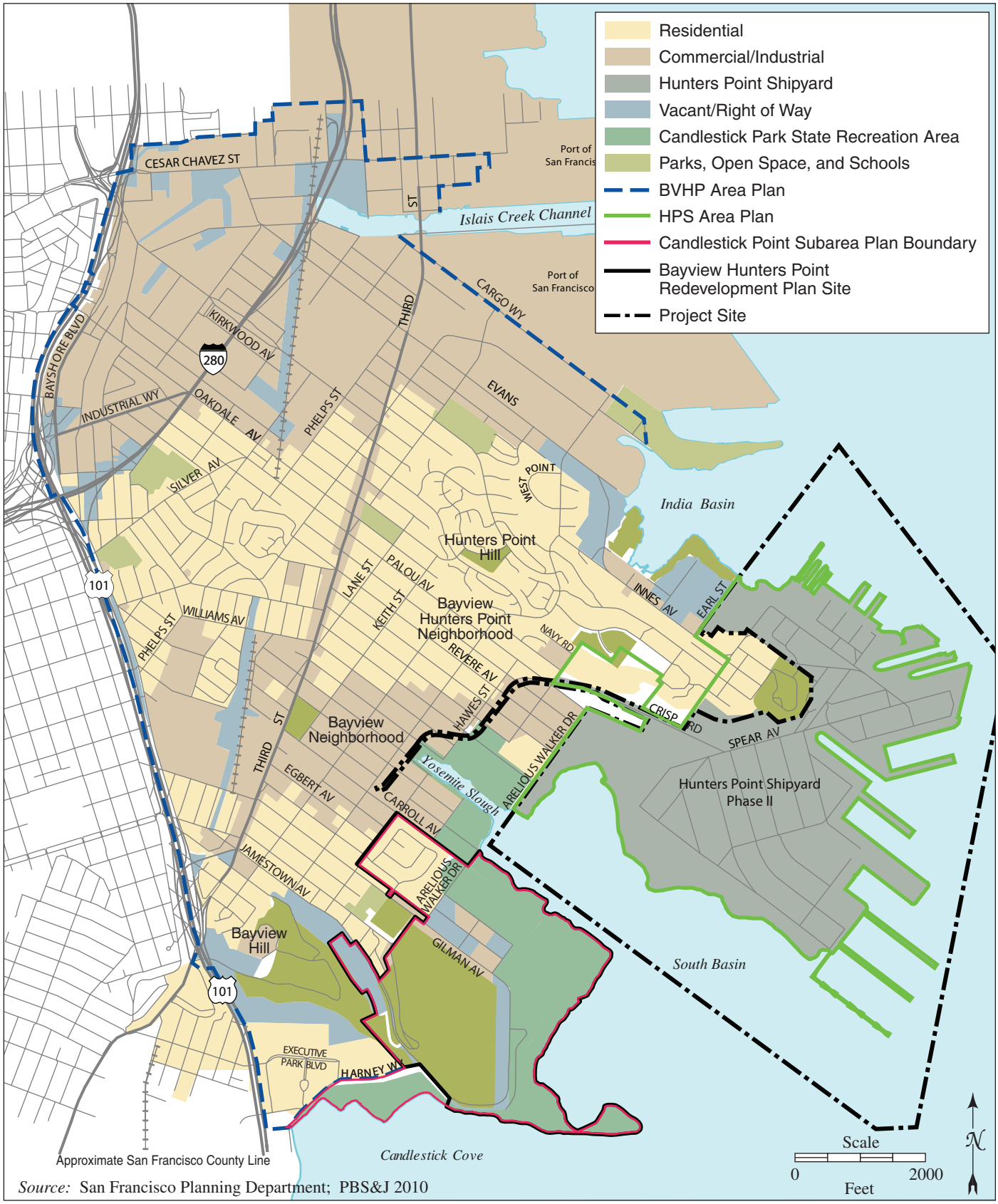
The project site is part of the larger BVHP neighborhood, an area characterized by well-established residential neighborhoods, commercial uses, and industrial areas. Land outside of HPS lies within the jurisdiction of the City and County of San Francisco. Figure 3.4.3-3 illustrates the future land uses in the project vicinity as designated by the BVHP Area Plan and *Candlestick Point Subarea Plan*. Designated land uses immediately adjacent to the project site along streets or other boundaries include residential uses along Earl Street; commercial/industrial uses, parks/open space uses, and schools along Crisp Road; residential, CPSRA, and commercial/industrial uses along Walker Road; and the San Francisco Bay along other boundaries. Uses in the area immediately surrounding the project site, such as industrial uses on Crisp Road, historically provided a buffer between HPS activities and nearby residential uses. Large setbacks and street blocks and a lack of pedestrian amenities were designed to discourage traffic near the HPS (SFRA 2009).

Existing land uses in this neighborhood are also described below by type of use including residential, civic and institutional, open space and recreation, commercial/retail, and industrial.

Residential. Residential neighborhoods in the BVHP neighborhood are east and west of Third Street from US-101 to HPS. A majority of the existing residential uses are single-family units. However, there are multi-family units distributed on the lower slopes of Bayview Hill and along Jamestown Avenue, Williams Avenue, and Innes Avenue. In addition, much of the residential development on Hunters Point Hill consists of multi-family housing units.

Civic and Institutional. A number of civic, institutional, religious, and social service uses are centered on Third Street including an opera house, senior care facilities, medical facilities, a library, community facility, and educational facilities.

Commercial/Retail. Commercial and retail uses are distributed throughout the neighborhood. Third Street, which includes neighborhood-serving retail shops and other commercial businesses, is the central north/south corridor through the community. This corridor includes a variety of shops, eating establishments, cleaners, beauty supply stores, hardware stores, groceries, and liquor stores. Bayview Plaza near Evans Avenue provides a cluster of retail uses, including a drugstore, a copy shop, several restaurants, and offices. Along Bayshore Boulevard and in proximity to the I-280 and US-101 freeways in the northern part of the neighborhood are a number of auto-oriented retail uses, including large-scale commercial uses with off-street parking frontages, home improvement businesses, and fast food establishments.



Source: San Francisco Planning Department; PBS&J 2010

Figure 3.4.3-3. Existing Land Use in the Project Vicinity

Industrial. Industrial uses are found in the northern portion of the BVHP neighborhood, west and east of Third Street. This area includes many production, distribution, and repair uses and mixed-use development. Immediately west of Third Street and south of the Islais Creek Channel, large industrial uses, such as regional moving and storage companies and wholesale distributors are intermingled with a range of small, local businesses, such as auto parts distributors and bulk mail assembly services. The San Francisco Produce District is in this area.

Light industrial and production, distribution, and repair uses occupy the South Basin industrial area surrounding Yosemite Slough, extending west to US-101. The South Basin industrial area contains a variety of small-scale industrial uses, such as auto repair shops, food distributors, bulk warehouses, and recycling facilities. The India Basin Industrial Park, to the northwest of India Basin and HPS and south of the Islais Creek Channel, includes a major distribution facility for the U.S. Postal Service, light industrial, commercial service and multimedia businesses, and some retail businesses located at Bayview Plaza at the southeast corner of Third Street and Evans Avenue. Vacant parcels and buildings are distributed throughout all of the identified industrial areas.

Parks and Open Space. As shown in Figure 3.4.3-4, there are numerous existing public parks and open spaces located within the project vicinity. These parks and open spaces include Candlestick Point State Recreation Area, Candlestick Park, Gilman Park, Bayview Park, India Basin Shoreline Park, India Basin Flats, Milton Myer Recreation Center, New Parks and Open Space.

Other facilities (most of which are operated by the SFPRD) that are located beyond a quarter mile (0.4 km) of the project site, but within approximately one-half-mile (0.8 km) of the project site, include the following: LeConte Avenue Mini Park, Bayview Playground, Bayview Hunters Point Multipurpose Senior Center, and Heron's Head Park.

Other nearby parks also include Hill Top Park, Adam Rogers Park, Shoreview Park, and Jedediah Smith School. Shoreview Park is not operated by the SFPRD.

3.4.3.2.1 Zoning

The areas immediately adjacent to the project site and north of Innes Ave are zoned as "M-1", "P", and "NC-2" (Small-Scale Commercial); those areas adjacent to the project site and south of Innes Ave to Quesada Ave are generally zoned as "RM-1", (Residential/Mixed, Low Density), "RM-2" (Residential/Mixed, Moderate Density), and "M-1" (Light Industrial). Areas between Palau Ave and Thomas Ave and adjacent to the project site are zoned as "PDR-2" (Core) and adjacent to the project site south of Thomas Ave to Carroll Ave are zoned "P" (Public).

Zoning in the portion of the project vicinity generally within by the BVHP Area Plan is comprised mainly of "RM-1", "RM-2", "P", "M-1", "M-2" (Heavy Industrial), and "PDR-2" interspersed with areas of "NC-2" (Small-Scale Neighborhood Commercial) and "NC-3" (Moderate Scale Neighborhood Commercial).

Candlestick Point is located within the Candlestick Point Activity Node Special Use District. Zoning within the district includes "P", "M-1", "M-2", "RH-1(D)" (Residential/Housing, one unit per lot, detached), "RH-1" (Residential/Housing, One unit per lot), "RH-2" (Residential/Housing, two units per lot), and "RM-1". The area is subject to the land use and height and bulk regulations established by the zoning designations for the Candlestick Point Activity Node Special Use District. These controls are subject to the BVHP Redevelopment Plan, as amended on 3 August 2010, and the *Candlestick Point Design for Development* document dated 3 June 2010.

Source: Lennar Urban, RHAA 2009; PBS&J 2010

Figure 3.4.3-4. Existing and Approved Parks and Open Space in the Project Vicinity

3.4.3.3 Regional

West of HPS, major transportation corridors include US-101, Interstate 280 (I-280), Third Street, and Bayshore Boulevard. The Caltrain corridor, which travels between the Fourth and Townsend terminal and the Peninsula to the south, runs in a north/south direction approximately one mile (1.6 km) west of the project vicinity (to the west of Third Street) (Figure 2.3-11).

To the west of the project site, beyond the BVHP neighborhood, are the US-101 and the Bernal Heights, Portola, Excelsior, and Visitacion Valley neighborhoods. Uses in these neighborhoods consist primarily of moderate density, single-family homes with some multi-family homes and neighborhood-serving commercial uses.

To the north, beyond India Basin, are the city's Eastern Neighborhoods: the Mission District, Potrero Hill, the Central Waterfront, Showplace Square, and South of Market (Figure 3.4.3-1). Similar to the BVHP neighborhood, many of those neighborhoods include a mix of industrial, residential, and commercial uses.

Southwest of the project site beyond the City and County of San Francisco/San Mateo County line are the cities of Brisbane and Daly City. Uses within these cities largely mirror neighboring residential uses in San Francisco. The area contains the Cow Palace exhibition hall and Sunset Scavenger waste collection and recycling center. The City of Brisbane contains an industrial corridor, bounded on the west by Bayshore Blvd and on the east by US-101. Brisbane Baylands is the site of a former sanitary landfill (that closed in 1967) and former railroad facilities. The landfill has continued in operation as a repository for clean-fill materials from construction sites in the region and for recycling of sand, dirt, gravel, and other construction materials. Other uses in the Baylands include building supply businesses, lumberyards, the Kinder Morgan Energy tank farm, and the Bayshore Sanitary water pump station. San Bruno Mountain State Park, immediately west and south of Brisbane, is a 2,326-acre (941-hectare) park that encompasses San Bruno Mountain, the northernmost peak in the Santa Cruz Mountain Range.

Property in San Francisco that is permanently dedicated to publicly-accessible park and recreational uses totals approximately 5,886 ac (2,382 ha) (personal communication, Exline 2009). The SFRPD maintains more than 200 parks, playgrounds, and open spaces throughout the city, as well as 15 recreation centers, nine swimming pools, five golf courses, and a number of tennis courts, ball diamonds, athletic fields, and basketball courts. The SFRPD also manages the Marina Yacht Harbor, Candlestick Park stadium, and the Lake Merced Complex. As discussed earlier, the Bay Trail is a multipurpose recreational trail that, when complete, will encircle San Francisco and San Pablo Bays. Significant regional recreational resources and parks in the city include Golden Gate Park, Crissy Field, Lake Merced Park, McLaren Park and the Presidio.

3.5 Visual Resources and Aesthetics

3.5.1 Background

3.5.1.1 Visual Resources

Visual resources are generally defined as the natural and built features of the landscape visible from public views that contribute to an area's visual quality. This section describes the existing visual environment and changes resulting from the proposed action to characterize the aesthetic condition of the project site, including onsite structures and facilities.

The evaluation of visual resources in the context of environmental analysis typically addresses contrast between visible landscape elements. Collectively, these elements comprise the aesthetic environment, or landscape character. The landscape character is compared to the proposed action's visual qualities to determine the compatibility or contrast resulting from the buildout of the proposed action.

Views are defined as visual access to, or visibility of, a natural or built landscape feature from an observer's viewpoint. Views may be focal (restricted in scope to a particular object), or panoramic (encompassing a large geographic area with a wide or deep [i.e., distant] field of view). Focal views can be from a number of observer viewpoints compared to the object being viewed; observer viewpoints might include those from a lower elevation, at the same level, or from an elevated vantage. Panoramic views are usually associated with an elevated observer viewpoint. Scenic views or vistas are panoramic public views that include natural features including views of the ocean, unusual topographic features, or unique urban or historic structures.

Views are characterized by their distance from the viewer, including foreground, middle-ground, or background. Foreground views are those immediately perceived by the viewer and include objects at close range that tend to dominate the view. Middle-ground views occupy the center of the view and generally include objects that are the center of a viewer's attention if they are sufficiently large or visually contrasting with adjacent visual features. Background views include distant objects and other objects that form the horizon. Objects perceived in the background view eventually diminish in their importance with increasing distance. In the context of the background, the skyline can be an important visual context because objects above this point are highlighted against the typically blue background.

A viewshed, or visible area, is the total range of views experienced from an observer's viewpoint. A viewshed is defined by landscape features that constrain or obstruct sightlines, or the line of sight between an observer and a viewed object. Views may be partially or entirely obstructed by topography, buildings and structures, and/or vegetation. The closer an intervening obstruction is to the observer, the more it would potentially obstruct the viewshed. Accordingly, a small physical obstruction in the foreground of a view would potentially have a more substantial affect on the viewshed compared to a relatively large obstruction perceived in the middle or background.

3.5.1.2 Light

Certain types of lighting can cause negative visual impacts as experienced during the night. Evaluation of potential night lighting effects includes assessing ambient lighting conditions within the project site area, and the extent to which surrounding sensitive receptors (e.g., residential occupants, public recreational facility users, and/or institutional facility residents [such as health care facilities] who are present during evening and weekend hours) are exposed to these light intensities. Night lighting may be generated from point sources (e.g., focused points of origin representing unshielded light sources), as well as from indirectly illuminated sources of reflected light.

The effects of proposed night-lighting conditions are contextual and depend on the existing lighting environment, light intensity, and proximity to proposed light sources. Adverse lighting impacts can occur when project-related lighting is visually prominent, thereby affecting the character of the existing night sky. Alteration of the existing community or neighborhood's character may occur when proposed night lighting would increase the illumination perceived by a sensitive receptor, or when it would substantially increase existing ambient lighting levels in an area through unshielded spillover glare or excessive illumination of adjacent surfaces.

3.5.1.3 Glare

Glare, an indirectly caused phenomenon of lighting or reflection off building materials, can cause a negative impact during the day or night. Daytime glare is caused by the reflection of sunlight from reflective surfaces. Reflective surfaces are generally associated with buildings constructed with broad expanses of highly polished or smooth surfaces (e.g., glass or metal) or broad, light-colored paving surfaces such as concrete. Nighttime glare can include direct, intense, focused light, as well as reflected light. Glare can be caused by mobile, transitory sources such as automobiles, or from intense stationary sources, including security lighting.

3.5.2 Regulatory Framework

3.5.2.1 Federal

There are no federal regulations, plans, or policies related to visual resources that are applicable to the proposed action.

3.5.2.2 State

There are no state regulations, plans, or policies related to visual resources that are applicable to the proposed action.

3.5.2.3 Local

3.5.2.3.1 San Francisco General Plan

The *San Francisco General Plan* Urban Design Element addresses the physical character and environment of the city with respect to development and preservation. The Urban Design Element addresses issues related to city pattern, guidelines for major new development, and neighborhood environment. This element also promotes the preservation of landmarks, structures, and natural features with notable historic, architectural, or aesthetic value.

Although the project site is located within the City of San Francisco, the local government does not have any jurisdictional authority over land use on the project site because it is a federal military facility. Accordingly, the General Plan does not contain any goals and/or policies that are applicable to the proposed action. However, the city and the DoN consult on development issues, and the city is provided the opportunity to evaluate environmental impacts of any proposed development at federal facilities within the city's jurisdiction. Subsequent to transfer of HPS to the city, the project site would be developed consistent with local rules and regulation.

3.5.2.3.2 San Francisco Bay Conservation and Development Commission (BCDC) Public Access Design Guidelines

Along the San Francisco Bay shoreline, BCDC's land use authority relates primarily to public access; however, some of the public access objectives specifically seek to provide, maintain, and enhance visual

access to the bay and shoreline, and maintain and enhance the visual quality of the bay, shoreline, and adjacent development. In addition, Chapter IV (Site-Specific Public Access Improvements) of BCDC's Design Guidelines contains specific strategies for development to enhance the visual experience along the Shoreline. Refer to Section 3.4, Land Use and Recreation, for a full description of these Design Guidelines.

3.5.2.3.3 San Francisco Bay Plan

The *San Francisco Bay Plan* (Bay Plan) contains policies and objectives designed to enhance the visual quality of development around the bay, to enhance the pleasure of the viewer, and to take maximum advantage of the attractive setting it provides. The Bay Plan contains policies regarding appearance, design, and scenic views, including Appearance, Design, and Scenic Views Policies 1, 2, 3, 4, 6, 8, 10, 11, and 12 which may be applicable to various facilities included in the proposed action.

3.5.3 Existing Conditions

The area of influence for consideration of the proposed action's effects on visual resources/aesthetics is the portion of the project site and adjacent environment that is observed from public view corridors. Public views include those experienced while stationary (i.e., observed from recreational facilities such as parks and open space areas, and scenic vista points), or while mobile (i.e., traveling on public roads; running or walking on sidewalks or paths). Examples of private views that are not considered in this analysis are from individual residential yards or patios, and private commercial establishments, including visitor serving facilities.

3.5.3.1 Existing Visual Character and Views in the Project Vicinity

HPS is located in the City of San Francisco and is bordered by India Basin to the north, San Francisco Bay to the east and south, South Basin to the southwest, and the Bayview area of San Francisco to the northwest. The project site is relatively flat except for a residential area located on the crest of a ridge known as Hunters Point Hill.

Development in the project vicinity, including the Bayview Hunters Point (BVHP) neighborhood, consists of urbanized, moderate-density development. Building heights range from one to four stories, and building massing ranges from small-scale residences to block-scale warehouses. The architectural character includes nineteenth century and early twentieth century residential buildings, commercial buildings (including wood frame and brick structures), World War II-era industrial and commercial facilities, and more recently built warehouses and industrial development. Other recent residential development is located in the Third St corridor and other sites on Hunters Point and Bayview Hills.

Residential neighborhoods in the BVHP neighborhood are located east and west of Third St from US-101 to HPS. A majority of the existing residential uses are single-family units. There are multi-family units distributed on the lower slopes of Bayview Hill and on Hunters Point Hill, as well newer three- to four-story multi-family units along Jamestown Ave, Williams Ave, and Innes Ave.

Transportation corridors are also visual features. Third St is the major north-south commercial street, with Muni Metro Light-Rail Vehicle (LRV) service. Mixed-use developments, including multi-family housing, are also being developed along the Third St corridor. The US-101 and I-280 freeways, generally on elevated structures, define neighborhood boundaries further west. Other features include billboards and commercial signage, overhead utility lines, the Caltrain rail corridor, and large public facilities, such as the Southeast Water Pollution Control Plant west of Third St and the U.S. Postal Service distribution center on Evans Ave.

Public open space, including public parks and recreation areas along the bay shoreline, is distributed throughout the BVHP neighborhood. Public parks in the project vicinity include, but are not limited to, Bayview Playground, Bayview Park, India Basin Shoreline Park, Gilman Playground, other smaller neighborhood parks, the Yosemite Slough area, and the Candlestick Point State Recreation Area (CPSRA). Bayview Hill is west of Candlestick Point and is mostly undeveloped Recreation and Park Department land. Refer to Section 3.4, Land Use and Recreation, Existing Conditions for a detailed discussion of public parks, recreation areas, and open space in the project vicinity.

Double Rock is a formation of two rock outcroppings visible in the Waters of South Basin, approximately 500 ft (152 m) from the CPSRA shoreline. Double Rock is visible from some shoreline areas along CPSRA and HPS.

Photographs from several surrounding public viewpoints in the project vicinity illustrate the existing project site conditions (Figure 3.5.3-1 through Figure 3.5.3-5).

3.5.3.1.1 HPS

HPS appears as an abandoned and deteriorated waterfront industrial setting, with large industrial and administrative buildings, piers, drydocks, and the prominent structure of the Re-Gunning Crane (i.e., a type of crane used in shipbuilding and repair that is designed to lift heavy objects such as ship engines), which is located at the end of the Re-Gunning Pier. Much of the area is currently in a degraded condition. The scale of the structures contrasts with the slopes of Hunters Point Hill to the west and surrounding waters of the bay. Most of the structures are in various states of disrepair and a large portion of the shipyard consists of vacant parcels. There are piles of debris in some areas. Vegetation is sparse, consisting primarily of ruderal grasses and shrubs, with a small number of trees, generally located near the former offices, training centers, and barracks. Large expanses of asphalt paving are visible.

The northernmost cluster of development includes a number of single-story sheds and warehouses characterized by simple architecture, corrugated metal or wooden facades, and gabled or flat roofs. Buildings include a number of two- to three-story barracks, training facilities, and office buildings; other HPS buildings range from one to nine stories. Between drydocks 2 and 3, there are a number of pre-War buildings, including Building 205, a former pump house/substation dating to 1901. The architectural character of Building 205 stands out from other structures onsite due to the age of the building, its prominent waterfront location, and its red brick façade. This building includes characteristic architectural details such as large arched windows, ornamental overhangs, and a gabled roof. The first building built by the DoN in World War II was Building 231 (1942–1945), the Inside Machine Shop, which was constructed in 1942 by the San Francisco-based firm of Barrett & Hilp and situated adjacent to drydock 2. Building 211 was also one of the first erected by the DoN. The building was the original Shipfitters Shop and is a good representation of the typical semi-permanent, monitor-roof shop building constructed throughout HPS during the World War II era. Building 224, a concrete air raid/bomb shelter building built in 1944, and later used as an annex for the Naval Radiological Defense Laboratory (NRDL), is a unique representative of its type at HPS. The only building within the district completed after World War II is the Optical, Electronics and Ordnance Building, Building 253, finished in 1947 and attached to the west elevation of Building 211. This concrete frame curtain-wall building, which was designed for the DoN by a local architect, Kump, was a highly specific repair and research facility. Other wood and concrete framed structures range from one to four stories in height. These structures do not possess any unique distinguishing characteristics, with the exception of varied massing and rooftop appurtenances. Most of the site remains fenced off, prohibiting public access from surrounding neighborhoods for public safety reasons. HPS lacks pedestrian amenities, such as sidewalks. Figure 3.5.3-2 and Figure 3.5.3-3 illustrate the existing conditions at the project site.

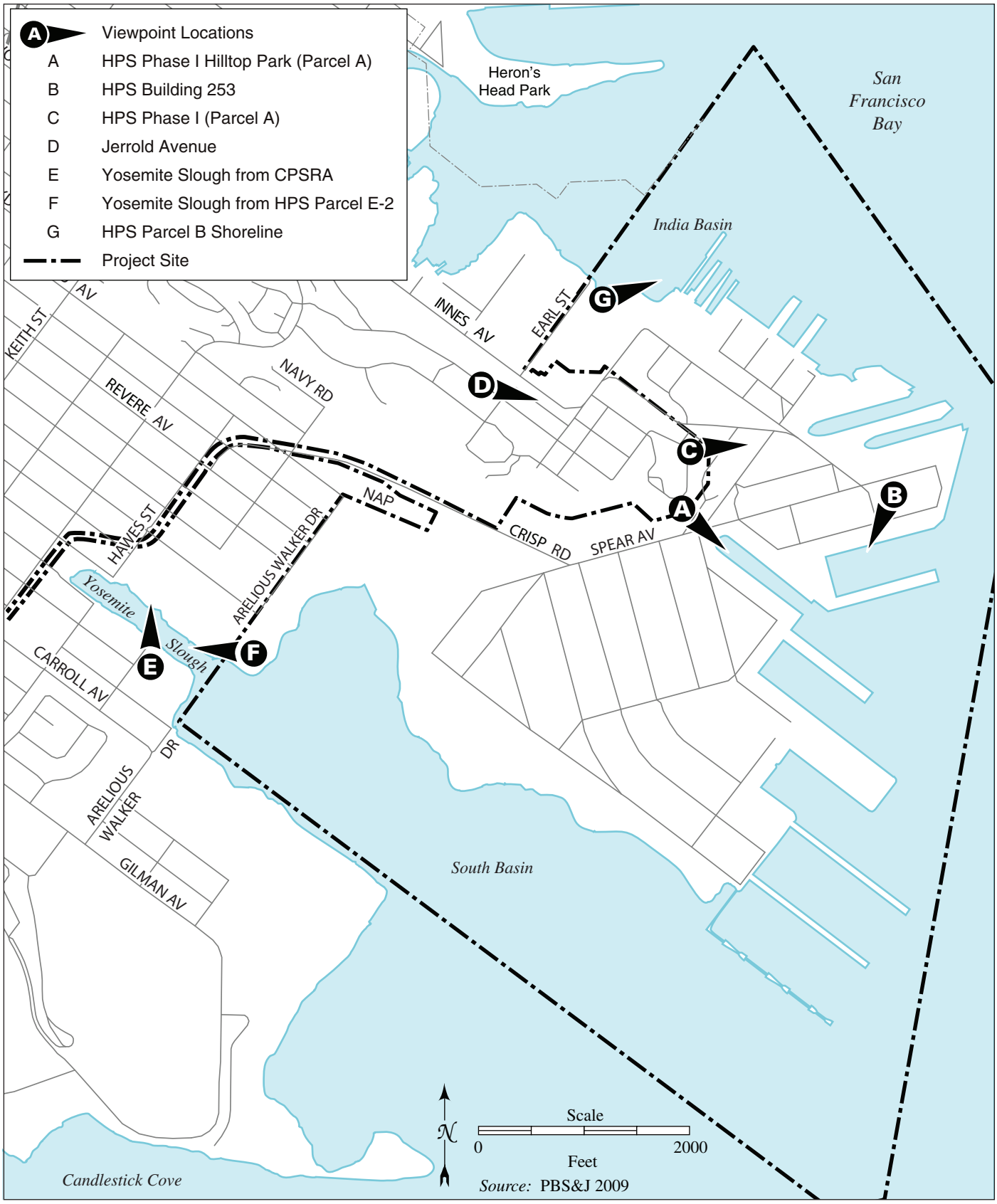


Figure 3.5.3-1. View Corridor Locations Diagram - Existing Conditions

Viewpoint A: View Southeast from HPS Phase I Hilltop Park (Parcel A)

Viewpoint B: View Southwest from HPS Building 253

Source: PBS&J 2009

Figure 3.5.3-2. Existing Conditions at Project Site

Viewpoint C: View East from HPS Phase I (Parcel A)

Viewpoint D: View East from Jerrold Avenue

Source: PBS&J 2009

Figure 3.5.3-3. Existing Conditions at Project Site

Viewpoint E: View of Yosemite Slough from CPSRA

Viewpoint F: View of Yosemite Slough from HPS Parcel E-2

Source: PBS&J 2009

Figure 3.5.3-4. Existing Conditions at Yosemite Slough

Viewpoint G: HPS Parcel B Shoreline

Source: PBS&J 2009

Figure 3.5.3-5. Existing Shoreline Conditions

None of the buildings or structures located at HPS are designated as a scenic resource or a feature of the built environment that contributes to a scenic public setting; however, they are visible and provide a visual point of reference, and, in some cases, may be considered historic (refer to Section 3.12, Cultural Resources for a discussion of historic buildings). Scenic resources in the project vicinity include the Yosemite Slough, the Re-Gunning Crane, and the shoreline.

The topography of the project site is generally flat. The bay is visible between and beyond structures throughout the project site.

Drydocks and piers, many of which are in disrepair, create a pattern of inlets along San Francisco Bay. On the 405-foot wide Re-Gunning Pier, the Re-Gunning Crane supported on four towers straddles the pier and rises to 182 ft (55 m). Much of the HPS shoreline is armored by a concrete seawall. The seawall does not rise above the existing shoreline.

3.5.3.1.2 Yosemite Slough

The Yosemite Slough is a tidal channel located west of the project site that traverses through a marsh between Hunters Point and Candlestick Point. Except for the mouth of the slough across which the bridge would be constructed, the slough is not within the project site. Yosemite Slough contains narrow patches of salt marsh habitat, varying in length from 20 to 100 ft (6 to 30 m), as well as mud flats that are exposed at low tides once or twice a day along its shorelines (H.T. Harvey & Associates 2009). The slough is habitat and feeding grounds for adult fish and invertebrates, water and shorebirds, and some mammals. Yosemite Slough brings in fresh nutrients at high tide and flushes out pollution and detritus at low tide. Ruderal vegetation occurs on both sides of the slough. There are also some areas with dirt and debris piles, old fencing, and riprap along the shoreline. Figure 3.5.3-4 illustrates existing conditions at Yosemite Slough.

3.5.3.1.3 Shoreline

The existing shoreline on the project site is characterized by a combination of riprap-protected slopes, unprotected embankments fronted by a beach, concrete submarine drydocks, pile-supported wharf, dilapidated piers, quay-wall structures, unprotected natural shoreline with debris (broken concrete, broken bricks, and random pieces of rock) lining the edges, and beach-fronted, unprotected slopes (Figure 3.5.3-5). The shoreline shows areas of erosion as well as areas of vegetation and habitat growth within the intertidal zone (Moffatt & Nichol 2009b).

3.5.3.2 Existing Light and Glare Conditions

Existing light and glare conditions in the project vicinity are typical of urban areas, with street lighting and exterior lighting at residential, public, and commercial structures. Lighting is seen during night periods along street corridors and on buildings throughout the area. Night parking lot lighting is also visible at the occupied portions of the project site. The night lighting patterns are visible from residential neighborhoods on hillside areas, including Hunters Point Hill.

3.5.3.3 Public Viewpoints

The project site is visible from several surrounding public viewpoints in the project vicinity. Four representative public views of the project site were taken from prominent public viewpoints including:

- Northeast from CPSRA (View 1);
- South from Hilltop Open Space (View 2);

- East from Hunters Point Hill Open Space (View 3); and
- Southeast from Heron's Head Park (View 4).

These views are presented in Figure 3.5.3-6 through Figure 3.5.3-9. The four views present two near-distance views of the site (Views 2 and 3) and two long-distance panoramas of the site (Views 1 and 4). They are considered representative of public views that encompass important visual characteristics of the project site and project vicinity. It should be noted that the "existing" views do not include already approved projects that have not yet been completed (HPS Phase I [Parcel A], Executive Park) but would be constructed by the time the proposed action is built out.

There are several features and landmarks within the project site that are visible from distant viewpoints. These features are summarized to assist the reader in identifying the location of HPS in the photos and simulations. The location of HPS is marked by the 182-ft (55 m) tall Re-Gunning Crane and former DoN buildings up to nine stories in height. Prominent structures include the six-story Building 253 in the eastern portion of the site and the nine-story officer's quarters building in the southern portion of the site.

3.5.3.3.1 View 1: Northeast from CPSRA (Figure 3.5.3-6)

This viewpoint provides a view of the project site north from the eastern tip of Candlestick Point. Structures within HPS, including storage and maintenance facilities and the Re-Gunning Crane, are visible. The most prominent onsite structure visible from this viewpoint is the nine-story officer's quarters building. To the west is the seven-story, former NRDL Headquarters. San Francisco Bay and the East Bay hills are visible in the background.

3.5.3.3.2 View 2: South from Hilltop Open Space (Figure 3.5.3-7)

This viewpoint provides a view south across the southern portion of HPS, from open space that would be completed as part of HPS Phase I (Parcel A). Foreground views consist of abandoned storage and maintenance facilities that range from one to five stories in height. The Re-Gunning Crane is prominently visible from this viewpoint. Views of paved roadways/lots, fences, and utility poles in various stages of disrepair are also present from this viewpoint. Middle-ground views consist of wharfs and docks at the southeastern point of HPS. The Santa Cruz Mountains along the San Francisco Peninsula are visible in the background.

3.5.3.3.3 View 3: East from Hunters Point Hill Open Space (Figure 3.5.3-8)

This viewpoint provides a view east across the northern portion of HPS. Foreground views include a large paved lot, storage buildings, and abandoned HPS buildings, which range from one to four stories in height, within HPS. Views of paved roadways, fences, and utility poles in various stages of disrepair are present from this viewpoint, as well as a view of a wharf along the shoreline. A prominent stand of trees approximately 30 to 50 ft (9 to 15 m) tall is visible in the center of HPS. The San Francisco Bay and the East Bay hills are visible in the background.

3.5.3.3.4 View 4: Southeast from Heron's Head Park (Figure 3.5.3-9)

This viewpoint provides a view southeast from Heron's Head Park across India Basin towards HPS. Views consist of structures in HPS, including storage and maintenance facilities and the Re-Gunning Crane. Low-rise residential development (approximately three stories) is visible on Hunters Point Hill to the west. San Francisco Bay and the East Bay hills are visible in the background.

Source: Lennar Urban 2009

Figure 3.5.3-6. Existing View: Northeast from CPSRA (View 1)

Source: Lennar Urban 2009

Figure 3.5.3-7. Existing View: South from Hilltop Open Space (View 2)

Source: Lennar Urban 2009

Figure 3.5.3-8. Existing View: East from Hunters Point Hill Open Space (View 3)

Source: Lennar Urban 2009

Figure 3.5.3-9. Existing View: Southeast from Heron's Head Park (View 4)

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3.6 Socioeconomics

3.6.1 Background

This section describes the existing conditions in the project site area with respect to social and economic conditions. The focus of the analysis of social conditions is on population and housing, while the analysis of economic conditions focuses on employment and income.

For purposes of the analysis of social and economic conditions, 2007 data are used to represent baseline conditions where available. Although the social and economic conditions analysis in the *Candlestick Point – Hunters Point Shipyard Phase II Development Plan Environmental Impact Report (EIR)* used a 2005 baseline because 2005 was the most current data available for the Candlestick Point area, the 2007 baseline used here is consistent with the baseline used throughout the remainder of this SEIS for the HPS site. Where quantitative data are provided to describe existing conditions, they are provided for the HPS site, the Bayview Hunters Point (BVHP) neighborhood, the City and County of San Francisco, and San Mateo County. The latest data available for the BVHP neighborhood are for 2000. Therefore, when the analysis presents data for this neighborhood, it also includes 2000 data for San Francisco and San Mateo County to allow for an appropriate comparison.

Although the project site is located entirely within San Francisco, it is in the southeastern portion of the city, so activities at the site could contribute to impacts (e.g., housing demand) in San Mateo County.

3.6.2 Regulatory Framework

Although disposal of the HPS site by the DoN is not subject to local regulation, the subsequent redevelopment of the site would be.

3.6.2.1 Federal Regulatory Framework

Executive Order (EO) 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was adopted in 1994. It requires that federal agencies make achieving environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations. For the SEIS, DoN is the lead federal agency with responsibility for implementing EO 12898. While aimed primarily at disadvantaged populations, EO 12898 also addresses social and economic conditions with respect to a project (see Section 6.4, Environmental Justice).

3.6.2.2 Local Regulatory Framework

The *City of San Francisco General Plan* (General Plan), adopted by the Planning Commission and the Board of Supervisors, is relevant to the reuse of HPS, which is located within San Francisco. The General Plan contains the following elements: Air Quality, Arts, Commerce and Industry, Community Facilities, Community Safety, Environmental Protection, Housing, Recreation and Open Space, Transportation, and Urban Design. Objectives and policies from these General Plan Elements are discussed in the respective chapters of the SEIS that deal with the related topics. This section discusses relevant objectives and policies from the Housing, Commerce and Industry, and Arts Elements.

As required every five years by state law, the San Francisco Planning Department has prepared a Draft 2009 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 draft 2009 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 draft 2009 Housing Element Update at an equal level of detail. The 2004 Housing Element, as modified by the Superior Court, contains objectives and policies that are relevant to the proposed action as follows (San Francisco Planning Department 2004a):

Objective 1 To provide new housing, especially permanently affordable housing, in appropriate locations which meets identified housing needs and takes into account the demand for affordable housing created by employment demand.

Objective 4 Support affordable housing production by increasing site availability and capacity.

Objective 8 Ensure equal access to housing opportunities.

Objective 11 In increasing the supply of housing, pursue place making and neighborhood building principles and practices to maintain San Francisco's desirable urban fabric and enhance livability in all neighborhoods.

Objective 12 Strengthen citywide affordable housing programs through coordinated regional and state efforts.

In addition, the Commerce and Industry Element (Mayor's Office of Housing 2007) has several objectives and policies that are relevant to the proposed action.

Objective 1 Manage economic growth and change to ensure enhancement of the total city living and working environment.

Objective 2 Maintain and enhance a sound and diverse economic base and fiscal structure for the city.

Objective 3 Provide expanded employment opportunities for city residents, particularly the unemployed and economically disadvantaged.

Objective 4 Improve the viability of existing industry in the city and the attractiveness of the city as a location for new industry.

Objective 6 Maintain and strengthen viable neighborhood commercial areas easily accessible to city residents.

Finally, the Arts Element of the General Plan (San Francisco Planning Department 2004b) contains one relevant objective:

Objective 6-1 Support the continued development and preservation of artists' and arts organizations' spaces.

3.6.3 Existing Conditions

3.6.3.1 Population

3.6.3.1.1 Regional Overview

The San Francisco Bay Area has experienced an influx of population over the past several decades that is expected to continue into the foreseeable future, albeit at a more gradual rate than in past decades. The Bureau of Economic Analysis (BEA) estimates there were approximately 7 million residents living in the nine Bay Area counties in 2007 (BEA 2009). Between 2000 and 2005, the regional population of the Bay

Area grew by just under 1 percent per year. Growth through 2030 is expected to occur at approximately this same rate, with 916,800 new area residents by 2030 (ABAG 2006).

The population in the City and County of San Francisco in 2007 was 799,185 (BEA 2009). In terms of population, San Francisco is the second largest city in the Bay Area, after San Jose.

3.6.3.1.2 BVHP Neighborhood and Project Site

The project site (HPS) contains no residents.

The most recent socioeconomic data available for the BVHP neighborhood is from the 2000 Census. In 2000, the population of the neighborhood was about 33,000, and the average household size was 3.6 persons per household (Table 3.6.3-1). This figure is 1.2 more persons than the average San Francisco household (2.4 persons per household). The larger household size in comparison to other parts of the city may be due to larger housing units, occupancy above optimal housing unit capacity (overcrowding), or a combination of both factors (SFRA 2009).

The average San Francisco household size grew during the latter part of the 20th century, particularly during the 1990s, as housing costs rose and forced shared rentals (San Francisco Planning Department 2004a). In the future, citywide household sizes are expected to stay relatively constant or shrink slightly as a result of changing demographic trends (San Francisco Planning Department 2009). Factors contributing to a decrease in household size include smaller family sizes and lower birth rates, a greater prevalence of single-person households, longer life spans, greater geographic mobility, and greater independence for seniors. Relative to other parts of the city, the BVHP neighborhood experiences a higher number of residents per habitable room (San Francisco Planning Department 2004a). As new housing varying in affordability, type, and size is developed in the area, existing crowding is expected to be alleviated. As a result of new developments, including the proposed project, the household size in the project site area is expected to decrease to 2.33 people per unit by 2030, consistent with the 2005 citywide average and the average identified in the General Plan Housing Element. A 2.3-person household size is thus used to estimate future population for the project site.

Table 3.6.3-1. Population and Households

Data Item	*San Francisco (2007)*	*San Mateo County (2007)*	*San Francisco (2000)*	*San Mateo County (2000)*	*BVHP (2000)*	*HPS (2007, 2000)*
Population	764,976	706,984	776,733	707,161	32,958	0
Households	321,947	251,357	329,850	254,219	9166	0
Persons per household	2.4	2.8	2.4	2.8	3.6	n/a

Note: The latest data available for the BVHP neighborhood are for 2000.
Sources: U.S. Census Bureau 2009a; U.S. Census Bureau 2002.

3.6.3.2 Housing

3.6.3.2.1 Regional Overview

Over the course of the past several decades, the 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 lack of local housing options causes many Bay Area residents to seek housing in the Sacramento region and Central Valley, resulting in long commutes and significant impacts on the regional transportation system (ABAG 2006).

There were approximately 358,000 housing units in San Francisco in 2007. The city had a vacancy rate of 10.0 percent, and 62 percent of its total housing stock consisted of rental units. In 2007, the number of households totaled 321,947 (U.S. Census Bureau 2009a). The projections of the Association of Bay Area Governments (ABAG) indicate that the number of households in San Francisco would increase by 0.6 percent annually through 2030, roughly the same as for projected population increases, although the household increases between 2005 and 2008 were only about 0.3 percent per year (ABAG 2006).

This housing shortage in San Francisco is compounded by additional factors. San Francisco was historically developed as an employment center, which means that there are more jobs than housing units in the city. In addition, San Francisco is relatively built up, with few tracts of land available for development of new housing. Although the city does not have an adopted jobs-housing ratio target, Policy 1.9 of the Housing Element of the San Francisco General Plan encourages new commercial developments that would generate employment to also develop housing or pay in-lieu fees through the city's Jobs-Housing Linkage Program (San Francisco Planning Department 2004a).

3.6.3.2.2 Project Site and BVHP Neighborhood

The HPS site contains no residents.

The housing characteristics of the BVHP neighborhood differ from those of San Francisco as a whole. The 2000 Census, the most recent comprehensive source of housing characteristics by neighborhood, reported that the BVHP neighborhood had a lower proportion of rental units (48 percent versus 62 percent), lower vacancy rates (1.3 percent versus 4.9 percent), and more persons per household (3.8 versus the 2.3 citywide average).

As shown in Table 3.6.3-2, the BVHP neighborhood vacancy rate was lower than the city in 2000, but comparable to the rate for San Mateo County. The vacancy rates in the city and San Mateo County were somewhat higher in 2007 than 2000. Note that 2000 data are the latest available for the BVHP neighborhood. BVHP also had a percentage of rental units intermediate between the city and San Mateo County.

Table 3.6.3-2. Existing Housing Characteristics

Data Item	***San Francisco (2007)***	***San Mateo County (2007)***	***San Francisco (2000)***	***San Mateo County (2000)***	BVHP ***(2000)***	***HPS (2007, 2000)***
Housing units	357,833	266,796	346,527	260,576	9,525	0
Vacancy rate	10.0%	5.8%	4.9%	2.5%	2.9%	n/a
Percent rental units	62%	38%	65%	39%	48%	n/a

Note: The latest data available for the BVHP neighborhood are for 2000.
Sources: U.S. Census Bureau 2009a; U.S. Census Bureau 2002.

3.6.3.2.3 Regional Housing Needs Plan

To respond to statewide population and household growth and to ensure the availability of affordable housing for all income groups, the state enacted Government Code Section 65584 in 1981, which requires each Council of Governments (COG) to periodically distribute state-identified housing needs to all jurisdictions within its region. The California Department of Housing and Community Development (HCD) is responsible for determining this regional need and for initiating the process by which each COG must then distribute its share of statewide need to all jurisdictions within its region. This statute requires COGs to develop a new Regional Housing Needs Plan (RHNP) every five years. In June 2008, ABAG

released its RHNP, which documents the Regional Housing Needs Allocation (RHNA) for the Bay Area for the June 2007 to June 2014 planning period (ABAG 2008b).

California Government Code Section 65584 requires that a city's share of regional housing needs include housing needs for 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 county and city in California, are "Very Low Income," "Low Income," "Moderate Income," and "Above Moderate Income." Based on a U.S. Department of Housing and Urban Development formula, San Francisco's Area Median Income (AMI) in 2007 was estimated to be $64,250 for a two-person household and $72,300 for a three-person household (San Francisco Planning Department 2007). San Francisco is estimated to have the income level distribution shown in Table 3.6.3-3.

Table 3.6.3-3. San Francisco Income Distribution

Income Group	*Income Level*	*Income Range*[1]	*Number of Households*
Very low	≤ 50% of AMI	≤ $33,650	88,824
Low	50–80% of AMI	$33,650–$53,840	44,859
Moderate	80–120% of AMI	$53,840–$80,760	47,826
Above Moderate	> 120% of AMI	> $80,760	140,438

Note:
1. Based on an interpolation of San Francisco's Area Median Income (AMI) in 2007 of $64,250 for a two-person household and $72,300 for a three-person household, and the average household size of 2.38 persons.

Sources: San Francisco Planning Department 2007; U.S. Census Bureau 2009a.

The ABAG Policy Board established housing needs for all jurisdictions within its boundaries for the 2007 to 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 RHNP, the Bay Area's overall housing need would total about 214,500 new units by June 2014 (ABAG 2008b). The jurisdictional need of the city is estimated to be 31,193 units, or an average annual need of 4,456 new units.

The distribution of future housing units needed by income level in San Francisco during the 2007 to 2014 period is shown in Table 3.6.3-4.

Table 3.6.3-4. San Francisco Housing Need, 2007–2014

Income Group	*Number of Units*
Very low	6,589
Low	5,535
Moderate	6,754
Above moderate	12,315
Total	**31,193**

Source: ABAG 2008b.

3.6.3.2.4 San Francisco Citywide Affordable Housing Program

The San Francisco Redevelopment Agency's (SFRA) Citywide Tax Increment Housing Program (Housing Program) dedicates a portion of the tax increment generated through the SFRA real estate activities to the development of affordable housing. By state law, the SFRA must expend at least 20 percent of its tax increment financing for the construction or preservation of affordable housing. The SFRA also must produce affordable housing totaling at least 15 percent of all new units within the redevelopment project areas. The SFRA sets maximum incomes for all affordable units, which can vary by unit and location. The income limits are adjusted each year based on data provided by HUD.

Through the Housing Program, tax increment funds are committed as grants and loans to non-profit and for-profit housing organizations for the development of a range of affordable housing for San Francisco residents. Funds are committed at all stages of project development, from predevelopment, acquisition, construction, and rehabilitation, to permanent financing.

3.6.3.3 Employment and Income

3.6.3.3.1 Regional Overview

The Bay Area is a major employment center, with over 4.5 million jobs in 2007 (BEA 2009). About 16 percent of this employment is in San Francisco. As shown in Table 3.6.3-5, there were approximately 736,000 jobs in the city in 2007, with the sectors with highest employment being professional and technical services, accommodation and food services, finance and insurance, retail trade, and local and state government.

At the time of the 2000 Census, about 55 percent of the workers holding jobs in San Francisco lived in the city, while the remaining 45 percent lived in other jurisdictions (USDOT 2006). Although some San Francisco residents also commute to other cities to work, on balance San Francisco is an employment center more than a residential center, which means that the daytime population associated with local employment substantially exceeds the residential (nighttime) population. Estimated city employment for 2030 would be 748,100 jobs, including employment projections associated with the proposed action.

Table 3.6.3-5. Existing Employment (2007) - San Francisco

Sector	*Employment (number or percent)*
Total employment (number of jobs)	736,416
Farm employment	0.02%
Forestry, fishing, agricultural services	0.1%
Mining	0.1%
Utilities	n/a[1]
Construction	3.6%
Manufacturing	1.8%
Wholesale trade	2.1%
Retail Trade	7.4%
Transportation and warehousing	n/a[1]
Information	3.2%
Finance and insurance	8.2%
Real estate and rental and leasing	5.2%
Professional and technical services	15.5%
Management of companies and enterprises	2.3%
Administrative and waste services	5.9%
Educational services	3.2%
Health care and social assistance	7.2%
Arts, entertainment, and recreation	3.6%
Accommodation and food services	9.8%
Other services, except public administration	5.4%
Federal government (civilian)	2.1%
Military	0.2%
State government	5.3%
Local government	6.0%
Additional sectors not disclosed[1]	2.0%

Note:
1. To protect confidential business information, BEA does not disclose employment data when there are three or fewer employers in a sector. The line item "Additional sectors not disclosed" shows the total income attributable to these categories.

Source: BEA 2009.

3.6.3.3.2 Project Site

Based on data from the San Francisco County Transportation Authority (SFCTA) (2008), there are 316 jobs at HPS, as measured in full-time equivalent (FTE) numbers. This currently includes approximately 100 professional artists, as well as contract and temporary jobs associated with cleanup activities, security, and environmental cleanup staff.

Table 3.6.3-6 provides additional information relevant to employment, namely educational attainment among the BVHP residents compared with residents of San Francisco and San Mateo County. As the table shows, residents of BVHP generally have lower levels of formal education. For instance, 60 percent of neighborhood residents have a high school diploma or less, 36 percent have some college, and 4 percent have a postgraduate degree. In San Francisco as a whole, 33 percent of residents have a high school diploma or less, 51 percent have some college, and 16 percent have a postgraduate degree. The educational disparities are important because they influence what types of jobs are available to neighborhood residents compared to other job candidates in San Francisco as a whole, as well as other communities.

Table 3.6.3-6. Educational Attainment (2000)

Level of Educational Attainment	*San Francisco*	*San Mateo County*	*Bayview Hunters Point*
Less than high school	19%	15%	36%
High school diploma	14%	17%	24%
Some college	17%	22%	23%
College diploma[1]	34%	32%	13%
Postgraduate degree	16%	15%	4%

Note:
1. Includes Associate's degree.

Source: U.S. Census Bureau 2002.

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3.7 Hazards and Hazardous Substances

This section describes the regulatory framework, the DoN's environmental restoration program, and existing site conditions related to hazards and hazardous substances, and presents a summary of the ongoing environmental management and restoration programs at HPS. The management, investigation, and cleanup activities at HPS are ongoing; therefore, this section presents the latest data available at the time of preparation. The most current data regarding the cleanup activities are published as part of the environmental restoration processes and can be found in the local information repository at the San Francisco Main Library[1] or on the HPS Environmental Restoration Program Web site at: http://www.bracpmo.navy.mil.

3.7.1 Background

HPS was placed on the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) National Priorities List (NPL) on 21 November 1989, and subsequent CERCLA investigation and remedial actions have been conducted and continue at HPS under the DoN's Environmental Restoration Program (ERP). On 22 January 1992, the DoN entered into a Federal Facilities Agreement (FFA) pursuant to Section 120(e) of CERCLA, 42 U.S.C. 9620(e), with the USEPA, California Department of Toxic Substances Control (DTSC), and the RWQCB ("FFA Signatories"). The FFA requires that the DoN investigate and remediate actual or threatened releases of hazardous substances, pollutants, and contaminants at HPS in accordance with Sections 104 and 120 of CERCLA, 42 U.S.C. 9604 and 9620, as delegated under Executive Order 12580; the Defense Environmental Restoration Program (DERP), 10 U.S.C. 2701, *et seq*.; and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR Part 300). The DoN addresses these requirements through its Installation Restoration (IR) Program which is itself a component of the DoN's ERP. This program is ongoing, regardless of whether the installation was recommended for disposal under the BRAC program.

DoN is implementing CERCLA response (both remedial and removal) actions to address releases of hazardous substances at HPS in accordance with CERCLA, SARA, DERP, the NCP, and the FFA that will ensure adequate protection of human health and the environment. Potential environmental effects of CERCLA response actions (e.g., soil excavation, soil transport, and operation of treatment systems) have been, and will continue to be, evaluated by DoN and regulatory agencies in conjunction with the approval process for specific response actions selected and implemented by the DoN under CERCLA. Redevelopment and reuse activities are not CERCLA response actions. However, CERCLA response actions are designed to be consistent and integrated with and support future redevelopment and reuse and may in some cases impose some use restrictions upon such redevelopment and reuse. Appropriate controls to protect human health and the environment have been, and will continue to be, incorporated into the selection, design and implementation of those response actions.

The DoN, USEPA, DTSC, RWQCB, and the California Department of Public Health (CDPH) will, independent of the proposed action and this SEIS, require that before any project site development activity occurs at HPS, appropriate and legally enforceable CERCLA Institutional Controls (ICs) in the form of a recorded covenant, deed provision, easement, or lease term are in effect and applicable in order to ensure adequate protection of human health and the environment.

Remediation is ongoing at portions of the project site for known hazardous substances, pollutants, and contaminant release sites regulated under CERCLA. These remediation areas are the only known hazardous substance release sites requiring remediation at the project site. Additional cleanup is ongoing in "compliance programs" such as the petroleum corrective action program overseen by the RWQCB

[1] Repository for the HPS Project is located at the San Francisco Main Library (Hardcopy Only), 100 Larkin St, San Francisco, CA, 94102.

pursuant to Subtitle I of the federal *Resource Conservation and Recovery Act* (RCRA) and the *California Porter-Cologne Water Quality Control Act*. The ongoing regulatory compliance programs are separate from the CERCLA requirements.

Other elements of hazardous substance and materials exposure and potential risks to human health and the environment are air emissions that are not regulated under CERCLA. Sources of hazardous or toxic air emissions include, but are not limited to, processes, vehicle use, and proximity to existing or relocated sources of diesel or other toxic air emissions such as freeways and railroads and existing offsite industries and businesses. The environmental setting and associated impacts related to toxic air contaminants, including the release of diesel particulate matter from construction truck trips and/or delivery truck trips, are identified in Sections 3.2 and 4.2, Air Quality and Greenhouse Gases.

3.7.2 Regulatory and Environmental Restoration Program Overview

The DoN is managing hazardous substances and materials, and is remediating any contamination resulting from past operations at HPS in accordance with the requirements of the following programs:

Resource Conservation and Recovery Act (RCRA)

RCRA regulates the treatment, storage, transportation, handling, labeling, and disposal of hazardous waste. The Hazardous and Solid Waste Amendments of 1984 added the requirement for treatment, storage, and disposal facilities with permits issued after 8 November 1984, to include corrective actions.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA, passed in 1980, created a legal mechanism for cleaning up abandoned or uncontrolled hazardous waste sites. CERCLA requires federal agencies to respond where necessary to protect human health and the environment when there is a release or threat of release of a hazardous substance into the environment or when there is a release of any pollutant or contaminant which may present an imminent and substantial danger to public health or welfare. Under CERCLA, the USEPA developed the National Priorities List (NPL) of sites that present the greatest risk to public health and the environment.

CERCLA 120(h)(3)(A) requires that, prior to property transfer, all necessary remedial actions to protect human health and the environment with respect to any such hazardous substance remaining on the property be completed or in place and proven to be operating properly and successfully.

CERCLA 120(h)(3) imposes several requirements on all transfers of federal real property "owned by the United States" to non-federal entities. With regard to the Federal Real Property Disposal Process, CERCLA requires the Federal Government to:

- Give notice of hazardous substance activity to the grantee;
- Include a covenant in the deed that "all remedial action necessary to protect human health and the environment with respect to any such substance remaining on the property has been taken before the date of such transfer;"
- Include a deed covenant that the United States will return and perform any additional response action that may be required in the future; and
- Retain a perpetual right of access necessary to do such additional response actions.

As noted above, these requirements only apply to conveyances of real property out of federal ownership. They do *not* apply to interagency federal real property transfers or to leases, licenses, or easements granted for the use of federal land.

In addition, CERCLA 120(h)(3)(C) allows property at NPL sites to be transferred before all necessary remedial actions have been taken if USEPA, with the concurrence of the Governor of the state in which a facility is located, determines that the property is suitable for transfer, based on a finding that:

(I) the property is suitable for transfer for the use intended by the transferee, and the intended use is consistent with protection of human health and the environment;

(II) the deed or other instrument between the United States and the transferee of the property contains assurances that:

1. provide for any necessary restrictions on the use of the property to ensure the protection of human health and the environment;
2. provide that there will be restrictions on the use necessary to ensure that required remedial investigations, response action, and oversight activities will not be disrupted;
3. provide that all necessary response action will be taken and identify the schedules for investigation and competition of all necessary response action as approved by the appropriate regulatory agency; and
4. provide that the DoN, for HPS, will submit a budget request to the Director of the Office of Management and Budget that adequately addresses schedules for investigation and completion of all necessary response action, subject to congressional authorizations and appropriations;

(III) the DoN, for HPS, has provided notice, by publication in a newspaper of general circulation in the vicinity of the property, of the proposed transfer and of the opportunity for the public to submit, within a period of not less than 30 days after the date of the notice, written comments on the suitability of the property for transfer; and

(IV) the deferral and the transfer of the property will not substantially delay any necessary response action at the property.

Transfer of property pursuant to CERCLA 120(h)(3)(C) is commonly referred to as an "early transfer."

Superfund Amendments and Reauthorization Act (SARA)

In 1986, Congress passed SARA, which mandated that DoD follow the same cleanup regulations that apply to private entities. SARA also established the DERP. Through DERP, the DoD conducts environmental restoration activities at sites on active installations undergoing BRAC, and formerly utilized defense sites (FUDS).

The Defense Environmental Restoration Program (DERP)

DERP addresses the cleanup of DoD hazardous waste sites consistent with the requirements of CERCLA. In accordance with SARA Section 211, the three main objectives of DERP are:

- The identification, investigation, research and development, and cleanup of contamination from hazardous substances, pollutants, and contaminants;
- The correction of other environmental damage (such as detection and disposal of unexploded ordnance) that creates an imminent and substantial endangerment to public health or the environment; and
- The demolition and removal of unsafe buildings and structures, including buildings and structures of the DoD at sites formerly used by or under the jurisdiction of the Secretary of Defense.

DERP requires the Secretary of Defense to carry out a program of environmental restoration for hazardous substance, pollutant, and contaminant releases at facilities under the Secretary's jurisdiction consistent with Section 120 of CERCLA.

DoN Environmental Restoration Program (ERP)

To comply with the requirements of CERCLA, SARA, and DERP, the DoN established the ERP to reduce the risk to human health and the environment from past waste disposal operations and hazardous substance spills at DoN activities, including certain oil spills that are not addressed in the CERCLA framework. The program goal is to provide for cost-effective and timely site assessment, planning, and remediation of identified releases consistent with DERP requirements. The ERP has been organized into three program categories, one of which is the IR Program. The DoD established the DoN's IR Program in 1986 to identify, assess, characterize, and clean up or control contamination from past hazardous waste-disposal operations and hazardous materials spills at U.S. Navy and Marine Corps installations. The program was developed to comply with federal requirements regarding cleanup of hazardous waste sites, including CERCLA and SARA.

The DoN's IR Program is structured in accordance with CERCLA guidelines. The CERCLA process and the IR Program specify a number of sequential procedures for initiating and carrying out the remedial process under the IR Program. Interested agencies and the public have opportunities to review and comment on assessments/studies and proposals for removal/remedial actions throughout the remedial process. A CERCLA Record of Decision (ROD) is prepared after public review of the Proposed Remedial Action Plan. The ROD explains the remedy selection process and identifies the remedy selected based on information and technical analysis presented in the Remedial Investigation/Feasibility Study (RI/FS) report. A site may be removed from the NPL when the ROD requirements are attained and the site is operational and functional. No site may be deleted from the NPL without an EPA-approved Close Out Report. More information on the environmental investigation and cleanup process at HPS is included in Section 3.7.4, Existing Conditions, below.

The process described above is for activities addressing hazardous substances under CERCLA. Because CERCLA excludes petroleum from its definition of hazardous substances, the cleanup of petroleum releases from underground storage tanks (USTs) or other sources is regulated under federal RCRA Subtitle I and state law by the RWQCB. The petroleum cleanup follows a parcel-by-parcel iterative process similar to the CERCLA cleanup program (i.e., investigation followed by identification of cleanup options, culminating in the approval by the RWQCB of a Corrective Action Plan for each parcel (if necessary) and implementation of the cleanup actions identified in that plan).

3.7.3 Compliance Programs

Under the ongoing, Regulatory Compliance Program, the DoN is required to manage hazardous materials and hazardous substances currently used by the DoN during its ownership and occupancy of the HPS property, including at above ground petroleum storage tank sites, underground petroleum storage tank sites, oil/water separator sites, certain former polychlorinated biphenyl (PCB)-containing transformer sites regulated under the *Toxic Substances Control Act* (TSCA), and miscellaneous other locations of concern at HPS.

The DTSC provides oversight for the RCRA program, and the California State Water Resources Control Board (SWRCB) provides oversight for the petroleum corrective action program (tank sites and other sites where petroleum was stored or released). The DoN has investigated and continues to investigate known or suspected petroleum release sites and conducts remediation as appropriate.

3.7.3.1 Hazardous Materials Use

The management of hazardous materials is regulated under a number of laws at federal, state, and local levels through programs administered by the USEPA and the Department of Transportation (USDOT), agencies within the California Environmental Protection Agency (Cal/EPA) including DTSC, RWQCB, and Caltrans, California Highway Patrol (CHP), federal and state Occupational Safety and Health Administration (OSHA); the U.S. Department of Public Health, the CDPH, and the San Francisco Department of Public Health (DPH). The local requirements discussed in this section are evaluated as they would apply during future occupancy and use by transferee(s) after the DoN has conveyed the property. They do not apply to the DoN's cleanup program because local requirements are not federal or state "applicable or relevant and appropriate" requirements (see Subsections 121(d) and (e) of CERCLA; 42 U.S.C. 9621(d) and (e)).

Hazardous materials are required to be stored in designated areas designed to prevent accidental release to the environment. *California Building Code* (CBC) requirements prescribe safe accommodations for materials that present a moderate explosion hazard, high fire or physical hazard, or health hazards.

The *Hazardous Materials Management Act* requires that businesses handling or storing certain amounts of hazardous materials prepare a hazardous materials business plan (HMBP), which includes an inventory of hazardous materials stored onsite, an emergency response plan, and an employee-training program. Businesses that use, store, or handle 55 gallons (208 liters) of a liquid, 500 pounds (226 kg) of a solid, or 200 ft^3 (5.6 m^3) of a compressed gas at standard temperature and pressure, are required to prepare and implement this business plan.

Handling and Transportation of Hazardous Waste and/or Materials

Hazardous materials that could be excavated from construction or other activities during future development of the project site may require offsite transportation for disposal and/or treatment. Transportation and disposal of soil that is classified as hazardous waste would be subject to applicable federal and state regulations. The USDOT regulates transportation of hazardous materials including contaminated soil between states, as described in Title 49 of the CFR, and implemented by Title 13 of the CCR. CHP and Caltrans are the state agencies with primary responsibility for enforcing federal and state regulations related to transportation within California. These agencies respond to hazardous materials transportation emergencies and determine container types to be used and grant licenses to hazardous waste haulers for hazardous waste transportation on public roads.

Radioactive Materials

The CDPH is responsible for ensuring that facilities that use, store, or dispose of radiological materials are properly licensed (or properly issued an exemption from such requirements) in accordance with state and federal laws and regulations, including the state Radiation Control Law (*California Health and Safety Code* Section 114960 *et seq*. and 17 CCR Division 1, Chapter 5). CDPH's Radiologic Health Branch licenses institutions that use radioactive materials and radiation-producing equipment, such as X-ray equipment. To maintain a radioactive materials license, an institution must meet training and radiation safety requirements and be subject to routine inspections.

Worker Safety

Occupational safety standards have been established in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. The state and federal OSHA are the agencies with primary responsibility for ensuring worker safety in the workplace. Cal/OSHA) has primary responsibility for developing and enforcing standards for safe workplaces and work practices in California, in accordance with regulations specified in CCR, Title 8. If additional investigation or

remediation is determined to be necessary during development of the project site, compliance with Cal/OSHA standards for hazardous waste operations (8 CCR 5192) would be required for those individuals involved in the investigation or cleanup work. A site Health and Safety Plan (HASP) must be prepared prior to commencing any work located at a contaminated site or involving disturbance of building materials containing hazardous substances, to protect workers from exposure to potential hazards.

Disturbance or Disposal of Shoreline Sediment

In the San Francisco Bay Area, projects involving the disturbance or disposal of sediments (e.g., routine maintenance of a marina) in the bay cannot be approved without concurrence from all permitting and commenting agencies in the Dredged Material Management Office (DMMO). The purpose of the DMMO is to cooperatively review sampling and analysis plans, analyze the results of sediment quality sampling, and make suitability determinations for material proposed for disposal in the bay. The goal of this interagency group is to increase efficiency and coordination between the member agencies and to foster a comprehensive and consolidated approach to handling dredged material management issues (BCDC 2008).

Air Emissions Associated with Development of Hazardous Materials Release Sites

The BAAQMD is primarily responsible for planning, implementing, and enforcing federal and state ambient air quality standards in the San Francisco Bay Area. BAAQMD regulates both criteria air pollutants and toxic air contaminants (refer to Regulatory Framework in Section 3.2, Air Quality and Greenhouse Gases). The state Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations is also regulated by the BAAQMD (17 CCR 93105). This agency regulates particulate matter from construction activities and requires the implementation of various dust control measures to keep respirable particulate matter, or $PM_{10,}$ levels to a minimum.

In addition, the city has adopted Article 22B, the Construction Dust Control Ordinance (Dust Ordinance), which requires stringent controls to minimize dust emissions. The Dust Ordinance was adopted in July 2008 and requires that all site preparation work, demolition, or other construction activities within the city comply with specific dust control measures. For projects over one-half ac (0.2 ha), the Dust Ordinance requires that the future developer or property owner submit a Dust Control Plan for approval by the DPH prior to issuance of a building permit by Department of Building Inspection (DBI).

The Dust Ordinance requires the future developer or property owner and contractors responsible for construction activities during development of the project site to control construction dust on the site or implement other practices that result in equivalent dust control that are acceptable to the DPH Director. It is anticipated that *San Francisco Health Code* Article 31, described below, will be amended to include a requirement for submittal of a Dust Control Plan for HPS.

Naturally Occurring Asbestos

The ATCM for Construction, Grading, Quarrying, and Surface Mining Operations is intended to protect public health and the environment by requiring the use of best available dust control measures to prevent offsite migration of naturally occurring asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of ultramafic rock, serpentine, or asbestos. The ATCM applies to grading or excavation activities, which would involve the excavation of bedrock or fill materials potentially containing naturally occurring asbestos.

For construction activities disturbing less than one ac (0.4 ha) of area underlain by these types of bedrock, specific dust control measures must be implemented in accordance with the ATCM before construction

begins and each measure must be maintained throughout the duration of the portion of the construction project when these types of bedrock are being disturbed. For construction activities disturbing greater than one ac (0.4 ha) of area underlain by these types of bedrock, construction contractors are required to prepare an Asbestos Dust Mitigation Plan specifying measures that will be taken in an attempt to ensure that no visible dust crosses the property boundary during construction.

Section 3.2, Air Quality and Greenhouse Gases, provides further information on construction dust, toxic air contaminants, and airborne asbestos regulations.

Asbestos in Structures and Buildings

Asbestos is regulated both as a hazardous air pollutant under the federal CAA regulations and as a potential worker safety hazard under the authority of the Cal/OSHA. These regulations prohibit emissions of asbestos from asbestos-related manufacturing, demolition, or construction activities; require medical examinations and monitoring of employees engaged in activities that could disturb asbestos-containing building materials; specify precautions and safe work practices that must be followed to minimize the potential for release of asbestos fibers; and require notice to federal and local government agencies prior to beginning renovation or demolition that could disturb asbestos-containing building materials. The agencies with primary responsibility for asbestos safety are the BAAQMD, Cal/OSHA, OSHA, and the USEPA.

Lead-Based Paint

Federal, state, and local laws and regulations govern handling of building materials that contain lead-based paint. OSHA Lead Construction Standards establish a maximum safe exposure level for the following types of construction work where lead exposure may occur: demolition or salvage of structures where lead or materials containing lead are present; removal or encapsulation of materials containing lead; and new construction, alteration, repair, or renovation of structures or materials containing lead. Typically, building materials with lead-based paint are considered hazardous waste (22 CCR Division 4.5, Chapter 2) unless the paint is chemically or physically removed from the building debris.

Building Lighting

Lighting waste may be classified as hazardous waste if it contains concentrations of mercury, lead, or PCBs that exceed specified limits. Fluorescent light ballasts that contain PCBs, regardless of size or quantity, are regulated under TSCA as hazardous waste and must be transported and disposed of as such. Such hazardous wastes and materials would be subject to regulations governing hazardous waste and materials outlined above.

San Francisco Health Code Article 21

Article 21 of the *San Francisco Health Code* provides for safe handling of hazardous materials in the city. In accordance with this article, person or business that handle, sell, store, or otherwise use hazardous materials in quantities exceeding specified thresholds would be required to obtain and keep a current hazardous materials certificate of registration and to implement an HMBP, to be submitted with the registration application. Facilities with USTs are also required to obtain a permit to operate the tank. In addition to specifying permitting requirements for hazardous materials and USTs, Article 21 prohibits unauthorized releases of hazardous materials and specifies requirements for reporting an unauthorized release, inspections after an unauthorized release, addressing abandoned USTs or hazardous materials handling facilities, and closure of hazardous materials handling facilities.

Article 21 is designed to help protect the health and safety of the general community and emergency response personnel, such as fire fighters and paramedics. Data on hazardous materials use are stored in a

citywide computer system and can be made available to emergency responders. The information assists emergency responders in assessing and resolving hazardous materials incidents quickly and safely. Inspections are performed by the city every one to two years, or upon complaint.

Article 21 incorporates the California Underground Storage Tank Regulations specified in the *California Health and Safety Code*, Chapters 6.7 and 6.75; Hazardous Materials Release Response Plans and Inventory Regulations requiring preparation of an HMBP, and specified in the *California Health and Safety Code*, Chapter 6.95, Article 1; Aboveground Petroleum Storage Tank Regulations requiring preparation of a Spill Prevention Control and Countermeasures (SPCC) Plan, and specified in the *California Health and Safety Code*, Section 25270.5; and hazardous materials management provisions of the *Uniform Fire Code* requiring Hazardous Materials Inventories specified in Sections 8001.3.2(a) and 8001.3.3(a). It also provides for additional stricter local requirements.

San Francisco Health Code Article 22

San Francisco Health Code Article 22 provides for safe handling of hazardous wastes in the city. This article incorporates the state requirements for hazardous waste management specified in the *California Health and Safety Code*, Chapter 6.5, Article 2, and authorizes the DPH to implement the requirements of the *Hazardous Waste Control Act* related to hazardous waste generators in San Francisco. Hazardous wastes generated at a facility would be disclosed in the Hazardous Materials Certificate of Registration and HMBP prepared for the facility, in accordance with Article 21 of the *San Francisco Health Code* (described above).

San Francisco Health Code Article 22A and Article 31

San Francisco Health Code Article 22A creates special requirements to protect against the potential presence of hazardous wastes within historic fill areas of the city. Specifically, for future projects that are bayward of the 1851 high-tide line, Article 22A requires a site assessment and mitigation of any risks identified as a condition for construction. All reports are submitted to DPH for approval.

Because Article 22A requirements do not apply to HPS, DPH created Article 31, modeled on Article 22A. Article 31 was added to the *San Francisco Municipal Code* in 2004 (Ordinance 0303-04) in conjunction with the execution of a Disposition and Development Agreement (DDA) between SFRA and Lennar Urban pertaining to redevelopment of Parcel A (HPS Phase I), which was previously disposed of by the DoN for development. It was subsequently amended in 2010 (Ordinance 0204-10) to apply to development in the entire HPS.

In addition to the site assessment and mitigation requirements taken from Article 22A, Article 31 incorporates substantive requirements of mitigation measures required in the EIR, and it establishes a mechanism for DPH to verify compliance with restrictions in deeds and covenants enforceable by the FFA Signatories and the DoN, as well as EIR mitigation measures. Substantively, Article 31 regulations require the preparation of plans in connection with permit applications and establish minimum criteria for the content of those plans. The required plans include, as applicable, Dust Control Plans, Unknown Contaminant Contingency Plans, Disposal Plans, HASPs, Foundation Support Piles Installation Plans, and Serpentinite Cover Plans. As an enforcement mechanism, DPH would assist permit-issuing departments of the city in verifying that restrictions have been complied with before the city issues excavation and other ground-disturbing permits and that compliance with the various measures continues for the duration of the construction.

San Francisco Department of Public Health (DPH) Hazardous Materials Unified Program

Cal/EPA has adopted regulations implementing a Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program). The six elements of the Unified Program are

hazardous waste generators and hazardous waste onsite treatment, USTs, above-ground storage tanks (ASTs), hazardous material release response plans and inventories, risk management and prevention programs, and Uniform Fire Code hazardous substances management plans and inventories. The program is implemented at the local level by the Certified Unified Program Agency (CUPA), a local agency responsible for consolidating the administration of the six program elements within its jurisdiction.

The DPH Hazardous Materials Unified Program Agency (HMUPA) has been granted authority by the state under the Unified Program to enforce the program element regulations pertaining to hazardous materials in the city.

Handling of Affected Groundwater

It may be necessary to pump shallow groundwater – or "dewater" – areas to facilitate construction within HPS. Discharges to the sewage system related to these activities are regulated by the San Francisco Department of Public Works (SFDPW), through Article 4.1, the Industrial Waste Ordinance of the *Public Works Code,* as well as the San Francisco Public Utilities Commission (SFPUC) batch wastewater discharge permit process. Groundwater from dewatering and/or cleanup activities must meet specific treatment standards before being discharged to the city sewage system under permits issued by the SFPUC.

If shallow groundwater were to be pumped directly into the bay as a necessary by-product of construction dewatering, the discharger would be required to notify and obtain approval of the RWQCB, as described in Section 3.9, Water Resources. Any groundwater proposed for discharge from the project site into the bay must meet strict water quality standards established by the San Francisco Bay Basin Plan, as defined by the RWQCB, and may have to be treated before discharge into the bay to avoid potential degradation of the bay's water quality. Furthermore, dischargers are required to meet stringent monitoring standards established by the RWQCB (and to a certain extent, the SWRCB) to ensure compliance under this permitting system.

San Francisco General Plan

The *San Francisco General Plan* (1996) provides long-term guidance and policies for maintaining and improving the quality of life and the man-made and natural resources of the community. The Community Safety chapter and the Environmental Protection chapter of the *San Francisco General Plan* contain the following policies relating to hazardous materials:

COMMUNITY SAFETY

Policy 2.12 Enforce state and local codes that regulate the use, storage, and transportation of hazardous materials in order to prevent, contain, and effectively respond to accidental releases.

ENVIRONMENTAL PROTECTION

Policy 1.4 Ensure that all new development meets strict environmental quality standards and recognizes human needs.

San Francisco Bay Plan

The objectives and policies of the Bay Plan concerning hazards that are relevant to the proposed action are listed below. These objectives and policies are for future occupancy and use by transferee(s) after the DoN has conveyed the property.

Part IV: Development of the Bay and Shoreline: Safety of Fills

2. Even if the Bay Plan indicates that a fill may be permissible, no fill or building should be constructed (during development of the project site) if hazards cannot be overcome adequately for the intended use in accordance with the criteria prescribed by the Engineering Criteria Review Board.

3.7.4 Existing Conditions

As described below, the historic uses at HPS, by both the DoN and its tenants, resulted in a number of hazardous substance release sites that are presently undergoing remediation by the DoN, in accordance with federal law, including CERCLA, and under the supervision of federal and state environmental agencies.

3.7.4.1 HPS Cleanup Parcels

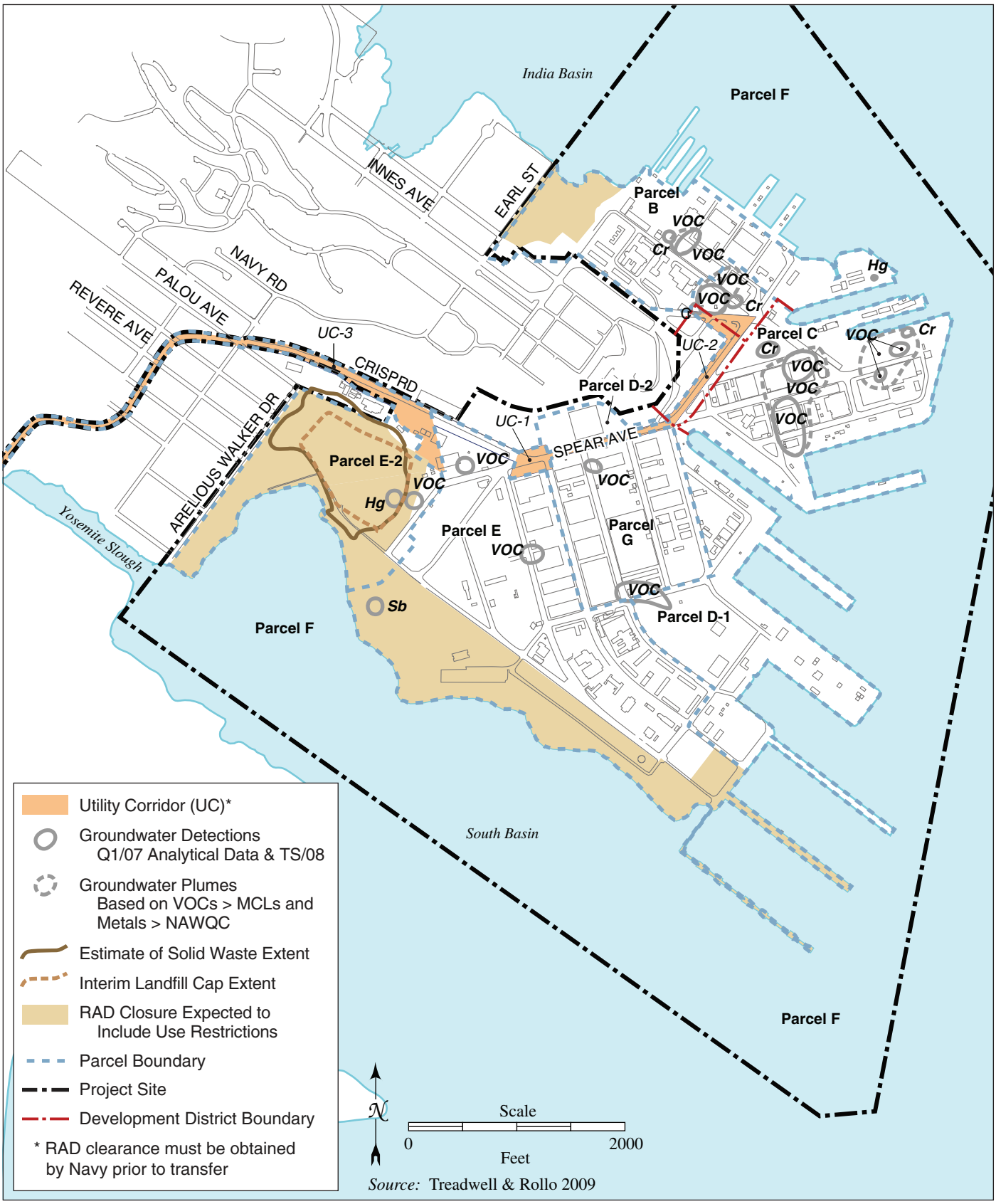
Separate from the community's redevelopment process, the DoN has divided HPS into individual cleanup parcels – Parcels B, C, UC-1, UC-2, UC-3, D-1, D-2, E, E-2, F, and G – to aid in environmental investigation and clean-up. Figure 3.7.4-1 shows the approximate boundaries of the DoN clean-up parcels at HPS. Table 3.7.4-1 identifies the relationship between the DoN clean-up parcels and the proposed future land use for each of the redevelopment alternatives assessed in this SEIS. The status of the DoN's environmental investigations and cleanup activities at each of the parcels in HPS is discussed in the subsections below.

3.7.4.2 Overview of the Environmental Investigation and Cleanup Process

DoN is implementing CERCLA response (both remedial and removal) actions to address releases of hazardous substances at HPS in accordance with CERCLA, SARA, DERP, NCP, other applicable laws and regulations, and the FFA that will ensure adequate protection of human health and the environment under either the *HPS Redevelopment Plan* (2010) or a revised redevelopment plan addressed in this SEIS. Potential environmental effects of the remedial activities (i.e., of soil excavation, soil transport, and operation of treatment systems) have been, and will continue to be, evaluated by DoN and regulatory agencies in conjunction with the approval process for specific response actions selected and implemented by the DoN under CERCLA. Appropriate controls to protect human health and the environment have been, and will continue to be, incorporated into the design and implementation of those remedial actions.

More specifically, these provisions require that the DoN implement all remedial actions necessary to adequately protect human health and the environment from risks associated with the actual or potential release of hazardous substances, pollutants, or contaminants into the environment. This fundamental "threshold" requirement of CERCLA (Section 121(b) of CERCLA, 42 U.S.C. Section 9621(b)), and the

NCP (40 CFR 300.430(f)(1)(i)(A)) applies regardless of future ownership of HPS property or the legal authority utilized to convey the property from the DoN to another legal entity. CERCLA and the NCP also require that CERCLA response actions selected by the DoN and approved by the FFA Signatories comply with a wide range of applicable or relevant and appropriate federal and state laws and regulations during the course of and at the completion of remedial action. For example, the DoN has committed in CERCLA work plans approved by the FFA Signatories to comply with the substantive asbestos dust mitigation requirements of 17 CCR 93105 during the course of CERCLA response actions in order to ensure adequate protection of human health and the environment.



Source: Treadwell & Rollo 2009

Figure 3.7.4-1. Environmental Cleanup Parcel Boundaries and General Hazardous Substance Conditions

Table 3.7.4-1. Hunters Point Shipyard DoN Parcels' Relationship to Proposed Districts					
Hunters Point Shipyard Parcel Designation	***Proposed HPS Districts***				
	Alternative 1: Stadium Plan	***Alternative 2: Non-Stadium Plan/Additional R&D***	***Alternative 2A: Non-Stadium Plan/Housing and R&D***	***Alternative 3: Non-Stadium Plan/ Additional Housing***	***Alternative 4: Non-Stadium Plan/Reduced Development***
B	Residential, Parks and Open Space, Neighborhood Retail		Residential, Parks and Open Space		
C	HPS Village Center, Residential, Research & Development, Parks and Open Space, Neighborhood Retail				
UC-1	Research & Development, Right-of-Way		Research & Development, Community Facility, Right-of-Way		
UC-2	HPS Village Center, Neighborhood Retail, Right-of-Way				
UC-3	Right-of-Way				
D-1	Stadium, Parks and Open Space		Residential, Parks and Open Space		
D-2	Research & Development, Community Facility				
E	Stadium, Community Facility, Parks and Open Space	Parking, Research & Development, Community Facility, Parks and Open Space	Research & Development, Community Facility, Parks and Open Space	Parks and Open Space	
E-2	Parks and Open Space				
F	Open Water				
G	Stadium	Parking, Research & Development, Community Facility, Parks and Open Space	Residential, Parks and Open Space	Residential, Parks and Open Space, Community Facility	Residential, Parks and Open Space, Community Facility
Source: Lennar Urban 2009a; DoN documents.					

The CERCLA response actions (or "CERCLA Process") being carried out by the DoN at HPS, involves a process that includes site specific investigations, feasibility studies, and remedial activities, and securing the approval of those reports from the other FFA Signatories (i.e., USEPA, DTSC, and RWQCB) at each of the HPS cleanup parcels. This process is described below.

Early in the CERCLA Process, the DoN conducted a preliminary assessment/site inspection (PA/SI) study at each of the HPS cleanup parcels to identify locations requiring additional investigation and potential remediation. These locations were identified as IR Sites and were designated by numbers, IR 1 through IR 78. Table 3.7.4-2 illustrates and identifies the location and chemicals of concern (COCs) in soil and groundwater at each of the IR sites.

After the site identification process, the next step under the CERCLA Process was the preparation of remedial investigation (RI) reports for each cleanup parcel. A RI report addressed the nature and extent of contamination in the parcel. A human health risk assessment (HHRA) was then prepared in conjunction with the RI, which identified the contaminants that could pose a health risk under different exposure scenarios. At certain sites, an ecological risk assessment (ERA) was also conducted.

Table 3.7.4-2. Summary of Chemicals of Concern at Installation Restoration Sites			
Site	***Area Designation***	***Soil***	***Groundwater***
PARCEL B			
IR-7	Sub-Base Area	Metals, PAHs, TOG, TPH-D	Metals
IR-10	Battery and Electroplating Shop	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-G, TRPH, VOCs	Metals, PAHs, SVOCs, TOG, TPH-D, VOCs
IR-18	Waste Oil Disposal Area	Metals, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-G, VOCs	Metals, PAHs, TOG, VOCs
IR-20	Building 156	Metals, PCBs, SVOCs, TOG, TPH-D, TPH-G, VOCs	Metals, PAHs, TOG, VOCs
IR-23	Buildings 145, 146, 161, 162, UST	Metals, PAHs, PCBs, PEST, SVOCs, TPH-D, TPH-E, VOCs, TPH-MO, Waste Oil	SVOCs, TPH
IR-24	Buildings 124, 125, 128, 130	Metals, PCBs, SVOCs, TOG, TPH-D, TPH-E, TPH-G, TPH-P, VOCs	Metals, PAHs, TOG, TPH-D, TPH-E, TPH-P, VOCs
IR-26	Building 157, Area North of Drydock 3	Metals, PAHs, PCBs, TOG, TPH-E, TPH-G, TPH-P, VOCs	Metals
SI-31	Building 114	Metals, PAHs	NA
IR-42	Buildings 109, 113, 113A	Metals, PAHs, PCBs, PEST, TOG, TPH-E, TPH-MO	NA
IR-60	Drydocks 5, 6, 7	Metals, SVOCs TPH, VOCs	Metals
IR-61	Substation V/Building 122	PCBs, SVOCs, TPH	PCBs, SVOCs, TPH
IR-62	Buildings 115, 116, UST	PCBs, SVOCs, TPH	PCBs, SVOCs, TPH
PARCEL C			
IR-6	Tank Farm	Metals, PAHs, PCBs, SVOCs, TOG, TPH-D, TPH-G, VOCs	Metals, SVOCs, TPH-D, VOCs
IR-25	Building 134	Metals, PAHs, PCBs, TOG, TPH-D, TPH-E, VOCs, TPH-MO, TPH-P	Metals, PEST, SVOCs, TPH, VOCs
IR-27	Building 205, USTs	Metals, SVOCs, TOG, TPH-D, TPH-G	NA
IR-28	Buildings 211/253, 219, 229, 230, 231, 258, 270, 271, 273, 281, USTs	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-G, TPH-MO, TPH-P, VOCs	Metals, PAHs, PEST, SVOCs, TOG, TPH-D, TPH-G, TPH-P, VOCs
IR-29	Buildings 203, 217, 275, 279, 280, 282, USTs	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-E, TPH-P, VOCs	Metals, PEST, SVOCs, TPH, VOCs
IR-30	Building 241	CN, Metals, PAHs, PCBs, SVOCs, TOG, TPH-D, TPH-E, TPH-P, VOCs	CN, Metals, PAHs, PEST, PCBs, SVOCs, TOG, TPH-D, TPH-E, TPH, VOCs
IR-57	Drydock 4 Area (excluding in-water drydock)	Metals, PCBs, SVOCs, TOG, TPH-D, VOCs, Waste Oil	NA
IR-58	Scrap Yard north of Building 258	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-E, TPH-P, VOCs	Metals, SVOCs, TPH, VOCs
IR-63	Former Building 278	Metals, PCBs, SVOCs, TPH	NA
IR-64	Building 206	Metals, SVOCs, TPH, VOCs	Metals, TPH, VOCs
PARCELS D-1, D-2, and G			
IR-8	PCB Spill Area (Building 503)	Metals, PAHs, PCB, PEST, SVOCs, TOG, TPH-D, VOCs	Metals, PAHs, PCBs, SVOCs, VOCs

Table 3.7.4-2. Summary of Chemicals of Concern at Installation Restoration Sites			
Site	***Area Designation***	***Soil***	***Groundwater***
IR-9	Pickling and Plate Yard	Metals, PAHs, PEST, TPH-D, VOCs	Metals, PAHs, SVOCs, VOCs
IR-16	Container Storage Area	Metals	Metals, PCBs, TPH
IR-17	Drum Storage and Disposal Area	Metals, PAHs, TOG, VOCs	TOG, VOCs
IR-22	Buildings 368, 369, UST	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-E, VOCs	Metals, PAHs, TOG, VOCs
SI-32	Building 383, Re-Gunning Pier	Metals, CN, PAHs, SVOCs, TOG, TPH-D	Metals, VOCs
IR-33	Buildings 302, 302A, 304, 364, 365, 411, 417, 418, 424, UST	Metals, CN, PAHs, PCBs, PEST, RAD, SVOCs, TOG, TPH-D, TPH-E, TPH-G, TPH-MO, VOCs	Metals, TPH
IR-34	Buildings 351, 366	Metals, PAHs, PCBs, PEST, SVOCs, TOG, THP-D, TPH-MO, VOCs	Metals, TPH, VOCs
IR-35	Buildings 274, 306, 313, 313A, 322, 372, Area bounded by Manseau, Morell and E Streets	Metals, PAHs, PCBs, PEST, TOG, TPH-E, TPH-MO, TPH-P, VOCs	Metals, TPH, VOCs
IR-37	Buildings 401, 423, 435, 436, 437, UST VOCs	Metals, PCBs, SVOCs, TOG, TPH-D, TPH-G,	Metals, SVOCs, TPH
SI-38	Building 500, UST	Metals, SVOCs, TOG, TPH-D, TPH-G	Metals, TPH
IR-39	Building 505	Metals, PAHs, PCBs, SVOCs, TOG, TPH-D, TPH-E, TPH-G, VOCs	Metals, TPH, VOCs
IR-44	Area near Buildings 408, 409, 410, 438	Metals, SVOCs, TPH, VOCs	Metals, SVOCs, TPH, VOCs
IR-53	Buildings 525, 530	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-E, TPH-G, VOCs	Metals, PCBs, SVOCs, TPH, VOCs
IR-55	Building 307 and adjacent area	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-E, TPH-P, VOCs, TPH	Metals, TPH
IR-65	Building 324	PCBs	PCBs
IR-66	Building 407	Metals, SVOCs, TPH	Metals, SVOCs, TPH
IR-67	Building 439	Metals, SVOCs, VOCs, TPH	TPH
IR-68	Building 378	TPH	PCBs, TPH
IR-69	Building 523, Metal shed near Building 523	Metals, PCBs, TPH	Metals
IR-70	Area northeast of S-308	Metals, SVOCs, TPH, VOCs	Metals, SVOCs, TPH, VOCs
IR-71	Crane Area	TPH	TPH
PARCEL E and E-2			
IR-1/21	Industrial Landfill	Metals, PCBs, RAD, SVOCs, TOG, TPH-D, TPH-G, VOCs	Metals, PCBs, SVOCs, TPH-D, TPH-G, VOCs
IR-2	Bay Fill	Metals, PCBs, PEST, RAD, SVOCs, TOG, TPH-D, TPH-G, VOCs	Metals, PCBs, SVOCs, TPH-D, TPH-G, TRPH, VOCs

Table 3.7.4-2. Summary of Chemicals of Concern at Installation Restoration Sites			
Site	***Area Designation***	***Soil***	***Groundwater***
IR-3	Oil Reclamation Ponds	Metals, PAHs, PCBs, SVOCs, TOG, TPH-D, TPH-E, TRPH, VOCs	Metals, PCBs, PEST, SVOCs, TPH-D, VOCs
IR-4	Scrap Yard	Metals, PAHs, PCBs, SVOCs, TOG, THP-D, TPH-G, VOCs	Metals, TOG, TPH-D, TPH-G, VOCs
IR-5	Old Transformer Storage Yard	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-G, VOCs	Metals, PAHs, PCBs, TPH-D, TPH-P, VOCs
IR-11	Building 521, Power Plant Area	Metals, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-G, VOCs	TPH-D, VOCs
IR-12	Disposal Trench Area	Metals, CN, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-E, TPH-G, TPH- MO, VOCs	Metals, PCBs, SVOCs, TOG, TPH-D, TPH-G, VOCs
IR-13	Old Commissary Area	Metals, PCBs, SVOCs, TOG, THP-D, TPH-G, VOCs	SVOCs, TOG, TPH-E
IR-14	Oily Liquid Waste Disposal Area	Metals, PEST, SVOCs, TOG, TPH-D, TPH-G, TRPH, VOCs	Metals, TOG, TPH-D, TPH-G
IR-15	Oily Waste Ponds, Incineration Tank	Metals, PEST, SVOCs, TOG, TPH-D, TPH-G, VOCs	Metals, PAHs, PCBs, SVOCs, TOG, TPH-D, TPH-G, VOCs
IR-36	Buildings 371, 400, 404A, 405, 406, 413, 414, 704, 710, parts of Area IV, UST	Metals, PAHs, PEST, PCBs, SVOCs, TOG, TPH-D, TPH-G,TPH-MO, TPH-P, VOCs	Metals, SVOCs. PEST, TOG, TPH-D, TPH-G, TPH-MO,VOCs
SI-38	Buildings 506, 507, 509, 510, UST	Metals, TOG, TPH-D, TPH-G, VOCs	Metals
IR-39	Building 707	Metals, TOG, TPH-D	CN, Metals
IR-40	Building 527, Pier 2	Metals, PCBs, SVOCs, TOG, TPH-D, TPH-G, VOCs	NA
IR-52	Railroad Right-of-Way	Metals, PCBs, PEST, TOG, TPH-D, TPH-G, VOCs	NA
SI-54	Building 511A	Metals, PAHs, PCBs, PEST, TOG, TPH-D, TPH-G, TRPH	NA
IR-56	Railroad Tracks and yard south of Crisp Rd	Metals, PAHs, SVOCs, TOG, VOCs	Metals, TPH, VOCs
IR-72	Building 810 Area, UST	Metals, SVOCs, TPH, VOCs	SVOCs, TPH, VOCs
IR-73	Asphalt Batch Plant	SVOCs, TPH, VOCs	SVOCs, TPH, VOCs
IR-74 (AOC-74)	Building 815 (FUDS)	SVOCs, TPH	NA
IR-75 (AOC-75)	Building 820 (FUDS)	Metals, TPH	Metals, TPH, VOCs
IR-76 (AOC-76	Area surrounding Buildings 830 and 831 (FUDS)	Metals, PEST, PCBs, SVOCs, TPH	Metals, PEST, SVOCs, TPH, VOCs
PARCEL F			
IR-78, (AOC-78)	Subtidal Area	Metals, PAHs, PCBs, TPH	NA
Utility Sites**			
IR-45	Steam Lines	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-G, VOCs	NA

Table 3.7.4-2. Summary of Chemicals of Concern at Installation Restoration Sites

Site	Area Designation	Soil	Groundwater
IR-46	Fuel Distribution Lines (Tank Farm)	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-D, TPH-E, TPH-P, TRPH, VOCs	TPH-D
IR-47	Fuel Distribution Lines (Tank S-505)	Metals, PCBs, PEST, TOG, TPH-E, TPH-P, VOCs	TPH-D
IR-48	Suspected Steam Lines (Building 503)	Not Found	Not Found
IR-49	Fuel Distribution Lines (Buildings 203, 205)	Metals, PAHs, PCBs, PEST, SVOCs, TOG, TPH-E, TPH-P, TRPH, VOCs	TPH-D
IR-50	Storm Drains, Sanitary Sewers	CN, Metals, PAHs, PCBs, SVOCs, TPH-D, TPH-E, TPH-G, TRPH, VOCs	Fecal Coliform, Metals, PAHs, TPH-G, VOCs
IR-51	Former Transformer Locations	PCBs	NA

Notes:
** = Facility-wide sites (Parcels B through E only)
AOC = Area of concern
SI = Site Inspection
CN = Cyanide
NA = Not Analyzed
ND = Not Detected
PEST = Pesticides
RAD = Radiation
TBD = To be determined
TOG = Total oil and grease
TPH = Total petroleum hydrocarbons
TPH-D = Total petroleum hydrocarbons as diesel
TPH-E = Total petroleum hydrocarbons as extractable unknown hydrocarbons
TPH-G = Total petroleum hydrocarbons as gasoline
TPH-MO = Total petroleum hydrocarbons as motor oil
TPH-P = Total petroleum hydrocarbons as purgable unknown hydrocarbons
TRPH = Total recoverable petroleum hydrocarbons

The next step was the preparation of a feasibility study (FS) for the parcels requiring further action and other locations of concern in a parcel. The FS evaluated the effectiveness and cost of various remedial technologies that can be used to reduce site risk to acceptable levels. The DoN has completed the RI/FS process at all parcels except Parcels E. A draft FS has been completed for Parcel E. In addition, the DoN has completed numerous time critical (and non-time critical) removal actions and treatability pilot studies in conjunction with its physical investigations and evaluation of alternatives for remediating the identified IR sites.

After the RI/FS process, the DoN prepared a proposed plan (PP), which summarized the findings of the RI and proposed a preferred remedial approach for each identified IR site based on the options evaluated in the FS. After the PP was presented to regulatory agencies and the public, the final decision selecting the remedy for the parcel was documented in a CERCLA Record of Decision (ROD), which is approved by the FFA Signatories. The CERCLA ROD considered public comments and community concerns and included the DoN's response to these comments. RODs have been completed for Parcels B, C, D-1, D-2, UC-1, UC-2, and G. The RODs for Parcels C and F are anticipated to be complete in 2013. The

Corrective Action Plan to address impacts from petroleum hydrocarbons at Parcel E is currently under development. A draft ROD for E-2 is anticipated to be released in early 2012.

After a ROD is finalized, a remedial design document is prepared to set forth details of how the remedies identified in the ROD will be carried out. The remedial actions are then conducted in accordance with the specifications of the approved remedial design. These may include different types and combinations of remedial actions including excavation and disposal; treatment and containment of hazardous substances, pollutants or contaminants; and ICs that are evaluated and ultimately selected in a CERCLA ROD (remedial action) or CERCLA Action Memorandum (removal action).

ICs consist of a set of legal and administrative mechanisms to implement land use restrictions to limit the exposure of future landowner(s) and/or user(s) of the property to hazardous substances present on the property, and to ensure the integrity of remedial action. ICs will be selected as a component of remedial action in areas of HPS where residual levels of hazardous substances will remain at concentrations that are not suitable for unrestricted use and ICs are necessary to provide adequate protection of human health and the environment. Implementation of ICs will allow the property to be developed for its intended use, subject to land use restrictions designed to prevent exposure to residual levels of hazardous materials. ICs include requirements for monitoring, inspecting, and reporting to ensure compliance with land use or activity restrictions.

The DoN, USEPA, DTSC, RWQCB, and CDPH will, independent of the proposed action and this SEIS, require that before any project site development activity occurs at HPS, appropriate and legally enforceable CERCLA ICs in the form of recorded covenants, deed provisions, easements, or lease requirements are in effect and applicable in order to ensure adequate protection of human health and the environment both during and at the conclusion of CERCLA remedial action as required by CERCLA.

Prior to any transfer or lease of HPS property, the DoN must ensure that actual or potential releases of hazardous substances have been addressed to ensure the protection of human health and the environment following transfer (Section 120(h) of CERCLA, 42 U.S.C. Section 9620(h)). Any deed transferring title to real property shall contain, to the extent required by law, the notices, descriptions, and covenants specified in Section 120(h), as well as ICs required as a CERCLA remedial action. Such restrictions will ensure that the property after transfer will be used in a manner that is adequately protective of the environment and human health as required by CERCLA.

The most current data regarding the cleanup activities at HPS are published as part of the environmental restoration processes and are available to the public at the City of San Francisco Main Library (100 Larkin St. San Francisco, CA 94102). The downtown San Francisco library contains a nearly complete record of all documents related to the investigation and cleanup actions underway at HPS. Information is also available on the Navy's HPS website at www.bracpmo.navy.mil.

3.7.4.3 Status of Environmental Investigations and Cleanup Activities

3.7.4.3.1 HPS Parcel B

HPS Parcel B: Historic Uses

Parcel B, approximately 59 ac (24 ha), was formerly part of the industrial support area of HPS and was used for fuel distribution, sandblasting, painting, machining, acid mixing, metal fabrication, shipping, training, barracks, and offices. Other significant activities at Parcel B included potential disposal of decontamination materials from ships used during nuclear weapons testing in 1946 and 1947. Fill containing a high percentage of construction debris was placed on the northwestern side of Parcel B (an

area that includes IR Sites 07 and 18) during the expansion of the shipyard in the 1950s. In 1976, the DoN leased most of HPS, including all of the area now known as Parcel B, to a company called Triple A. From 1945 through 1987, contaminant releases occurred during site operations under the DoN and Triple A; however, specific dates of releases are not known. Since 1986, portions of Parcel B have been leased for such uses as artists' studios, storage, and cabinet making. About 75 to 80 percent of HPS ground surface is covered by pavement and buildings.

HPS Parcel B: Results of Environmental Investigations

Investigations at Parcel B since the 1997 ROD include the Historical Radiological Assessment (HRA); an investigation of the Bay Mud Aquitard and B-aquifer; a study of fill conditions at IR-07 and IR-18; an investigation into sediment contamination along the Parcel B shoreline; studies of ambient concentrations of nickel and manganese in soil; a soil gas investigation at IR-07 and IR-18; an investigation of VOCs in groundwater at the boundary of Parcels B and C; and a wetlands delineation assessment.

The primary chemicals in Parcel B soils at concentrations above cleanup goals are VOCs, SVOCs, PCBs, petroleum hydrocarbons, and metals. VOCs, hexavalent chromium (chromium VI), mercury, and petroleum hydrocarbons are the primary chemicals that have been detected in groundwater. A survey of IR Sites 07 and 18 found methane present at concentrations supporting further investigation and, ultimately, a removal action. The DoN investigated the nature and extent of chemicals in sediments along the shoreline at IR-07 and IR-26. COCs in sediment include metals, pesticides, PCBs, and polycyclic aromatic hydrocarbons (PAH) (DoN 2009a).

Radiological surveys have been performed on the grounds and buildings at Parcel B to assess the extent of contamination and the types of radionuclides present. The HRA lists the structures and areas considered to be radiologically impacted. The potential for residual radioactive contamination at each impacted site was identified through an evaluation of historical information, previous radiological survey results, and site reconnaissance. Additional cleanup has occurred at many of these areas as part of the DoN's TCRA for radionuclides (DoN 2009a).

The HRA identified the land areas at IR-07 and IR-18 as radiologically impacted (DoN 2004) because: 1) the areas were used as disposal sites for excess large-scale shipyard waste as part of specific fill operations conducted in that area to expand the shoreline; and 2) the DoN had limited controls in place at the time of the shoreline expansion which would have allowed for land disposal of certain types of radioactive materials. For example, sandblast grit used in decontamination of ships that participated in atomic weapons testing during the 1950s may have been disposed of along with other fill materials (DoN 2009a).

The DoN conducted a more comprehensive review of the shoreline expansion at IR-07 and IR-18 and concluded that atomic weapons testing in the South Pacific, which occurred in July and August 1946, was before the initial shoreline expansion. Decontamination of ships associated with atomic weapons testing began in September 1946 and continued through 1951 when the USS INDEPENDENCE was sunk at sea. Furthermore, the southern portion of IR-18 was used for housing during the 1940s (including 1946) and it is unlikely that any radiological contamination would be associated with that area. Consequently, the DoN concluded that the portion of IR-07 and IR-18 that was filled after 1946 will be considered radiologically impacted (DoN 2009a).

Additional information on the results of previous environmental investigations conducted by the DoN at Parcel B can be found in the *Final Amended Record of Decision for Parcel B, Hunters Point Shipyard, San Francisco, California, January 14, 2009* (DoN 2009a).

HPS Parcel B: Cleanup Status

A summary of the cleanup status at Parcel B follows, including a chronology of the CERCLA accomplishments in Table 3.7.4-3. Additional information on the cleanup process for Parcel B conducted by the DoN can be found in the *Final Amended Record of Decision for Parcel B, Hunters Point Shipyard, San Francisco, California, January 14, 2009* (DoN 2009a).

Table 3.7.4-3 CERCLA Chronology for Parcel B

Process Step	*Year Completed*
Preliminary Assessment/Site Inspection (PA/SI)	1994
Remedial Investigation (RI)	1996
Feasibility Study (FS)	1996
Proposed Plan (PP)	1996
1997 Record of Decision (ROD)	1997
Remedial Design (RD)	1999
Remedial Action (Phase 1) – Field Excavations	1998 – 1999
Remedial Design Amendment	2001
Remedial Action (Phase 2) – Field Excavations	2000 – 2001
Remedial Action – Construction Summary Report	2008
Five-Year Review	2003
TMSRA (update to Feasibility Study)	2007
TMSRA Radiological Addendum	2008
Proposed Plan to Support a ROD Amendment	2008
Five-Year Review	2008
2009 Amended ROD	2009

Source: DoN 2009a.

In 1997, the DoN selected a remedial action for Parcel B, which was documented in a ROD for Parcel B issued in 1997 (DoN 1997). The 1997 ROD identified excavation of contaminated soil, offsite disposal, and placement of clean backfill as the primary components of the selected remedy. The DoN conducted a series of excavations at Parcel B to remove contaminated soil, including 1) pre-ROD exploratory excavations in 1996, 2) remedial action excavations from 1998 to 2001, and (3) a removal action to excavate soil contaminated by fuel-related compounds in 2004 (DoN 2009a). Other actions since the October 1997 ROD included changes to the boundary of Parcel B, additional investigations, removal and remedial actions, treatability studies, and regulatory actions.

After performing detailed technical assessments over the subsequent 10 years, including additional investigations, and a revised risk assessment, the DoN developed a proposed revised remedy. The revised approach took into account updated information and included items such as the ubiquitous nature of metals in soil across Parcel B as a function of the imported fill, the presence of methane and mercury, the findings of a SLERA, and findings from removal actions to address radiological contaminants.

The revised remedy was documented in the *Final Amended Record of Decision for Parcel B, Hunters Point Shipyard, San Francisco, California, January 14, 2009* (DoN 2009a). The major components of the amended ROD include the following: excavate soil in select areas where concentrations of COCs exceed remediation goals and transport the excavated contaminated soil and materials offsite to an appropriate disposal facility; backfill excavated areas with clean fill material; install durable soil covers over the entire parcel to prevent contact with any COCs that are not excavated; maintain covers to laterally contain the soil at the shoreline; install a revetment along the shoreline at IRSite-07 and IRSite-26; install an SVE system at IRSite-10 to remove VOCs from soil; apply ICs to limit exposure to contaminated soil and groundwater by restricting specified land uses and activities, as described in *HPS*

Parcel B: Institutional Controls below; and a soil gas survey may be conducted in the future (DoN 2009a).

The primary components of the groundwater cleanup consist of injecting a biological substrate to destroy VOCs in groundwater and monitoring, and water quality monitoring in the area of the mercury and methane source removals to evaluate the effectiveness of the removals in remediating mercury and methane in groundwater. ICs, such as prohibitions on the use of groundwater, would also be implemented (ChaduxTt and Tetra Tech 2007; ChaduxTt and Tetra Tech 2009; Jonas and Associates 2008).

Radiological contamination in soil will be remediated through ongoing removal and offsite disposal of impacted storm drain and sewer lines and related affected soil, and through removal of contaminated materials (if found to be present) at IR Sites-07 and -18. A demarcation layer has been installed across areas of IR Sites-07 and -18 to mark the boundary between the existing surface and a new soil cap. Additionally, groundwater monitoring will be conducted at IR Sites-07 and -18 to confirm that radionuclides have not been released into groundwater. Finally, ICs will be implemented to minimize inadvertent contact with potentially radiologically impacted media. The ICs for radiological impacts will only be applicable to IR Sites 07 and 18, and potentially for an area deep beneath Building 140, where a culvert is located that may contain radioactive material. The other potentially radiologically impacted sites would be cleared for unrestricted radiological release (or free release) as decided by CDPH. If a building is found to contain radiologically impacted materials, the DoN will remediate and/or demolish that building (DoN 2009a).

In addition, a Corrective Action Plan was prepared to address petroleum releases at Parcel B (Shaw Environmental, Inc. 2008). A Work Plan to implement the Parcel B Corrective Action Plan has also been prepared (ITSi 2009). The remediation of TPH-impacted areas is being conducted primarily under the oversight of RWQCB. TPH remediation was completed January 2011 and groundwater monitoring will continue through 2012.

HPS Parcel B: Institutional Controls

The amended selected remedy includes ICs to limit exposure by restricting specified land uses and activities on the parcel. This section discusses ICs related to all the components of the selected remedy (soil, groundwater, and radiologically impacted soil and structures) to provide a single source location within this amended ROD. The following section and description of ICs was obtained from the *Final Amended Record of Decision for Parcel B, Hunters Point Shipyard, San Francisco, California, January 14, 2009* (DoN 2009a).

Institutional Controls in General

ICs are legal and administrative mechanisms used to implement land use restrictions to limit the exposure of future landowner(s) or user(s) of the property to hazardous substances present on the property, and to ensure the integrity of the remedial action. ICs are required on a property where the selected remedial clean-up levels result in contamination remaining at the property above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring and inspections, and reporting to ensure compliance with land use or activity restrictions.

The DoN has determined that it will rely upon proprietary controls in the form of environmental restrictive covenants as provided in the "Memorandum of Agreement Between the United States

Department of the Navy and the California Department of Toxic Substances Control" and attached covenant models (DoN and DTSC 2000) (hereinafter referred to as the "DoN/DTSC MOA"). Specifically, land use and activity restrictions will be incorporated into two separate legal IC instruments as provided in the DoN/DTSC MOA:

1. Restrictive covenants included in one or more Quitclaim Deeds from the DoN to the property recipient.
2. Restrictive covenants included in one or more "Covenants to Restrict Use of Property" entered into by the DoN and DTSC as provided in the DoN/DTSC MOA and consistent with the substantive provisions of 22 CCR 67391.1.

The "Covenant(s) to Restrict Use of Property" will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC and any other signatory state entity against future transferees and users. The Quitclaim Deed(s) will include the identical land use and activity restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the DoN against future transferees. The activity restrictions in the "Covenant(s) to Restrict Use of Property" and Deed(s) shall be addressed in the Parcel B Risk Management Plan ("Parcel B RMP") that may be prepared by the City and County of San Francisco and approved by the DoN and FFA Signatories and/or the Land Use Control remedial design (LUC RD) report that would be reviewed and approved by the FFA Signatories. The RMP(s) and/or LUC RD shall be referenced in the applicable Covenant to Restrict Use of Property and Deed. The RMP(s) and/or LUC RD shall specify soil and groundwater management procedures for compliance with the remedy selected in the Parcel B amended ROD. The RMPs and/or LUC RD shall identify the roles of local, state, and federal government in administering the RMPs and/or LUC RD and shall include, but not be limited to, procedures for any necessary sampling and analysis requirements, worker health and safety requirements, and any necessary site-specific construction and/or use approvals that may be required.

The Parcel B RMP, excluding IR Sites 7 and 18, that may be prepared by the City and County of San Francisco and approved by the FFA Signatories, may set forth certain requirements and protocols that, if followed, will allow certain activities that are otherwise restricted to be performed without additional approval by the FFA Signatories. There may also be an IR Sites 07 and 18 RMP that may be prepared by the City and County of San Francisco and approved by the FFA Signatories and CDPH that may set forth certain requirements and protocols that, if followed, will allow certain activities that are otherwise restricted to be performed without additional approval by the FFA Signatories and CDPH.

In addition to being set forth in the "Covenant(s) to Restrict Use of Property" and Quitclaim Deed(s) as described above, restrictions applied to specified portions of the property will be described in findings of suitability for transfer (FOST) and findings of suitability for early transfer (FOSET).

Access - The Deed(s) and Covenant(s) shall provide that the DoN and FFA Signatories where applicable, and for CDPH in radiological areas requiring institutional controls (ARICs), and their authorized agents, employees, contractors, and subcontractors shall have the right to enter upon HPS Parcel B to conduct investigations, tests, or surveys; inspect field activities; or construct, operate, and maintain any response or remedial action as required or necessary under the cleanup program, including but not limited to monitoring wells, pumping wells, treatment facilities, and cap/containment systems.

Implementation - The DoN shall address and describe IC implementation and maintenance actions including but not limited to frequency and requirements for periodic inspections during development and post development, monitoring, and reporting in the preliminary and final LUC RD reports to be developed and submitted to the FFA Signatories and CDPH in regard to IR Sites 07 and 18, for review and approval pursuant to the FFA (see "Navy Principles and Procedures for Specifying, Monitoring and

Enforcement of Land Use Controls and Other Post-ROD Actions" attached to a 16 January 2004 Department of Defense memorandum titled "Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy").

It may also be necessary to have some of the above IC implementation and maintenance actions in their essentially final form at the time of the early transfer to ensure protection of human health and the environment. The DoN is responsible for implementing, maintaining, reporting on, and enforcing land use controls. Although the DoN may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the DoN shall retain ultimate responsibility for remedy integrity.

Activity Restrictions that Apply Throughout Parcel B - The following sections describe the IC objectives to be achieved through activity restrictions throughout Parcel B in order to ensure that any necessary measures to protect human health and the environment and the integrity of the remedy have been undertaken.

Restricted Activities - The following restricted activities throughout HPS Parcel B must be conducted in accordance with the "Covenant(s) to Restrict Use of Property," Quitclaim Deed(s), the Operation and Maintenance Plan(s), LUC RD report, the RMPs, and if required, any other work plan or document approved in accordance with these referenced documents:

a) "Land disturbing activity" which includes but is not limited to: 1) excavation of soil, 2) construction of roads, utilities, facilities, structures, and appurtenances of any kind, 3) demolition or removal of "hardscape" (for example, concrete roadways, parking lots, foundations, and sidewalks), 4) any activity that involves movement of soil to the surface from below the surface of the land, and 5) any other activity that causes or facilitates the movement of known contaminated groundwater.

b) Alteration, disturbance, or removal of any component of a response or cleanup action (including but not limited to pump-and-treat facilities, revetment walls and shoreline protection, and soil cap/containment systems); groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities.

c) Extraction of groundwater and installation of new groundwater wells.

d) Removal of or damage to security features (for example, locks on monitoring wells, survey monuments, fencing, signs, or monitoring equipment and associated pipelines and appurtenances).

Prohibited Activities - The following activities are prohibited throughout HPS Parcel B:

a) Growing vegetables or fruits in native soil for human consumption.

b) Use of groundwater.

Activity Restrictions Relating to VOC Vapors at Specific Locations within Parcel B - Any proposed construction of enclosed structures must be approved in accordance with the "Covenant(s) to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and RMPs prior to the conduct of such activity within the ARIC for VOC vapors in order to ensure that the risks of potential exposures to VOC vapors are reduced to acceptable levels that are adequately protective of human health. Initially, the ARIC for VOC vapors will include all of Parcel B except Redevelopment Block 4. The reduction in potential risk can be achieved through engineering controls or other design alternatives that meet the specifications set forth in the amended ROD, RD reports, LUC RD report, and the RMPs. The ARIC for VOC vapors may be modified by the FFA Signatories and CDPH if IR Sites 07 and 18 are involved, as the soil contamination

areas and groundwater contaminant plumes that are producing unacceptable vapor inhalation risks are reduced over time or in response to further soil, vapor, and groundwater sampling and analysis for VOCs that establishes that areas now included in the ARIC for VOC vapors do not pose an unacceptable potential exposure risk to VOC vapors.

Additional Land Use Restrictions for IR Sites 07 and 18 - In addition to the specific uses prohibited below, a portion of IR Sites 07 and 18 shall be restricted to open space and recreational uses, unless written approval for other uses is granted by the FFA Signatories and CDPH. In addition, the following land uses are specifically prohibited unless written approval for such uses is granted by the FFA Signatories and the CDPH in accordance with the "Covenant(s) to Restrict Use of the Property," Quitclaim Deed(s), LUC RD report, and IR Sites 7 and 18 RMP, if applicable:

a) A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation.

b) A hospital for humans.

c) A school for persons under 21 years of age.

d) A day care facility for children.

Additional Land Use Restrictions Related to Radionuclides at IR Sites 07 and 18 - The following activity restriction requirements shall apply in the ARIC for potential radionuclides located on a portion of IR Sites 07 and 18 in addition to those generally applicable prohibited and restricted activities specified above for all of Parcel B. At the time of transfer, the areas that require this restriction will be surveyed to define the legal metes and bounds for inclusion in the property transfer documents. No variance or exemption from these restrictions shall be allowed unless written approval is provided by the FFA Signatories and CDPH in a design and/or work plan, or pre-approved in the IR Sites 07 and 18 Operation and Maintenance Plan, LUC RD report, and/or the IR Sites 07 and 18 RMP, if applicable.

The Operation and Maintenance Plan for IR Sites 07 and 18 or LUC RD report shall address any necessary additional soil and radiological management requirements, for example inspections, monitoring, and reporting requirements for IR Sites 07 and 18. For land-disturbing activities, as defined above and including installation of water lines, storm drains, or sanitary sewers, at IR Sites 07 and 18 above the demarcation layer, the LUC RD report, the Operation and Maintenance Plan, IR Sites 07 and 18 RMP, or a project-specific work plan, if applicable, will list the procedures for ensuring that the cap is not disturbed or breeched. The specific design of the cap and clean soil cover shall be agreed to in the RD.

Excavation into IR Sites 07 and 18 soils within the ARIC for radionuclides beneath the demarcation layer is strictly prohibited unless approved in writing by the FFA signatories and CDPH. Any proposed excavation shall be required to be described in a work plan that will include but not be limited to a radiological work plan, the identification of a radiological safety specialist, a soil management plan, soil sampling and analysis requirements, and a plan for off-site disposal of any excavated radionuclides by the transferee in accordance with federal and state law. This work plan must be submitted to and approved in writing by the FFA Signatories and CDPH in accordance with procedures (including dispute resolution procedures) and timeframes that will be set forth in the IR Sites 07 and 18 Operation and Maintenance Plan, LUC RD report, or IR Sites 07 and 18 RMP, if applicable. The integrity of the cover/cap must be restored upon completion of excavation as provided in the IR Sites 07 and 18 Operation and Maintenance Plan, LUC RD report, or similar document. A completion report describing the details of the implementation of the work plan, the sampling and analysis, the off-site disposal, and the restoration of the integrity of the cover/cap must be submitted to and approved in writing by the FFA Signatories and CDPH in accordance with procedures (including dispute resolution procedures) and timeframes that will

be set forth in the IR Sites 07 and 18 Operation and Maintenance Plan, LUC RD report, or IR Sites 07 and 18 RMP, if applicable.

3.7.4.3.2 HPS Parcel C

HPS Parcel C: Historic Uses

Parcel C historically included about 79 ac (31 ha) of shoreline and lowland along the east-central portion of HPS. The central portion of the shipyard was formerly part of the industrial support area, and was used for shipping, ship repair, and office and commercial activities. Industrial support facilities for ship repair dominated the land use at Parcel C and included a foundry, a power plant, a sheet manufacturing shop, a paint shop, and various machine shops. Seventy buildings, two drydocks, one wharf, nine ship berths, and one pier are located within the boundaries of Parcel C. The docks at Parcel C were formerly part of the industrial production area. Portions of Parcel C were also used by NRDL. Soil at Parcel C consists largely of artificial fill. In 1997 and 2002, the boundaries of Parcels B and C were redefined, and IR-06 and IR-25 became part of Parcel C. In 2008, the DoN divided the former Parcel C into two new parcels: Parcel C and Parcel UC-2. The current Parcel C encompasses about 73 ac (30 ha) (DoN 2010a).

HPS Parcel C: Results of Environmental Investigations

Potential contamination at Parcel C is associated with metals, VOCs, PAHs, and PCBs in soil; VOCs, PAHs, SVOCs, and metals in groundwater; and radiologically impacted structures and soil. The DoN has completed a number of removal actions and treatability studies at Parcel C. Two key soil removal actions reduced or eliminated certain risks to human health and ecological receptors. Past and ongoing treatability studies at Parcel C have focused on technologies to reduce VOCs in groundwater and soil, including ZVI injection and sequential anaerobic/aerobic bioremediation (DoN 2010a).

Industrial operations, former fuel lines, and USTs are the significant sources of VOCs, PAHs, and metals in soil at Parcel C. The 28 former USTs (either removed or closed in place) stored various liquids, including boiler oil, diesel fuel, gasoline, solvents, waste oil, and brine and water. Metal contamination is associated with the pickling operation at Building 258, the former foundry at Building 241, and with fuel additives (DoN 2010a).

Pickling is the acid treatment of metallic surfaces to remove any surface impurities before further processing. Elevated concentrations of ubiquitous metals, such as arsenic and manganese, may be related to the bedrock fill quarried to build the shipyard in the 1940s. The fill may have contained elevated concentrations of select metals from the bedrock. Therefore, the DoN has worked with the regulatory agencies to identify remedial alternatives that address metals in soil, regardless of their source. SVOCs other than PAHs, pesticides, and PCBs were detected in localized areas in Parcel C soil (DoN 2010a).

The sources of contamination in groundwater are associated with four groundwater remedial units (RU), referred to as RU-C1, RU-C2, RU-C4, and RU-C5. The sources include dip tanks, sumps, former paint spray and cleaning rooms, industrial machining, USTs, solvent tanks, a pickling and degreasing area, floor drains and sewer lines, a former tank farm, and a former oil-water separator. The predominant chemicals present in Parcel C groundwater are VOCs, and discrete VOC plumes are found in each RU (DoN 2010a).

The DoN identified radiologically impacted sites – including buildings, equipment, and infrastructure – within Parcel C associated with former use of general radioactive materials and decontamination activities. Radiologically impacted buildings (203, 205 and discharge tunnel, 211, 214, 224, 241, 253, 271, and 272), storm drains, and sanitary sewers are all of concern in Parcel C. Storm

drains and sewer lines were removed in 2007 at portions of IR-06 and IR-25 in Parcel C to address radiological concerns. The TCRA to address the remaining radiologically impacted sites in Parcel C began in 2010 and is scheduled for completion in 2012 (DoN 2010a).

Additional information on the results of previous environmental investigations conducted by the DoN at Parcel C can be found in the *Final Record of Decision for Parcel C, Hunters Point Shipyard, San Francisco, California, September 30, 2010* (DoN 2010a).

HPS Parcel C: Cleanup Status

Numerous physical cleanup activities have been implemented at Parcel C, including: removal of USTs and subsurface fuel lines; excavation and/or encapsulation of soil; collection and removal of sandblast waste; and encapsulation of Drydock 4 waste drainage culverts by sealing all inlets and outlets to the culverts with concrete slurry, thereby eliminating the pathways of exposure of ecological receptors to hazardous substances. In addition, groundwater treatability studies have been performed for VOCs, along with in-situ bioremediation, which have demonstrated reductions in VOC concentrations in soil and groundwater (Jonas and Associates 2008). A chronology of the CERCLA actions completed at Parcel C is identified in Table 3.7.4-4.

Table 3.7.4-4 CERCLA Chronology for Parcel C

Process Step	*Year Completed*
Preliminary Assessment (PA)	1984-1990
Site Inspection (SI)	1994
Remedial Investigation (RI)	1993-1997
Feasibility Study (FS)	1996-1998
Feasibility Study (FS) - Revised	2008
Proposed Plan (PP)	2009
Record of Decision (ROD)	2010

Source: DoN 2010a.

The DoN published a Final ROD for Parcel C in 2010 (*Final Record of Decision for Parcel C, Hunters Point Shipyard, San Francisco, CA, September 30, 2010*). The selected remedies are described below (DoN 2010a).

The selected remedy for soil consists of removing soil in areas where COCs exceed remediation goals and disposing of excavated soil at an off-site facility. Excavations are planned at 32 areas within Parcel C. Soil in the areas selected for excavation is contaminated by arsenic, lead, and organic chemicals such as chlorinated VOCs and PAHs at concentrations that exceed remediation goals based on the planned reuse. Excavations to remove zinc would focus on redevelopment block 20A, where zinc is likely present as a result of industrial activities. Excavations to remove arsenic are also included where concentrations significantly exceed the HPAL and are outside concentration ranges found in naturally occurring geologic formations in the San Francisco area. The only excavations proposed beneath existing buildings would be at Building 251, where the foundation was disturbed during waste consolidation, and at Building 241 to remove benzene after radiological removal activities.

The only excavations proposed to depths greater than 10 feet would occur if light nonaqueous phase liquid is encountered, or at areas previously excavated to bedrock during removal activities, which include TCRA excavations 290301, 290302 (west of Building 203), and 290601 (south of Building 203). Open excavations would be backfilled with imported clean soil, and an appropriate durable cover would be installed.

In areas where total petroleum hydrocarbons (TPH) constituents are commingled with CERCLA contaminants in soil, the TPH constituents would be also cleaned up under the DoN's CERCLA program at Parcel C. For areas where TPH constituents in soil are not commingled with CERCLA contaminants or TPH remains after CERCLA cleanup is complete, the TPH cleanup would be conducted under the DoN's TPH Corrective Action Program for Parcel C, and would not be addressed by the DoN's CERCLA program.

SVE would be implemented as a source reduction measure to address VOC-contaminated soils and soil vapor above the groundwater plumes. VOCs that migrate through the subsurface to indoor air (vapor intrusion) can pose an inhalation risk. The SVE areas would incorporate the soil sampling locations where VOCs were detected at concentrations above remediation goals and where soil characteristics are appropriate for SVE. SVE would not be used as the sole remedy in areas where VOCs are commingled with chemicals that do not readily volatilize (DoN 2010a).

Across all of Parcel C, durable covers would be applied as physical barriers to cut off potential exposure to metals in soil. Existing asphalt and concrete surfaces (repaired as necessary to be durable) and buildings would act as covers. The type of new covers installed would be consistent with the redevelopment plan (for example, soil covers may be used for open space areas or asphalt for industrial areas). The cover design, including details on how the cover would be finished at the "improved shoreline," would be provided in the RD and would include plans for inspection and maintenance. Covers would be maintained to contain the soil at the "improved shoreline." Backfill for soil covers would be analyzed to confirm that the material does not contain chemicals above Parcel C remediation goals or contain greater than 0.25 percent asbestos. Modification of covers will be governed by the RMP and its terms will be enforced by the regulatory agencies. Based on aerial photographs of Parcel C, an estimated 2 ac (0.8 ha) would be covered with soil and maintained landscaping, 35 ac (14 ha) would be covered with new asphalt, and 35.5 ac (14.4 ha) of existing asphalt and concrete surfaces (including buildings) would be used and repaired, as necessary. As a result of the meeting on 19 May 2009, attended by the DoN, USEPA, DTSC, and CCSF, five existing buildings have been identified where further action would be needed if the building foundation is removed. The footprints of Buildings 134, 214, 231, 272, and 281 serve as covers for ARICs. The DoN concluded that the building foundation cover is sufficiently protective of human health at Parcel C until such time as the building foundation would be removed or altered. Further action would be needed if the building foundations are removed or altered (DoN 2010a).

HPS Parcel C: Institutional Controls

ICs will be implemented to prevent or minimize exposure to areas where potential unacceptable risk is posed by COCs in soil and groundwater. ICs are legal and administrative mechanisms used to implement land use restrictions to limit the exposure of future landowners or users of the property to hazardous substances present on the property and to ensure the integrity of the remedial action. ICs are required on a property where the selected remedial cleanup levels result in contamination remaining at the property above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring and inspections and reporting to ensure compliance with land use or activity restrictions.

The DoN concluded that it will rely on proprietary controls in the form of environmental restrictive covenants as provided in the DoN/DTSC MOA. Specifically, land use and activity restrictions will be incorporated into two separate legal instruments as provided in the DoN/DTSC MOA:

1. Restrictive covenants included in one or more Quitclaim Deeds from the DoN to the property recipient.

2. Restrictive covenants included in one or more "Covenant(s) to Restrict Use of Property" entered into by the DoN and DTSC as provided in the DoN/DTSC MOA and consistent with the substantive provisions of 22 CCR 67391.1.

The "Covenant(s) to Restrict Use of Property" will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC and USEPA, as a third party beneficiary, against future transferees and users. The Quitclaim Deed(s) will include the identical land use and activity restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the DoN against future transferees.

The activity restrictions in the "Covenant(s) to Restrict Use of Property" and Quitclaim Deed(s) shall be addressed in the land use control remedial design (LUC RD) report that would be reviewed and approved by the FFA Signatories. The LUC RD shall be referenced in the applicable Covenant(s) to Restrict Use of Property and Quitclaim Deed(s). The LUC RD shall be submitted in accordance with the FFA schedule. The LUC RD shall specify soil and groundwater management procedures for compliance with the remedy selected in the Parcel C ROD. The LUC RD shall identify the roles of local, state, and federal government in administering the LUC RD and shall include, but not be limited to, procedures for any necessary sampling and analysis requirements, worker health and safety requirements, and any necessary site-specific construction or use approvals that may be required.

Land use restrictions will be applied to specified portions of the facility and described in FOST, FOSET, "Covenant(s) to Restrict Use of Property" between the DoN and DTSC, and any Quitclaim Deed(s) conveying real property containing Parcel C at HPS.

A RMP may be prepared by the City and County of San Francisco and approved by the FFA Signatories that may set forth certain requirements and protocols for implementing the activity restrictions specified in the ROD.

Access - The Deed and Covenant shall provide that the DoN and FFA Signatories and their respective officials, agents, employees, contractors, and subcontractors shall have the right to enter upon HPS Parcel C for purposes consistent with the DoN IR Program or the FFA.

Implementation - The DoN shall address and describe IC implementation and maintenance actions including periodic inspections and reporting in the preliminary and final LUC RD reports to be developed and submitted to the FFA Signatories for review and approval pursuant to the FFA (see "DoN Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions" attached to 16 January 2004 Department of Defense memorandum titled "Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy"). The preliminary and final RD reports are primary documents as provided in Section 7.3 of the FFA. The DoN is responsible for implementing, maintaining, reporting on, and enforcing land use controls. Although the DoN may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the DoN shall retain ultimate responsibility for remedy integrity.

Activity Restrictions that Apply throughout Parcel C - The following sections describe the IC objectives to be achieved through activity restrictions throughout Parcel C to ensure that any necessary measures to protect human health and the environment and the integrity of the remedy have been undertaken.

Restricted Activities - The following restricted activities throughout HPS Parcel C must be conducted in accordance with the "Covenant(s) to Restrict Use of Property," Quitclaim Deed(s), the Parcel C RMP, the

LUC RD report, and if required, any other work plan or document approved in accordance with these referenced documents, and must be further reviewed and approved by the FFA Signatories:

a) "Land disturbing activity," which includes but is not limited to: 1) excavation of soil, 2) construction of roads, utilities, facilities, structures, and appurtenances of any kind, 3) demolition or removal of hardscape" (for example, concrete roadways, parking lots, foundations, and sidewalks), 4) any activity that involves movement of soil to the surface from below the surface of the land, and 5) any other activity that causes or facilitates the movement of known contaminated groundwater.

b) Alteration, disturbance, or removal of any component of a response or cleanup action (including but not limited to pump-and-treat facilities and soil cap/containment systems); groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities.

c) Extraction of groundwater and installation of new groundwater wells, with the exception of construction, operation, and maintenance responses or remedial actions as required or necessary under the CERCLA remedy.

d) Removal of or damage to security features (for example, locks on monitoring wells, survey monuments, fencing, signs, or monitoring equipment and associated pipelines and appurtenances).

Prohibited Activities - The following activities are prohibited throughout HPS Parcel C:

a) Growing vegetables, fruits, or any edible items in native soil for human consumption.

b) Use of groundwater.

Proposed Activity Restrictions Relating to VOC and SVOC Vapors at Specific Locations within Parcel C - Any proposed construction of enclosed structures must be approved in accordance with the "Covenant(s) to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and the RMP with approval of the FFA Signatories prior to the conduct of such activity within the ARIC for VOC and SVOC vapors to ensure that the risks of potential exposures to VOC and SVOC vapors are reduced to acceptable levels that are adequately protective of human health. The reduction in potential risk can be achieved through engineering controls or other design alternatives that meet the specifications set forth in the ROD, RD reports, LUC RD report, and the RMP. Initially, the ARIC will include all of Parcel C. The ARIC for VOC and SVOC vapors may be modified by the FFA Signatories as the soil contamination areas and groundwater contaminant plumes that are producing unacceptable vapor inhalation risks are reduced over time or in response to further soil, vapor, and groundwater sampling and analysis for VOCs and SVOCs that establishes that areas now included in the ARIC for VOC and SVOC vapors do not pose unacceptable potential exposure risk to VOC and SVOC vapors.

Additional Land Use Restrictions for Areas Designated for Open Space, Educational/Cultural, and Industrial Reuse - The following restricted land uses for property areas designated for open space, educational/cultural, and industrial land uses in the SFRAs reuse plan must be reviewed and approved by the FFA Signatories in accordance with the "Covenants to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and the RMP for each parcel prior to use of the property for any of the following restricted uses:

a) A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation.

b) A hospital for humans.

c) A school for persons under 21 years of age.

d) A daycare facility for children.

3.7.4.3.3 HPS Parcel UC-2

HPS Parcel UC-2: Historic Uses

Historical use of the southern portion of Parcel UC-2 is as a roadway (Fisher Ave) and the northern portion is as a triangularly shaped parking lot (at the corner of Fisher Ave and Robinson St) for Building 101. The roadway was constructed by placing borrowed fill, and the parking lot is located on the original promontory with native soil over shallow bedrock. These features apply to most of the parcel, with a limited amount of property directly adjacent to them; there are no buildings. Parcel UC-2 is about 3.9 ac.

HPS Parcel UC-2: Results of Environmental Investigations

Potential contamination at Parcel UC-2 is associated with metals in soil, VOCs in groundwater, and radiologically impacted structures (storm drains and sanitary sewers), and soil associated with these structures (DoN 2009b).

Additional information on the results of previous environmental investigations conducted by the DoN at Parcel UC-2 can be found in the *Final Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California, October 28, 2009* (DoN 2009b).

HPS Parcel UC-2: Cleanup Status

Numerous physical cleanup activities have been implemented at Parcel UC-2, including: removal of ASTs and associated piping; excavation of soils; and removal of the Parcel UC-2 storm drain and sanitary sewer lines (DoN 2009b). A chronology of the CERCLA actions completed at Parcel UC-2 is identified in Table 3.7.4-5.

Table 3.7.4-5 CERCLA Chronology for Parcel UC-2

Process Step	***Year Completed***
Preliminary Assessment (PA)	1984-1990
Site Inspection (SI)	1994
Remedial Investigation (RI)	1993-1997
Feasibility Study (FS) – Initial Phase	1996-1998
Feasibility Study (FS) - Revised	2008
Proposed Plan (PP)	2009
Record of Decision (ROD)	2010

Source: DoN 2009b.

The DoN published a Final ROD for Parcel UC-2 in 2009 *(Final Record of Decision for Parcel UC-2, Hunters Point Shipyard, San Francisco, California, October 28, 2009*) , of which the selected remedies included the following.

Durable covers will be applied as physical barriers for the Parcel UC-2 soil remedy to cut off potential exposure to metals in soil. Details of the design for covers at Parcel UC-2 will be developed in the RD. The RD will include plans for inspection and maintenance to ensure the covers remain intact. Modification of the covers will be governed by the land use control remedial design (LUC RD) report discussed below, and its terms will be enforced by the regulatory agencies (DoN 2009b).

The selected remedy for radiologically impacted structures consisted of removal and offsite disposal of the remaining radiologically impacted storm drains and sanitary sewers and soil associated with these structures while implementing appropriate dust control measures. Survey and removal of the Parcel UC-2 storm drain and sanitary sewer lines were completed in early October 2009 (DoN 2009b).

HPS Parcel UC-2: Institutional Controls

ICs will be implemented to prevent or minimize exposure to areas where potential unacceptable risk is posed by COCs in soil and groundwater. ICs are legal and administrative mechanisms used to implement land use restrictions to limit the exposure of future landowners or users of the property to hazardous substances present on the property and to ensure the integrity of the remedial action. ICs are required on a property where the selected remedial cleanup levels result in contamination remaining at the property above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring and inspections, and reporting to ensure compliance with land use or activity restrictions.

The DoN concluded that it will rely on proprietary controls in the form of environmental restrictive covenants as provided in the DoN/DTSC MOA. Specifically, land use and activity restrictions will be incorporated into two separate legal instruments as provided in the DoN/DTSC MOA:

1. Restrictive covenants included in one or more Quitclaim Deeds from the DoN to the property recipient.
2. Restrictive covenants included in one or more "Covenant(s) to Restrict Use of Property" entered into by the DoN and DTSC as provided in the DoN/DTSC MOA and consistent with the substantive provisions of 22 CCR 67391.1.

The "Covenant(s) to Restrict Use of Property" will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC, and USEPA, as a third-party beneficiary, against future transferees and users. The Quitclaim Deed(s) will include the identical land use and activity restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the DoN against future transferees.

The activity restrictions in the "Covenant(s) to Restrict Use of Property" and Quitclaim Deed(s) shall be addressed in the LUC RD report that would be reviewed and approved by the FFA Signatories. The Parcel UC-2 LUC RD shall be referenced in the applicable "Covenant(s) to Restrict Use of Property" and Quitclaim Deed(s). The Parcel UC-2 LUC RD shall specify soil and groundwater management procedures for compliance with the remedy selected in the Parcel UC-2 ROD. The Parcel UC-2 LUC RD shall identify the roles of local, state, and federal government in administering the Parcel UC-2 LUC RD and shall include, but not be limited to, procedures for any necessary inspections, sampling and analysis requirements, worker health and safety requirements, and any necessary site-specific construction or use approvals that may be required. The LUC RD will be submitted in accordance with the FFA schedule.

Land use restrictions will be applied to specified portions of the property and described in FOST, FOSET, "Covenant(s) to Restrict Use of Property" between the DoN and DTSC, and any Quitclaim Deed(s) conveying real property containing Parcel UC-2 at HPS.

A RMP may be prepared by the City and County of San Francisco and approved by the FFA Signatories that may set forth certain requirements and protocols for implementing the activity restrictions specified in the ROD.

Access - The Deed and Covenant shall provide that the DoN and FFA Signatories and their respective officials, agents, employees, contractors, and subcontractors shall have the right to enter upon HPS Parcel UC-2 for purposes consistent with the DoN IR Program or the FFA.

Implementation - The DoN shall address and describe IC implementation and maintenance actions including periodic inspections and reporting requirements in the preliminary and final LUC RD reports to be developed and submitted to the FFA Signatories for review and approval pursuant to the FFA (see "Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions" attached to 16 January 2004 Department of Defense memorandum titled "Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy").

The DoN is responsible for implementing, maintaining, reporting on, and enforcing land use controls. Although the DoN may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the DoN shall retain ultimate responsibility for remedy integrity.

Activity Restrictions that Apply throughout Parcel UC-2 - The following sections describe the IC objectives to be achieved through activity restrictions throughout Parcel UC-2 to ensure that any necessary measures to protect human health and the environment and the integrity of the remedy have been undertaken.

Restricted Activities - The following restricted activities throughout HPS Parcel UC-2 must be conducted in accordance with the "Covenant(s) to Restrict Use of Property," Quitclaim Deed(s), the RMP, the LUC RD report, and if required, any other work plan or document approved in accordance with these referenced documents and must be further reviewed and approved by the FFA signatories:

a) "Land disturbing activity," which includes but is not limited to: 1) excavation of soil, 2) construction of roads, utilities, facilities, structures, and appurtenances of any kind, 3) demolition or removal of "hardscape" (for example, concrete roadways, parking lots, foundations, and sidewalks), 4) any activity that involves movement of soil to the surface from below the surface of the land, and 5) any other activity that causes or facilitates movement of known contaminated groundwater.

b) Alteration, disturbance, or removal of any component of a response or cleanup action (including but not limited to pump-and-treat facilities and soil cap/containment systems); groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities.

c) Extraction of groundwater and installation of new groundwater wells with the exception of environmental sampling and monitoring requirements described in this ROD.

d) Removal of or damage to security features (for example, locks on monitoring wells, survey monuments, fencing, signs, or monitoring equipment and associated pipelines and appurtenances).

Prohibited Activities - The following activities are prohibited throughout HPS Parcel UC-2:

a) Growing vegetables or fruits in native soil for human consumption.

b) Use of groundwater.

Proposed Activity Restrictions Relating to VOC Vapors at Specific Locations within Parcel UC-2 - Any proposed construction of enclosed structures must be approved in accordance with the

"Covenant(s) to Restrict Use of the Property," Quitclaim Deed(s), LUC RD report, and the RMP with approval of the FFA Signatories prior to the conduct of such activity within the ARIC for VOC vapors to ensure that the risks of potential exposures to VOC vapors are reduced to acceptable levels that are adequately protective of human health. The reduction in potential risk can be achieved through engineering controls or other design alternatives that meet the specifications set forth in the ROD, RD reports, LUC RD report, and the RMP. Initially, the ARIC will include Redevelopment Block 10 within Parcel UC-2. The remaining areas of Parcel UC-2 are planned roads, with the exception of a small sliver of Redevelopment Block 17. The ARIC for VOC vapors in Redevelopment Block 10 in Parcel UC-2 may be modified by the FFA Signatories as the soil contamination areas and groundwater contaminant plumes that are producing unacceptable vapor inhalation risks are reduced over time or in response to further soil, vapor, and groundwater sampling and analysis for VOCs that establishes that areas now included in the ARIC for VOC vapors do not pose unacceptable potential exposure risk to VOC vapors.

3.7.4.3.4 HPS Parcels UC-1 and D-1

HPS Parcel UC-1 and D-1: Historic Uses

Parcel D-1 is located on the southeastern portion of the former 98-ac Parcel D and Parcel UC-1 is located on the northern portion of former Parcel D. Parcel D-1 is 48.7 ac, and Parcel UC-1 is 3.9 ac. The remainder of former Parcel D was divided into Parcel D-2 and Parcel G (see Sections 3.7.4.3.5, HPS Parcel D2 and 3.7.4.8, HPS Parcel G). The area is located in the central portion of the shipyard and was formerly part of the industrial support area and was used for shipping, ship repair, and office and commercial activities.

Parcel D-1 and Parcel UC-1 consist of flat lowlands that were constructed by placing borrowed fill material from various sources, including crushed serpentinite bedrock from the adjacent highland and dredged sediments. The serpentinite bedrock and serpentine bedrock-derived fill material consist of minerals that naturally contain asbestos and relatively high concentrations of arsenic, manganese, nickel, and other metals.

HPS Parcel UC-1 and D-1: Results of Investigations

Potential contamination at Parcel D-1 is from metals and PAHs in soil, metals and VOCs in groundwater, and radiologically impacted structures and soil. Potential contamination at Parcel UC-1 includes metals in soil and radiologically impacted structures and soil. Assessment of contamination and risk for Parcels D-1 and UC-1 is based on the Final Revised FS Report for Parcel D (30 November 2007), including the revised HHRA and the radiological addendum to the FS Report. The Revised FS Report for Parcel D considered new information associated with several cleanup actions completed within Former Parcel D and at other adjacent parcels at HPS. Both the FS and HHRA are detailed in the Final Revised FS Report for Parcel D.

Although a number of removal actions have been completed within Parcels D-1 and UC-1, chemical contamination remains. Based on recent studies and investigations, the sources and extent of the remaining contamination in soil and groundwater have been well characterized. Industrial activities resulted in elevated concentrations of PAHs and metals in soil. Elevated concentrations of metals, such as arsenic and manganese, may be related to the bedrock fill quarried to build the shipyard in the 1940s. The fill may have contained elevated concentrations of select metals from the bedrock. Therefore, the DoN worked with the regulatory agencies to identify remedial alternatives that address metals in soil, regardless of their source.

In adjacent Parcel G, the DoN identified the former Pickling and Plate Yard as the source of the elevated concentrations of chromium VI and possibly nickel in groundwater. Use of solvents during industrial operations also released VOCs into groundwater (IR-71). Chromium VI and nickel are not currently found in concentrations that would require remediation at Parcel D-1 or UC-1. However, the DoN is monitoring groundwater in these parcels to evaluate whether these metals have migrated into Parcels D-1 and UC-1.

Recent findings from a treatability study and ongoing groundwater monitoring suggest that there has been a reduction in the contaminant and plume extent since 2004. This reduction will result in a potential reconfiguration of the IR Site-71 plume and also will verify whether other plumes that originated in Parcel G may have migrated into Parcels D-1 and UC-1. The current groundwater sample data will be reviewed during the remedial design (RD) to focus groundwater remediation.

The DoN identified radiologically impacted sites, including buildings, equipment, and infrastructure at former Parcel D (including areas within Parcels D-1 and UC-1), associated with the former use of general radioactive materials and decontamination of ships used during atomic weapons testing in the South Pacific. Parcel UC-1 includes radiologically impacted Building 819, as well as storm drains and sanitary sewers. Parcel D-1 includes a radiologically impacted Building (274); former building sites (313, 313A, 322, 383, the Gun Mole Pier, and the NRDL site on Mahan Street); and storm drains and sanitary sewers.

The DoN is conducting a time-critical removal action (TCRA) to address potential radioactive contamination in buildings, former building sites, storm drains, and sanitary sewers. The TCRA involves 1) surveying radiologically impacted structures and former building sites; 2) decontaminating (and demolishing if necessary) buildings and former building sites; 3) excavating radiologically impacted storm drain and sanitary sewer lines; and 4) screening, separating, and disposing of radioactively contaminated excavated materials at an off-site, low-level radioactive waste facility.

Additional information on the results of previous environmental investigations conducted by the DoN at Parcel UC-2 can be found in the *Final Record of Decision for Parcels D-1 and UC-1, Hunters Point Shipyard, San Francisco, California, July 24, 2009* (DoN 2009c).

HPS Parcels UC-1 and D-1: Cleanup Status

Several remediation activities have been implemented at Parcel UC-1 and D-1, including removal of USTs, sandblast grit removal, excavation and removal of soils, asphalt, and concrete, storm drain sediment removal, remediation of radiologically impacts sites, and removal of storm drains and sanitary sewers (DoN 2009c). A chronology of the CERCLA actions completed at Parcels UC-1 and D-1 is presented in Table 3.7.4-6.

Table 3.7.4-6 CERCLA Chronology for Parcel UC-1 and D-1

Process Step	*Year Completed*
Preliminary Assessment (PA)	1990
Site Inspection (SI)	1994
Remedial Investigation (RI)	1988-1997
Feasibility Study (FS)	1996-1997
Proposed Plan (PP)/ Record of Decision (ROD)	1997
Revised FS	2007
PP	2008
Record of Decision (ROD)	2009

Source: DoN 2009c.

The DoN published a Final ROD for Parcels D-1 and UC-1 in 2009 *(Final Record of Decision for Parcels D-1 and UC-1, Hunters Point Shipyard, San Francisco, California, July 24, 2009*), which included the selected remedies described below.

The selected remedy for soil consists of removing soil in selected areas where COCs exceed remediation goals and disposing of excavated soil at an offsite facility. Six areas are planned for excavation within Parcel D-1. If the TCRA does not achieve the remedial goals, work will continue until the remedial goals specified in the ROD are met. Across all of Parcels D-1 and UC-1, durable covers will be applied as physical barriers to cut off potential exposure to metals in soil. The naturally-occurring metals prevent the parcels from being suitable for unrestricted residential reuse as shown in the Final Revised Feasibility Study for Parcel D. Existing asphalt and concrete surfaces (repaired as necessary to be durable) and buildings will act as covers. The type of new covers installed will be consistent with the redevelopment plan (for example, soil covers may be used for open space areas or asphalt for industrial areas). The cover design, including details on how the cover would be finished at the seawalls, will be provided in the RD. Covers will be maintained to contain the soil at the seawall. The RD will include plans for inspection and maintenance to ensure the covers remain intact. ICs will be implemented to maintain the integrity of the covers, including where the covers meet the seawall. With the construction and maintenance of durable covers and implementation of specified ICs, the remedy will be protective with respect to the cumulative risks. Modification of the covers will be governed by the LUC RD report and RMP discussed below and its terms will be enforced by the regulatory agencies.

The selected remedy for groundwater consists of actively treating VOCs in groundwater using an injected biological substrate or zero valent iron (ZVI) to destroy the VOCs in the IR-71 groundwater plume and minimize the possible migration of metals in the groundwater plume at IR-09 into Parcel UC-1. A treatability study is currently being conducted in Parcels G and D-1 using ZVI injection points in the plumes associated with IR-71. Groundwater monitoring will occur in and around the remediation areas and also in downgradient locations in D-1 and UC-1, as necessary. The locations of monitoring points and the monitoring frequency will be established in the RD. The RD will use current information on the plume extent and concentration to select the actual injection parameters. The monitoring plan will be flexible to allow modifications as data are collected.

The selected remedy for radiologically impacted soil and structures consists of surveying radiologically impacted buildings and former building sites with documented radiological impacts for unrestricted release. Unrestricted release means that a property can be used for any residential or commercial purpose once regulatory requirements have been met. To meet the objective of unrestricted radiological release, residential remedial goals will be used for radiologically impacted buildings, storm drains, sewer lines, and soil. Decontamination will be performed and buildings will be dismantled if necessary. Remaining radiologically impacted storm drains and sanitary sewer lines throughout Parcels D-1 and UC-1 will be removed and disposed of off-site.

As of 2009, the DoN has completed the removal of radiologically impacted storm and sanitary sewer piping within Parcel G and is close to completing the removal actions in Parcel UC-1. Survey and removal actions at Parcel D-1 have been scheduled to begin in late 2009. Once the removal actions have been completed at Parcels D-1 and UC-1, a RACR will summarize all Building, Storm and Sewer Drain Final Status Survey Reports and Survey Unit Package Reports. Should unrestricted radiological release not be achieved, further remedial actions will occur to meet remedial goals established in the ROD. Each radiologically impacted site will be investigated through the CERCLA process. If the final report of the site investigation is approved by the stakeholders, and the site is determined to require no further action, the classification of "radiologically impacted" may be removed.

The survey and removals will occur before any covers are installed. Buildings, former building sites, and excavated areas will be surveyed after cleanup is completed to ensure that no residual radioactivity is present at levels above the remediation goals. Excavated soil, building materials, and drain material from radiologically impacted sites will be screened and radioactive sources and contaminated soil will be removed and disposed of at an offsite, low-level radioactive waste facility.

HPS Parcels UC-1 and D-1: Institutional Controls

ICs will be implemented to prevent exposure to areas where potential unacceptable risk is posed by COCs in soil and groundwater. ICs are legal and administrative mechanisms used to implement land use restrictions that are used to limit the exposure of future landowners or users of the property to hazardous substances present on the property, and to ensure the integrity of the remedial action. ICs are required on a property where the selected remedial cleanup levels result in contamination remaining at the property above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring and inspections, and reporting to ensure compliance with land use or activity restrictions.

The DoN concluded that it will rely on proprietary controls in the form of environmental restrictive covenants as provided in the DoN/DTSC MOA and attached covenant models (DoN and DTSC 2000). Specifically, land use and activity restrictions will be incorporated into two separate legal instruments as provided in the DoN/DTSC MOA:

1. Restrictive covenants included in one or more Quitclaim Deeds from the DoN to the property recipient.
2. Restrictive covenants included in one or more "Covenant to Restrict Use of Property" entered into by the DoN and DTSC as provided in the DoN/DTSC MOA and consistent with the substantive provisions of 22 CCR 67391.1.

The "Covenant(s) to Restrict Use of Property" will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC and USEPA as a third party beneficiary against future transferees and users. The Quitclaim Deed(s) will include the identical land use and activity restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the DoN against future transferees.

The activity restrictions in the "Covenant(s) to Restrict Use of Property" and Deed(s) shall be addressed in the LUC RD Report that would be reviewed and approved by the FFA Signatories. The LUC RD shall be referenced in the applicable Covenant to Restrict Use of Property and Deed. The LUC RD shall be submitted in accordance with the FFA schedule. The LUC RD shall specify soil and groundwater management procedures for compliance with the remedy selected in the Parcels D-1 and UC-1 ROD. The LUC RD shall identify the roles of local, state, and federal government in administering the LUC RD and shall include, but not be limited to, procedures for any necessary sampling and analysis requirements, worker health and safety requirements, and any necessary site-specific construction and/or use approvals that may be required.

Land use restrictions will be applied to specified portions of the facility and described in FOST, FOSET, "Covenant(s) to Restrict Use of Property" between the DoN and DTSC, and any Quitclaim Deed(s) conveying real property containing Parcels D-1 and UC-1 at HPS.

A RMP may be prepared by the City and County of San Francisco and approved by the FFA Signatories that may set forth certain requirements and protocols for implementing the activity restrictions specified in the ROD.

Access - The Deed and Covenant shall provide that the DoN and FFA Signatories and their respective officials, agents, employees, contractors, and subcontractors shall have the right to enter upon HPS Parcels D-1 and UC-1 for purposes consistent with the DoN IR Program or the FFA.

Implementation - The DoN shall address and describe IC implementation and maintenance actions including but not limited to frequency and requirements for periodic inspections during development and post development, monitoring, and reporting in the preliminary and final LUC RD reports to be developed and submitted to the FFA Signatories for review and approval pursuant to the FFA (see "Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions" attached to 16 January 2004 Department of Defense memorandum titled "Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy").

The DoN is responsible for implementing, maintaining, reporting on, and enforcing land use controls. Although the DoN may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the DoN shall retain ultimate responsibility for remedy integrity.

Activity Restrictions that Apply throughout Parcels D-1 and UC-1 - The following sections describe the IC objectives to be achieved through activity restrictions throughout Parcels D-1 and UC-1 in order to ensure that necessary measures to protect human health and the environment and the integrity of the remedy have been undertaken.

Restricted Activities - The following restricted activities throughout HPS Parcels D-1 and UC-1 must be conducted in accordance with the "Covenant(s) to Restrict Use of Property", Quitclaim Deed(s), the Parcels D-1 and UC-1 RMP, the LUC RD report, and if required, any other work plan or document approved in accordance with these referenced documents and must be further reviewed and approved by the FFA Signatories:

a) "Land disturbing activity" which includes but is not limited to: 1) excavation of soil, 2) construction of roads, utilities, facilities, structures, and appurtenances of any kind, 3) demolition or removal of "hardscape" (for example, concrete roadways, parking lots, foundations, and sidewalks), 4) any activity that involves movement of soil to the surface from below the surface of the land, and 5) any other activity that causes or facilitates movement of known contaminated groundwater.

b) Alteration, disturbance, or removal of any component of a response or cleanup action (including but not limited to pump-and-treat facilities, shoreline protection, and soil cap/containment systems); groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities.

c) Extraction of groundwater and installation of new groundwater wells with the exception of environmental sampling and monitoring requirements described in this ROD.

d) Removal of or damage to security features (for example, locks on monitoring wells, survey monuments, fencing, signs, or monitoring equipment and associated pipelines and appurtenances).

Prohibited Activities - The following activities are prohibited throughout HPS Parcels D-1 and UC-1:

a) Growing vegetables or fruits in native soil for human consumption.

b) Use of groundwater.

Proposed Activity Restrictions Relating to VOC Vapors at Specific Locations within Parcels D-1 and UC-1 - Any proposed construction of enclosed structures must be approved in accordance with the "Covenant(s) to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and the RMP with approval of the FFA Signatories prior to the conduct of such activity within the ARIC for VOC vapors to ensure that the risks of potential exposures to VOC vapors are reduced to acceptable levels that are adequately protective of human health. The reduction in potential risk can be achieved through engineering controls or other design alternatives that meet the specifications set forth in the ROD, RD reports, LUC RD report, and the RMP. Initially, the ARIC will include all of Parcels D-1 and UC-1. The ARIC for VOC vapors may be modified by the FFA Signatories as the soil contamination areas and groundwater contaminant plumes that are producing unacceptable vapor inhalation risks are reduced over time or in response to further soil, vapor, and groundwater sampling and analysis for VOCs that establishes that areas now included in the ARIC for VOC vapors do not pose unacceptable potential exposure risk to VOC vapors.

Additional Land Use Restrictions for Areas Designated for Industrial Reuse - The following restricted land uses for property areas designated for industrial land uses in the San Francisco Redevelopment Agency's Reuse Plan must be reviewed and approved by the FFA Signatories in accordance with the "Covenants to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and the RMP for each parcel prior to use of the property for any of the following restricted uses:

a) A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation.

b) A hospital for humans.

c) A school for persons under 21 years of age.

d) A daycare facility for children.

3.7.4.3.5 HPS Parcel D-2

HPS Parcel D-2: Historic Uses

Parcel D-2 (approximately 5.78 ac [2.34 ha]) was originally within the boundary of former Parcel A (the property directly north of Parcel D) and contains Building 813. Building 813 is a large warehouse that was used as offices, a supply storehouse, and the Disaster Control Center. A former underground storage tank (UST S-812) site is also within the boundaries of Parcel D-2. The UST was removed in 1991.

HPS Parcel D-2: Results of Investigations

In 1993, the DoN performed a SI to evaluate potential contamination at Parcel A, which included Parcel D-2. Building 813 was investigated, and an inventory of the building was prepared to identify potential sources of contamination. No sources of contamination inside the building were identified at that time. In 1976, UST S-812 was installed adjacent to Building 813 and used to store fuel oil for a boiler in Building 813. In 1991, UST S-812 was removed, and soil and groundwater samples were collected for chemical analysis. The site was then backfilled and paved. The 1991 soil and groundwater analytical results showed concentrations of metals below ambient levels. VOCs were detected in the groundwater sample from the UST excavation.

In 1993, and in response to regulatory agency concerns, the DoN conducted an additional groundwater investigation. VOCs were not detected in any of the groundwater samples in concentrations at or above

the PQL of 10 µg/L. With the exception of acetone, no VOCs were detected above the method detection limit; the acetone detection was determined to be a result of laboratory contamination. The DoN therefore concluded that no further evaluation of the groundwater was necessary.

Based on the SI and the subsequent groundwater results, the area that is now Parcel D-2 (Building 813 and the area immediately surrounding it) did not qualify to be included in the RI.

In 2004, the DoN completed a basewide HRA. During research to support the HRA, documentation was found indicating that a single leaking 300 µCi strontium-90 check source may have been stored on the first floor of Building 813 in the past. As a result, the DoN recommended further evaluation of potential radiological contamination at Building 813. Subsequently, the southeastern boundary of Parcel A was revised to exclude Building 813 so it could be surveyed for potential radiological contamination. As a result of the boundary revision, Building 813 was included within Parcel D.

The HPS storm and sanitary combined sewer system was installed in the 1940s and underwent a series of separation projects (1958 to 1976), but was never completely separated. Based on gamma surveys of key manholes in the HRA, the determination was made that potential contamination of the storm and sanitary sewer system was likely near former NRDL sites or sites associated with radium use. Therefore, the DoN also recommended removal of sanitary and storm sewers at Parcels B, C, D, E and E-2. In 2006, the DoN began implementation of a TCRA to address the Parcel D-2 storm and sanitary sewers. The TCRA was conducted in stages. First, piping laterals were removed to within the 10-ft (about 3 m) safety buffer surrounding the structure or other associated obstructions. If no radiological contamination was present in this segment of the line, then the exposed ends of the lateral were capped or plugged and the remaining portions left in place. If evidence of radiological contamination was encountered, the remaining lateral was removed in 10-linear-foot (3 m) sections until the line had been determined to be free of radioactive contamination or to the face of Building 813 or other obstruction (stairways or loading docks) as practicable, whichever came first.

Six of the eight drain lines left in place at Building 813 were associated with a roof drain system. The DoN concluded there was a low potential for radiological contamination to enter the storm sewer systems from the roof drains. The DoN further concluded that roof drain pipes are not contaminated and may be left in place within the 10-ft (3 m) safety buffer. Sewer lines located on the north side of Building 813 were not excavated because of their proximity to the retaining wall that separates Parcel D-2 from the adjacent property and to prevent undermining the Building 813 loading dock. These lines either drain stormwater from the roof of Building 813 or are associated with upgradient storm drain lines emanating from the non-radiologically impacted SFRA property (formerly Parcel A, which was released for unrestricted use).

Based on analytical results and the radiological surveys, the DoN concluded that the storm drain piping remaining in place on Parcel D-2 after the TCRA was not radiologically impacted. The excavated storm drain and sanitary sewer trenches were backfilled to grade and covered with road base.

In 2007, the DoN surveyed Building 813 to evaluate whether strontium-90 or other radionuclides were a concern. Survey results concluded Building 813 could be released from radiological control pending regulatory agency approval. CDPH reviewed all radiological documentation on Building 813 and on 1 April 2008 concurred that no action was required and that Building 813 was acceptable for unrestricted use.

In 2009, the DoN completed removal of the sanitary and storm sewers. The DoN conducted surveys showing all areas of Parcel D-2 storm drains and sanitary sewers meet the risk criteria for release. DTSC and CDPH reviewed all radiological documentation on the storm drains and sanitary sewers in Parcel D-

2, and on 9 August 2010 concurred that no further action was required and that Parcel D-2 was acceptable for unrestricted use.

Additional information on the results of previous environmental investigations conducted by the DoN at Parcel D-2 can be found in the *Final Record of Decision for No Further Action at Parcel D-2, Hunters Point Shipyard, San Francisco, California, 9 August 2010* (DoN 2010b).

HPS Parcel D-2: Cleanup Status

The DoN concluded no further action under CERCLA is necessary to ensure protection of human health or the environment at Parcel D-2. Current conditions at the site do not pose an unacceptable risk to human health or the environment for current or future uses of Parcel D-2. No covers or ICs are required and no groundwater cleanup is needed for Parcel D-2. The DoN and the USEPA jointly selected the no further action decision for Parcel D-2. The DTSC and the RWQCB are in concurrence.

The DoN published a Final ROD for No Further Action at Parcel D-2 in 2010 (DoN 2010b).

3.7.4.3.6 HPS Parcels E and E-2

HPS Parcels E and E-2: Historic Uses

In September 2004, the DoN divided the original Parcel E into two parcels: Parcel E and Parcel E-2. Parcel E consists of 138 ac (55.8 ha) of shoreline and lowland area in the southern portion of HPS. Nearly all of the Parcel E land area was created using artificial fill. Historically, Parcel E was a mixed-use and industrial area that supported HPS shipping and ship repair activities. Areas near the shoreline were used to store construction and industrial materials and to dispose of industrial waste and construction debris (SFRA 2010, FEIR).

Parcel E-2 consists of 47.4 ac (19.2 ha) of shoreline and lowland areas along the southwestern portion of HPS. From 1955 to 1974, the landfill received liquid chemical waste, asbestos, domestic wastes and refuse, dredged materials, sandblast grit, solvent wastes, and potentially low-level radioactive wastes in the form of shipboard radium dials (SFRA 2010, FEIR).

HPS Parcels E and E-2: Results of Investigations

The chemicals of concern at Parcel E include metals and organic chemicals such as VOCs, PAHs, PCBs, and pesticides. The chemicals of concern at Parcel E-2 include metals, PCBs, SVOCs, pesticides, and petroleum hydrocarbons. The radionuclides of concern associated with Parcel E-2 include cobalt-60, cesium-137, radium-226, and strontium-90 (SFRA 2010, FEIR).

The HHRA results for groundwater indicated that the risk from potential exposure to VOCs in the aquifer via vapor intrusion exceeded action levels at certain locations. Potential human health risks from exposure to chemicals present in sediment was also evaluated for the shoreline at HPS. Based on this evaluation, chromium VI, total chromium, and PCBs appear to be the primary chemicals of concern for the evaluation of human health in sediment along the Parcel E shoreline (SFRA 2010, FEIR).

Two ecological risk assessments were performed for Parcel E: 1) the baseline ecological risk assessment, prepared in 1997, which evaluated risks from exposure to soil in areas planned for open space reuse along the Parcel E shoreline; and 2) a SLERA, prepared in 2005, which evaluated risks from exposure to sediment in the intertidal zone along the Parcel E-2 shoreline. The baseline ecological risk assessment found potential risk to birds and mammals from exposure to copper, lead, and total PCBs in soil along the

shoreline. The SLERA found potential risk to benthic invertebrates, birds, and mammals from exposure to metals and total PCBs in surface and subsurface sediments along the shoreline (Barajas and Associates 2008a; Jonas and Associates 2008) (SFRA 2010, FEIR).

HPS Parcels E and E-2: Cleanup Status

Numerous physical cleanup activities have been implemented at Parcels E and E-2. These include: collection and removal of 5,000 tons of sandblast waste; removal and containment of floating petroleum product to prevent further migration to the bay; a soil vapor extraction system to extract VOCs from the subsurface; excavation and removal of soils contaminated with PCBs; removal and/or containment of radioactive constituents and petroleum compounds; and removal of contaminated soil and placement of a clean soil cap in the metal debris reef and metal slag areas (SFRA 2010, FEIR).

In Parcel E-2, the DoN installed a groundwater containment and extraction system at the southeast portion of the landfill to reduce the potential for release of chemical constituents into the bay. This system includes sheet piling and a groundwater extraction system to control potential mounding of shallow groundwater at the southern end of the landfill. A multi-layer cap was constructed on a portion of the Parcel E-2 landfill to limit oxygen intrusion and extinguish smoldering subsurface areas following a subsurface fire in 2000. Following characterization of the nature and extent of landfill gas, a landfill gas barrier and monitoring system was constructed at the northern end of the landfill to prevent methane gas migration from reaching the University of California San Francisco (UCSF) facility adjacent to parcel E-2 (the UCSF facility is outside of HPS). In addition, ongoing monitoring programs at Parcel E-2 include a stormwater discharge management program, a landfill cover inspection and maintenance program, a basewide groundwater monitoring program, and a landfill gas control and monitoring program (Barajas and Associates 2008a; Jonas and Associates 2008; ITSi 2007) (SFRA 2010, FEIR).

In addition, the HHRA has been revised and an updated draft final Parcel E FS was prepared. For Parcel E-2, the range of cleanup options includes excavation and offsite disposal of solid waste, soil, and sediment (including monitoring and institutional controls), or onsite containment of solid waste, soil, and sediment with hot spot removal (including monitoring and institutional controls or some combination thereof) (ERRG 2009a; ERRG 2009b). Currently, Parcel E-2 is in the PP phase of the CERCLA process and a draft ROD is anticipated to be released in early 2012 (SFRA 2010, FEIR).

3.7.4.3.7 HPS Parcel F

HPS Parcel F: Historic Uses

Parcel F comprises 440 ac (178 ha) of submerged land surrounding all portions of HPS to the north, east, south, and southwest. Figure 3.7.4-1 shows Parcel F in relation to the other parcels. Figure 3.7.4-2 shows Parcel F in relation to the other parcels and five specific investigation subareas within the parcel, which are discussed below. Features of Parcel F include pier, slip, and drydock areas and offshore sediment.

HPS Parcel F: Results of Environmental Investigations

Numerous investigations have been conducted at Parcel F, including an RI/FS, a human health risk assessment, and an updated FS, as well as the collection of surface and subsurface sediment samples for chemical and ecological toxicity evaluations. During Phase 1A and Phase 1B Ecological Risk Assessments, Parcel F was subdivided into eleven subareas. Based on the previous investigation results, five areas were identified for further evaluation: Area I (India Basin Subarea), Area III (Point Avisadero Subarea), Area VIII (Eastern Wetland Subarea), Area IX (Oil Reclamation Subarea), and Area X (South

Basin Subarea). Although a final determination has not been made, no further evaluation of the sediment is considered necessary for the remaining subareas at this time (SFRA 2010, FEIR).

In Subarea III, copper and mercury were identified as the primary risk drivers; PCBs were of greatest concern in Subareas IX and X. These chemicals also exceeded concentrations considered safe for benthic invertebrates directly exposed to sediment. PCBs also were shown to cause potential risk to humans if they were to consume shellfish from HPS. No unacceptable ecological risk was indicated by sediments in Subareas I or VIII (SFRA 2010, FEIR).

HPS Parcel F: Cleanup Status

The DoN implemented source control measures to help reduce contaminant levels in Parcel F, including: extensive removal of contaminated soil, sediment, and debris along the Parcels B, E, and E-2 shorelines; storm drain cleaning program; and installation of a steel sheet-pile wall on the bay side of the former industrial landfill located in Parcel E-2. A revised Parcel F FS identified a range of alternatives to remediate Parcel F, the offshore areas of HPS. For Subarea III, the options include removal/backfill and offsite disposal of affected media in combination with a cap and institutional controls. For Subareas IX and X, similar methods could be used, along with in-situ stabilization and natural recovery with monitoring. (For Subareas I and VIII, no remedial actions were recommended by the DoN because no unacceptable ecological risk was identified.) The DoN will select the preferred remedial alternative for each subarea after receipt and resolution of regulatory agency comments (SFRA 2010, FEIR). The DoN will present its preferred alternative to the public in a PP (Barajas and Associates 2008b). The draft PP and ROD are anticipated to be issued in 2013 (DTSC 2009a).

3.7.4.3.8 HPS Parcel G

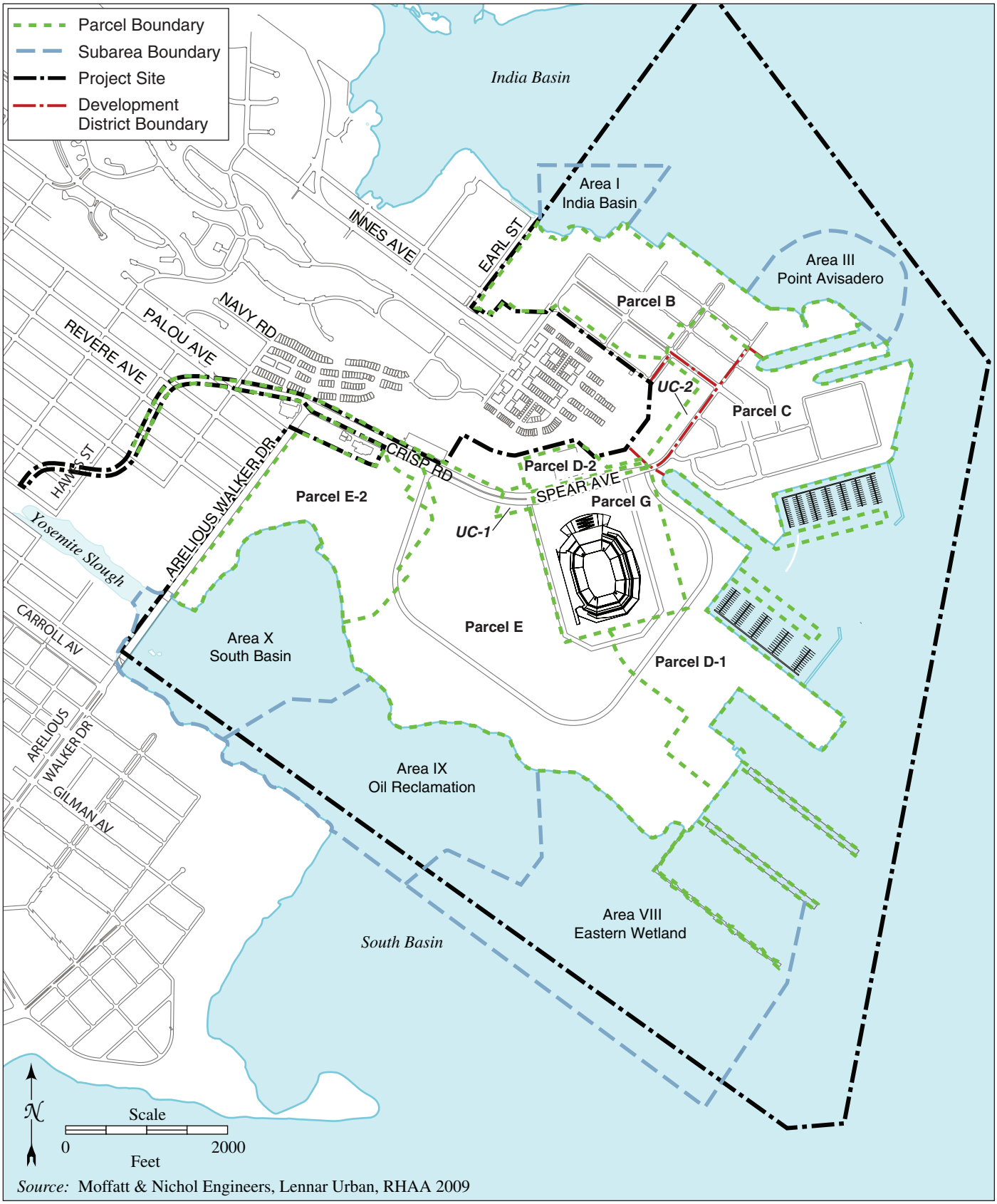
HPS Parcel G: Historic Uses

Parcel G is located within the central portion of the former 98-ac (40-ha) Parcel D. It was formerly part of the industrial support area and was used for shipping, ship repair, and office and commercial activities. In addition, a small area perpendicular to H Street has been added to Parcel G so that the boundary is now straight along H Street. Parcel G consists of flat lowlands that were constructed by placing borrowed fill material from various sources, including crushed serpentinite bedrock from the adjacent highland and dredged sediments. The serpentinite bedrock and serpentine bedrock-derived fill material consist of minerals that naturally contain asbestos and relatively high concentrations of arsenic, manganese, nickel, and other metals. Nearly all of Parcel G is covered with buildings or pavement. A series of storm drains and sanitary sewer lines beneath the parcel have been recently removed (DoN 2009d).

HPS Parcel G: Results of Environmental Investigations

Potential contamination at Parcel G is associated with metals and PAHs in soil, metals and VOCs in groundwater, and radiologically impacted structures and soil. Assessment of contamination and risk for Parcel G is based on the Final Revised FS Report for Parcel D, (30 November 2007) including the revised HHRA, and the radiological addendum to the FS Report. The FS Report and radiological addendum (11 April 2008) summarize the most recent information available on former Parcel D and provide the basis for the RODs for Parcel G and the other three parcels (DoN 2009d).

Although a number of removal actions have been completed within Parcel G, chemical contamination remains. Based on recent studies and investigations, the sources and extent of the remaining contamination in soil and groundwater have been well characterized. Industrial activities resulted in elevated concentrations of PAHs and lead in soil. Elevated concentrations of metals other than lead, such



Source: Moffatt & Nichol Engineers, Lennar Urban, RHAA 2009

Figure 3.7.4-2. Parcel F Investigation Subareas

as arsenic and manganese, may be related to the bedrock fill quarried to build the shipyard in the 1940s. The fill may have contained elevated concentrations of select metals from the bedrock. Therefore, the DoN worked with the regulatory agencies to identify remedial alternatives that address metals in soil, regardless of their source (DoN 2009d).

The DoN also identified IR Site-09 within Parcel G as the source of the elevated concentrations of chromium VI and possibly nickel in groundwater. Recent findings from a treatability study and ongoing groundwater monitoring suggest that there has been a reduction in the contaminant plume extent since 2004 (DoN 2009d).

The DoN identified radiologically impacted sites, including buildings, equipment, and infrastructure at Parcel D (including areas within Parcel G) associated with the former use of general radioactive materials and decontamination of ships used during atomic weapons testing in the South Pacific. Radiologically impacted buildings (351, 351A, 364, 365, 366/351B, 401, 408, and 411), former building sites (317), and storm drains and sanitary sewers are all of concern in Parcel G. In addition, a focused area in Building 439 was found to require remediation during the radiological investigation. The DoN decided to conduct a TCRA to address potential radioactive contamination in buildings, former building sites, storm drains, and sanitary sewers at Parcel G. The TCRA involves 1) surveying radiologically impacted structures and former building sites; 2) decontaminating (and demolishing if necessary) buildings and former building sites; 3) excavating radiologically impacted storm drain and sanitary sewer lines; and 4) screening, separating, and disposing of radioactively contaminated excavated materials at an off-site, low-level radioactive waste facility (DoN 2009d).

Activities for the TCRA at Parcel G began in 2006. The DoN excavated material and disposed of low-level radioactive waste offsite. As part of the TCRA, the DoN removed portions of storm drain and sanitary sewer lines for radiological contamination in Parcel G. Removal actions and backfill has been completed for approximately 80 percent of the storm drain and sanitary sewer trench units. Ongoing TCRA activities will continue post ROD until release criteria have been met. Upon completion of the storm drain and sanitary sewer trench TCRA, Survey Unit Package Reports will be completed and distributed to the BCT and CDPH for all trench units (DoN 2009d).

As of January 2009, 90 percent of the radiological surveys, remediation, and draft preparation of the final status surveys are complete for Parcel G Buildings, including Buildings 351, 351A, 366, 401, 408, 411, and 439. Following building surveys, Buildings 364, 365, and 408 were demolished, and their building footprints have been surveyed and remediated. Construction debris from Buildings 364, 365, and 408 have been radiologically and chemically screened and transported to the appropriate disposal facility. TCRA activities continue in the localized area surrounding former Building Sites 364, 365, and 317 (DoN 2009d).

Additional information on the results of previous environmental investigations conducted by the DoN at Parcel G can be found in the *Final Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California, February 18, 2009* (DoN 2009d).

HPS Parcel G: Cleanup Status

Numerous physical cleanup activities have been implemented at Parcel G, including: removal of USTs; excavation of soils, asphalt, and concrete; storm drain sediment removal; removal of equipment and cleanup of buildings, steam lines, fuel lines and impacted spoils; and removal of the Parcel G storm drain and sanitary sewer lines (DoN 2009d). A chronology of the CERCLA actions completed at Parcel G is presented in Table 3.7.4-7.

Table 3.7.4-7 CERCLA Chronology for Parcel G	
Process Step	***Year Completed***
Preliminary Assessment (PA)	1990
Site Inspection (SI)	1994
Remedial Investigation (RI)	1988-1997
Feasibility Study (FS)	1996-1997
Proposed Plan (PP)/ Record of Decision (ROD)	1997
Revised FS	2007
PP	2008
Record of Decision (ROD)	2009
Source: DoN 2009d.	

The DoN published a Final ROD for Parcel G in 2009 *(Final Record of Decision for Parcel G, Hunters Point Shipyard, San Francisco, California, February 18, 2009*), which included the selected remedies described below.

The Selected Remedy for soil consists of removing soil in selected areas where COCs exceed remediation goals and disposing of excavated soil at an offsite facility. Two areas are planned for excavation within Parcel G. Across all of Parcel G, durable covers will be applied as physical barriers to cut off potential exposure to metals in soil. Existing asphalt and concrete surfaces (repaired as necessary to be durable) and buildings will act as covers. The type of new covers installed will be consistent with the redevelopment plan (for example, soil covers may be used for open space areas or asphalt for industrial areas). The cover design will be provided in the RD and will include plans for inspection and maintenance. Future landowners will need approval from the regulatory agencies to modify the soil covers.

The Selected Remedy for groundwater consists of actively treating VOCs in groundwater using an injected biological substrate or ZVI to destroy the VOCs in the groundwater plumes at IR Sites -09, -33, and -71. The treatment will also minimize migration of metals in the groundwater plumes at IR-09 and IR-33 within Parcel G and reduce the risk of discharge of these metals into the bay at levels exceeding remediation goals. Groundwater monitoring will occur in and around the remediation areas and also in down gradient locations, as necessary. The locations of monitoring points and the monitoring frequency will be determined in the RD.

The Selected Remedy for radiologically impacted soil and structures consists of surveying radiologically impacted buildings and former building sites with documented radiological impacts for unrestricted release. Unrestricted release means that a property can be used for any residential or commercial purpose once regulatory requirements have been met. Decontamination will be performed and buildings will be dismantled if necessary. Remaining radiologically impacted storm drains and sanitary sewer lines throughout Parcel G will be removed and disposed of offsite.

In 2009, the DoN completed the removal of radiologically impacted storm and sanitary sewer piping within Parcel G. Active remediation efforts continue in less than 30 percent of the trench segments in Parcel G. Radiological surveys, remediation, and final status surveys have been completed in all Parcel G buildings. Furthermore, Buildings 364, 365, and 408 were demolished. Remediation efforts continue for soil areas outside the former sites for Buildings 364, 365, and 317.

HPS Parcel G: Institutional Controls

ICs will be implemented to prevent exposure to areas where potential unacceptable risk is posed by COCs in soil and groundwater. ICs are legal and administrative mechanisms used to implement land use

restrictions to limit the exposure of future landowner(s) or user(s) of the property to hazardous substances present on the property and to ensure the integrity of the remedial action. ICs are required on a property where the selected remedial cleanup levels result in contamination remaining at the property above levels that allow for unlimited use and unrestricted exposure. ICs will be maintained until the concentrations of hazardous substances in soil and groundwater are at such levels to allow for unrestricted use and exposure. Implementation of ICs includes requirements for monitoring and inspections and reporting to ensure compliance with land use or activity restrictions.

The DoN determined that it will rely on proprietary controls in the form of environmental restrictive covenants as provided in the DoN/DTSC MOA and attached covenant models (DoN and DTSC 2000). Specifically, land use and activity restrictions will be incorporated into two separate legal instruments as provided in the DoN/DTSC MOA:

1. Restrictive covenants included in one or more Quitclaim Deeds from the DoN to the property recipient.
2. Restrictive covenants included in one or more "Covenant to Restrict Use of Property" entered into by the DoN and DTSC as provided in the DoN/DTSC MOA and consistent with the substantive provisions of 22 CCR 67391.1.

The "Covenant(s) to Restrict Use of Property" will incorporate the land use restrictions into environmental restrictive covenants that run with the land and that are enforceable by DTSC against future transferees. The Quitclaim Deed(s) will include the identical land use and activity restrictions in environmental restrictive covenants that run with the land and that will be enforceable by the DoN against future transferees.

The activity restrictions in the "Covenant(s) to Restrict Use of Property" and Deed(s) shall be addressed in the Parcel G RMP that may be prepared by the City and County of San Francisco and approved by the DoN and FFA Signatories and/or the LUC RD report that would be reviewed and approved by the FFA Signatories. The Parcel G RMP and/or LUC RD shall be referenced in the applicable Covenant to Restrict Use of Property and Deed. The RMP and/or LUC RD shall specify soil and groundwater management procedures for compliance with the remedy selected in the Parcel G ROD. The Parcel G RMP and/or LUC RD shall identify the roles of local, state, and federal government in administering the Parcel G RMP and/or LUC RD and shall include, but not be limited to, procedures for any necessary sampling and analysis requirements, worker health and safety requirements, and any necessary site-specific construction and/or use approvals that may be required.

Land use restrictions will be applied to specified portions of the property and described in FOST, FOSET, "Covenant(s) to Restrict Use of Property" between the DoN and DTSC, and any Quitclaim Deed(s) conveying real property containing Parcel G at HPS.

Access - The Deed and Covenant shall provide that the DoN and FFA Signatories and their authorized agents, employees, contractors, and subcontractors shall have the right to enter upon HPS Parcel G to conduct investigations, tests, or surveys; inspect field activities; or construct, operate, and maintain any response or remedial action as required or necessary under the cleanup program, including but not limited to monitoring wells, pumping wells, treatment facilities, and cap/containment systems.

Implementation - The DoN shall address and describe institutional control implementation and maintenance actions including periodic inspections and reporting requirements in the preliminary and final RD reports to be developed and submitted to the FFA Signatories for review pursuant to the FFA (see "Navy Principles and Procedures for Specifying, Monitoring and Enforcement of Land Use Controls and Other Post-ROD Actions" attached to 16 January 2004 Department of Defense memorandum titled

"Comprehensive Environmental Response, Compensation and Liability Act [CERCLA] Record of Decision [ROD] and Post-ROD Policy").

The DoN is responsible for implementing, maintaining, reporting on, and enforcing land use controls. Although the DoN may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the DoN shall retain ultimate responsibility for remedy integrity.

Activity Restrictions that Apply throughout Parcel G - The following sections describe the IC objectives to be achieved through activity restrictions throughout Parcel G in order to ensure that any necessary measures to protect human health and the environment and the integrity of the remedy have been undertaken.

Restricted Activities - The following restricted activities throughout HPS Parcel G must be conducted in accordance with the "Covenant(s) to Restrict Use of Property", Quitclaim Deed(s), the Parcel G RMP, the LUC RD report, and if required, any other work plan or document approved in accordance with these referenced documents and must be further reviewed and approved by the FFA Signatories:

a) "Land disturbing activity" which includes but is not limited to: 1) excavation of soil, 2) construction of roads, utilities, facilities, structures, and appurtenances of any kind, 3) demolition or removal of "hardscape" (for example, concrete roadways, parking lots, foundations, and sidewalks), 4) any activity that involves movement of soil to the surface from below the surface of the land, and 5) any other activity that causes or facilitates the movement of known contaminated groundwater.

b) Alteration, disturbance, or removal of any component of a response or cleanup action (including but not limited to pump-and-treat facilities, shoreline protection, and soil cap/containment systems); groundwater extraction, injection, and monitoring wells and associated piping and equipment; or associated utilities.

c) Extraction of groundwater and installation of new groundwater wells.

d) Removal of or damage to security features (for example, locks on monitoring wells, survey monuments, fencing, signs, or monitoring equipment and associated pipelines and appurtenances).

Prohibited Activities - The following activities are prohibited throughout HPS Parcel G:

a) Growing vegetables or fruits in native soil for human consumption.

b) Use of groundwater.

Proposed Activity Restrictions Relating to VOC Vapors at Specific Locations within Parcel G - Any proposed construction of enclosed structures must be approved in accordance with the "Covenant(s) to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and the RMP with approval of the FFA Signatories prior to the conduct of such activity within the ARIC for VOC vapors to ensure that the risks of potential exposures to VOC vapors are reduced to acceptable levels that are adequately protective of human health. Initially, the ARIC will include all of Parcel G. This can be achieved through engineering controls or other design alternatives that meet the specifications set forth in the ROD, remedial design reports, LUC RD report, and the RMP. The ARIC for VOC vapors may be modified by the FFA Signatories as the soil contamination areas and groundwater contaminant plumes that are producing unacceptable vapor inhalation risks are reduced over time to a lifetime excess cancer risk of less than 1 in 10,000.

Additional Land Use Restrictions for Areas Designated for Open Space, Educational/Cultural, and Industrial Reuse - The following restricted land uses for property areas designated for open space,

educational/cultural, and industrial land uses in the San Francisco Redevelopment Agency's reuse plan must be reviewed and approved by the FFA Signatories in accordance with the "Covenants to Restrict Use of the Property," Quitclaim Deed(s), LUC RD, and the RMP for each parcel prior to use of the property for any of the following restricted uses:

a) A residence, including any mobile home or factory built housing, constructed or installed for use as residential human habitation.

b) A hospital for humans.

c) A school for persons under 21 years of age.

d) A daycare facility for children.

3.7.4.4 Basewide Environmental Investigations at HPS

3.7.4.4.1 Basewide Historical Radiological Assessment

HPS has been the subject of many radiological investigations, with particular focus on ionizing radiation. In 2000, the DoN began preparing a basewide assessment of the *potential* for radiological contamination in the buildings and environmental media. The preparation of the Historical Radiological Assessment 1939-2003 (HRA) was an extended process that involved review of thousands of records from 14 federal and private records repositories, electronic mail, and telephone contact with 200 persons with potential knowledge of radiological operations at HPS.

The primary purpose of the HRA was to designate sites as "impacted" or "non-impacted." As identified in the HRA, an impacted site is one that has the potential for radioactive contamination based on historical information, or is known to contain or have contained radioactive contamination. Designation as "impacted" does not confirm that radioactive contamination is present, only that the possibility exists and needs to be investigated. Non-impacted sites are those with no history of radiological operations or those that have no reasonable potential for residual contamination, such as residential or administrative buildings.

Of the 882 HPS historical and current sites and support areas identified in the HRA, 91 were identified as "impacted." These impacted sites include the following: buildings, drydocks, former building sites, outdoor areas, IR sites, ship berths, the Gun Mole Pier (Re-Gunning Pier), and septic, sanitary, and storm drain systems. Of the 91 sites, 29 were recommended for review in the Final Status Survey; these sites can be recommended for free release only when the DoN and appropriate regulatory agencies have reviewed the Final Status Survey report and agreed with the assessment. Sixty impacted sites were recommended for further investigative actions or remediation. The HRA identified the following potentially contaminated media: surface soils, subsurface soil and media, and structures and drainage systems. The assessment concluded, however, that there was no concern for airborne contamination from the potentially contaminated media in their undisturbed state, and no defined impacted site was recommended for emergency action. Eleven impacted sites require restricted access until the completion of remedial activities as a result of the presence of known levels of undisturbed radioactive contamination.

The overall conclusion of the HRA was that, although low levels of radioactive contamination exist in certain areas of HPS, no imminent threat or substantial risk exists to tenants, the environment of HPS, or the local community (DoN 2004). This conclusion has been reinforced by a subsequent FOSL (MACTEC 2008a) issued by the DoN for areas in Parcel B and Building 606 in Parcel D and approved by the regulatory agencies authorizing leases for various uses involving hundreds of employees, artists, and visitors in close proximity to various "impacted" sites each day. A basewide radiological work plan was subsequently prepared, describing survey and decontamination approaches to be implemented in support of radiological release of buildings and

areas (Tetra Tech 2007). Sites posing a potential risk from radiological contamination are currently being investigated and remediated under the DoN's CERCLA and DERP authority.

3.7.4.5 Project Site Vicinity Current Conditions

This section describes hazards and hazardous materials conditions in the vicinity of the project site, including naturally occurring asbestos, conditions at offsite locations, hazardous materials use on the project site, and proximity to schools.

3.7.4.5.1 Basewide Investigations for Specific Contaminants at HPS

In addition to the radiological investigations and cleanups, other DoN efforts include basewide investigation and remediation for PCBs, asbestos-containing building materials, USTs, and ASTs. Transformers containing PCBs have been removed, but investigation of soils for PCB contamination has been addressed separately for each parcel. The DoN has conducted building surveys for asbestos and has removed some hazardous asbestos-containing building materials in all parcels except the Parcel F submerged lands where there are no buildings. The DoN investigated USTs and removed or closed them in place in two phases in the 1990s. Most of the USTs contained petroleum products, waste oils, or solvents. The DoN also removed numerous ASTs. Most of the ASTs contained petroleum products or water, except for two that contained solvents. For both USTs and ASTs, associated contaminated soils have been removed and disposed of offsite (SFRA 2000, 2000 FEIR). As part of the implementation of the remedies set forth in each Parcel's ROD and petroleum Corrective Action Plan, all releases associated with ASTs or USTs will be addressed and determined by the FFA Signatories to be safe for the intended use.

Hazardous Building Materials: Current Conditions

Hazardous building materials include asbestos-containing materials, electrical equipment such as transformers and fluorescent light ballasts that may contain PCBs, fluorescent lights and switches containing mercury, and lead-based paints. Until the 1970s, asbestos was commonly used in building materials, including insulation materials, shingles and siding, roofing felt, floor tiles, brake linings, and acoustical ceiling material. Asbestos is a carcinogen and known to present a public health hazard if it is present in friable (easily crumbled) form. PCBs were commonly manufactured and used in the United States between 1929 and 1977 for use in devices such as electrical transformers and capacitors and fluorescent light ballasts. Spent fluorescent light tubes commonly contain mercury vapors at levels high enough to be considered a hazardous waste under California law; depending on the levels of mercury present, the light tubes may also be classified as hazardous under federal law. Lead-based paint was commonly used prior to 1960 and is likely present in buildings constructed prior to 1960. The DoD assumes that any military building constructed or rehabilitated prior to 1978 contains lead-based paint. Lead is toxic to humans, particularly young children, and can cause a range of human health effects depending on the level of exposure.

The investigation of some hazardous materials in buildings and structures in HPS has been completed by the DoN for parcels within the site. As described previously, damaged or friable asbestos and PCBs have been removed.

3.7.4.5.2 Naturally Occurring Asbestos

Asbestos is a naturally occurring mineral found in serpentinite rocks. As shown in Figure 3.8.3-1 of Section 3.8, Geology and Soils, there is an area of serpentinite mapped in the northern part of HPS, which extends north into the India Basin area. Serpentinite may also underlie proposed roadway segment locations in these areas. Previously disturbed serpentinite fragments have also been identified in fill material at HPS.

3.7.4.5.3 Offsite Hazardous Materials Release Sites

One site northeast of HPS is listed on DTSC's (EnviroStor) cleanup site database and has been the subject of ongoing investigation for contaminated groundwater. The Bayview Plume Study Area is bounded on the west by Keith St, on the north by Quesada Ave, on the east by Griffith St, and on the south by Shafter Ave. Groundwater is affected with a dry-cleaning solvent (polychlorinated ethylene), but results of remedial investigations show that the direction of groundwater flow is towards the northwest, away from the project site (DTSC 2009b; SWRCB 2009a).

3.7.4.5.4 Conditions at Offsite Improvement Locations

The Site History/Initial Site Assessment technical report prepared for the Bayview Transportation Improvements project (currently under environmental review) reviewed environmental conditions at most of the locations where the offsite improvements (e.g., roadways) may involve disturbance of soil or the existing asphalt cover (BASELINE Environmental 2009). At Griffith St, Ingalls St, and Carroll Ave, the historic and current land uses indicate the potential for hazardous substances to have been released at some locations, indicating the potential presence of hazardous materials in soil and groundwater in these areas. The proposed segment along Palou Ave was not included in the Site History/Initial Site Assessment technical report prepared for the Bayview Transportation Improvements project (currently under environmental review), however, so conditions there are not known.

Previous investigations that identified historic uses, USTs, and sampling results, along with a review of agency databases, show that many of the locations identified in the above-referenced Site History/Initial Site Assessment report have received regulatory closure (DTSC 2009b; SWRCB 2009a). However, some sites may still require investigation or remediation, and there may be new sites that have not been comprehensively evaluated for the presence of hazardous materials contamination in soil at the specific locations where soil disturbance could occur.

3.7.4.5.5 Hazardous Materials Use and Hazardous Waste

Section 3.4, Land Use and Recreation, describes the current land uses within the project site. There are no industrial, manufacturing/processing, or similar large-scale businesses that routinely use, store, or transport substantial quantities of hazardous materials in the project site.

Several former DoN buildings within HPS are leased to artists and woodworking and picture framing businesses. Some art materials and items used in woodworking contain hazardous materials, but the quantities onsite are minimal. As a condition of their leasing agreements, tenants are responsible for the management and appropriate disposal of their hazardous materials and wastes. Tenants are required to comply with all applicable laws and regulations pertaining to the use, transport, storage, and disposal of these materials.

According to information compiled for the Candlestick Point-Hunters Point Shipyard Phase II Development Plan Comments and Responses Final Environmental Impact Report (FEIR) (SFRA 2010) and a review of agency databases in 2009, there is one business with a reported address within the project site that generates hazardous waste and that is regulated by the USEPA. It is a "small quantity generator" as defined by the USEPA, meaning it generates from approximately 220 to 2,200 pounds of hazardous waste per month, and is required to report hazardous waste quantities in accordance with RCRA requirements.

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3.8 Geology and Soils

3.8.1 Background

This section describes the geologic and seismic setting of the project site, including regional geology, local geology, soils, and groundwater, as well as the regulatory framework relevant to the proposed action. A preliminary geotechnical assessment of the project site has been completed by ENGEO, Inc., as included in Appendix L of the CP-HPS DEIR (SFRA 2009). The preliminary geotechnical report provides a summary and compilation of available geotechnical information, which was used as part of the analysis of geologic, seismic, and geotechnical issues for this SEIS. The geotechnical report is based on previous site-specific geotechnical and hazardous material investigations, some of which include subsurface borings, and review of published geologic reports and maps. This preliminary geotechnical assessment describes and evaluates geologic and geotechnical conditions at the project site to support preliminary planning and conceptual-level design during initial phases of project planning. Design-level geotechnical studies would be completed on a parcel-by-parcel basis, during development of construction plans. Once infrastructure development is complete, foundation recommendations, which may or may not involve further exploration, would be required for each parcel.

3.8.2 Regulatory Framework

Federal regulations have not been established with respect to geologic hazards since such hazards are generally unique to different regions of the country, as well as to different regions of each state. Therefore, protection of geologic resources and reduction of geologic hazards are governed by state and local jurisdictions. Seismic hazards are addressed by state and local requirements for identifying and avoiding faults and the effects of seismic ground shaking when considering new development. The following acts, codes, and local plans are relevant to geologic and seismic issues at the project site.

3.8.2.1 State

3.8.2.1.1 Alquist-Priolo Earthquake Fault Zoning Act

Surface rupture is the most easily avoided seismic hazard. The *Alquist-Priolo Earthquake Fault Zoning Act* was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. In accordance with this act, the State Geologist of California established regulatory zones, called "earthquake fault zones," around the surface traces of active faults and published maps showing these zones. Buildings for human occupancy are not permitted to be constructed across the surface trace of active faults. Each earthquake fault zone extends approximately 200 to 500 ft (60 to 150 m) on either side of the mapped fault trace, because many active faults are complex and consist of more than one branch. There is the potential for ground surface rupture along any of the branches. The project site is not located within an Alquist-Priolo Earthquake Fault Zone; therefore, the proposed action would not be subject to this act.

3.8.2.1.2 Seismic Hazard Mapping Act

The state regulations protecting the public from geo-seismic hazards, other than surface faulting, are contained in California *Public Resources Code* Division 2, Chapter 7.8 (the *Seismic Hazards Mapping Act*), described here, and the 2007 24 CCR Part 2 (the *California Building Code* [CBC]), described below. Both of these regulations apply to public buildings, as well as a large percentage of private buildings, intended for human occupancy.

The *Seismic Hazard Mapping Act* was passed in 1990 following the Loma Prieta earthquake, to reduce threats to public health and safety and to minimize property damage caused by earthquakes. This act directs the California Geological Survey (CGS) to identify and map areas prone to the earthquake hazards of liquefaction, earthquake-induced landslides, and amplified ground shaking. The *Seismic Hazard Mapping Act* requires site-specific geotechnical investigations to identify potential seismic hazards and formulate corrective measures prior to permitting most developments designed for human occupancy, within the Zones of Required Investigation.

Seismic hazard mapping is being performed in the Bay Area. Twenty-seven official maps for the Bay Area have been released, with preparation of additional maps for San Mateo, Santa Clara, Alameda, and Contra Costa counties planned or in progress. The project site is located on the Seismic Hazard Map for the City and County of San Francisco (Hunters Point Quadrangle), published in November 2001, and shows approximately 90 percent of the project site to be in a Zone of Required Investigation for liquefaction potential. Although past earthquakes have caused ground failures in only a small percentage of the total area in mapped hazard zones, a worst-case scenario of a major earthquake has not occurred in northern California since 1906 (CGS 2008).

Section 2697 of the *Seismic Hazards Mapping Act* mandates that, prior to the approval of a project in a seismic hazard zone, the city must require the preparation of a geotechnical report, defining and delineating any seismic hazard. CGS has published Special Publication 117A, *Guidelines for Evaluating and Mitigating Seismic Hazards in California*, to assist the engineering geologist and/or civil engineer who must investigate the site and recommend mitigation of identified earthquake-related hazards and to promote uniform and effective statewide implementation of the evaluation and mitigation elements of the *Seismic Hazards Mapping Act*. Under the act, the San Francisco Department of Building Inspection (DBI), the local permitting authority, must regulate certain development projects within the mapped hazard zones. For projects in a hazard zone, DBI requires that the geologic and soil conditions of the project site are investigated and appropriate mitigation measures, if any, incorporated into development plans.

Based on Public Resources Code, Section 2693(c), "mitigation" is defined as those measures that are consistent with established practice and reduce seismic risk to acceptable levels. Based on 14 CCR 3721(a), "acceptable level" of risk is defined as that level that provides reasonable protection of public safety, although it does not necessarily ensure continued structural integrity and functionality of a building. Based on the above definitions of mitigation and acceptable risk, the *Seismic Hazards Mapping Act* and related regulations establish a statewide minimum public safety standard for mitigation of earthquake hazards. That standard is the minimum level of mitigation for a project that would reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy, but in most cases, not to a level at which no ground failure would occur.

The *Seismic Hazards Mapping Act* and associated regulations state that the site-investigation reports must be reviewed by a Certified Engineering Geologist or Registered Civil Engineer with competence in the field of seismic hazard evaluation and mitigation. As required by the mitigation measures herein, DBI would employ a third-party engineering geologist and/or civil engineer to form a Geotechnical Peer Review Committee (GPRC), which would complete the technical review. After a site-investigation report was approved, subsequent site investigation reports would not be required, provided that new geologic information warranting further investigation was not recorded. The *San Francisco Building Code* requires that the recommendations of the report be incorporated in the building design.

The city is required to submit one copy of the approved site investigation report to the State Geologist of California within 30 days of approval. If the city approves a project that is not in accordance with the policies and criteria of the *Seismic Hazards Mapping Act*, the city is required to explain in writing the

reasons for the differences to the State Geologist of California, within 30 days of approval of the project. The site-specific geotechnical investigation may refine the state's area-wide interpretations. If the new documentation supports the site-specific interpretation, the State Geologist of California would file the report as an amendment to the seismic hazard evaluation for the appropriate U.S. Geological Survey (USGS) topographic quadrangle map.

3.8.2.1.3 Caltrans Bridge Design Specifications

State guidelines protecting bridges and overpasses on state roads from geologic and seismic hazards are contained in Caltrans *Bridge Design Specifications*, *Bridge Memo to Designers*, *Bridge Design Practice Manual*, and *Bridge Design Aids Manual* (Caltrans, Division of Engineering Services 2009a, 2009b, 2009c, 2009d, respectively). The manuals provide state-of-the-art information to address geo-seismic issues that affect the design of transportation infrastructure in California. Bridge design is required to be based on the "Load Factor Design methodology with HS20-44 live loading, a procedure to incorporate the estimated weight of the vehicles and/or pedestrians on the bridge with the weight of the bridge for loading calculations," in the *Bridge Design Specifications*. Seismic-resistant design is required to conform to the *Bridge Design Specifications* and Section 20 of *Bridge Memo to Designers*, as well as Caltrans *Seismic Design Criteria* (Caltrans, Division of Engineering Services 2009e).

Section 20 of *Bridge Memo to Designers* outlines the category and classification, seismic performance criteria, seismic design philosophy and approach, seismic demands and capacities on structural components, and seismic design practices that collectively make up the Caltrans seismic design methodology. The methodology applies to all bridges and highways designed in California. The category and classification of a bridge determines its seismic performance level and which methods would be used to estimate the seismic demands and structural capacities. The performance criteria include functional and safety evaluations of ground motion, level of service to be attained following a major earthquake, and the level of damage the structure must be designed to withstand.

The Caltrans *Seismic Design Criteria* specify the minimum seismic design requirements that are necessary to meet the performance goals established in Section 20 of *Bridge Memo to Designers*. Each bridge presents a unique set of design challenges and the *Seismic Design Criteria* provide guidelines to determine the appropriate methods and level of refinement necessary to design and analyze each bridge on a case-by-case basis. The Caltrans Office of Structure Design provides the bridge designer with resources to establish the correct course of action. In addition, these offices provide Senior Seismic Specialists, an Earthquake Committee, and an Earthquake Engineering Office of Structure Design Services and Earthquake Engineering to peer-review proposed methods and provide further recommendations.

3.8.2.1.4 California Building Code and the San Francisco Building Code

Until January 1, 2008, the *California Building Code* (CBC) was based on the then current *Uniform Building Code* and contained Additions, Amendments and Repeals specific to building conditions and structural requirements in California. The 2007 CBC, effective January 1, 2008, is based on the current (2006) *International Building Code* (IBC) (California Building Standards Commission 2008). Each jurisdiction in California may adopt its own building code, based on the 2007 CBC. Local codes are permitted to be more stringent than Title 24, but, at a minimum, are required to meet all state standards and enforce the regulations of the 2007 CBC, effective 1 January 2008.

3.8.2.2 Local

San Francisco adopted the 2007 CBC as the basis for its Building Code (*Municipal Code* Title 17, Chapter 17.04), through Ordinance No. 3789, on 3 December 2007. The full 2007 *San Francisco Building Code* (SFBC) consists of the 2006 IBC, as amended by the 2007 CBC, and as further modified by San Francisco amendments designed to be used in conjunction with the 2007 CBC. The SFBC amendments were adopted by the Board of Supervisors on November 6, 2007, through Ordinance 258-07, effective 1 January 2008.

Chapter 16 of the SFBC deals with structural design requirements governing seismically resistant construction (Section 1604), including (but not limited to) factors and coefficients used to establish seismic site class and seismic occupancy category for the soil/rock at the building location and the proposed building design (Sections 1613.5 and 1613.6). Chapter 18 of the SFBC includes (but is not limited to) the requirements for foundation and soil investigations (Section 1802); excavation, grading, and fill (Section 1803); allowable load-bearing values of soils (Section 1804); and the design of footings, foundations, and slope clearances (Section 1805), retaining walls (Section 1806), and pier, pile, driven, and cast-in-place foundation support systems (Section 1808, 1809 & 1810). Chapter 33 of the SFBC includes (but is not limited to) requirements for safeguards at work sites to ensure stable excavations and cut or fill slopes (Section 3304). Appendix J of the SFBC includes (but is not limited to) grading requirements for the design of excavations and fills (Sections J103 through J107) and for erosion control (Sections J109 & J110).

Compliance with the SFBC is mandatory for development in San Francisco. Throughout the permitting, design, and construction phases of a building project, Planning Department staff, DBI engineers, and DBI building inspectors confirm that the SFBC is being implemented by project architects, engineers, and contractors.

During the design phase for buildings at the project site, foundation support and structural specifications, based on the preliminary foundation investigations, would be prepared by the project engineer and architect and would be reviewed for compliance with the SFBC, by the Planning Department and DBI.

During the proposed action construction phase, DBI inspectors would be responsible for enforcing the provisions of the SFBC as implemented by the contractor.

3.8.2.2.1 San Francisco General Plan

The General Plan (San Francisco Planning Department 1996) provides long-term guidance and policies maintaining and improving the quality of life and the man-made and natural resources of the community. The Community Safety Element includes policies for the avoidance of geologic hazards and/or the protection of unique geologic features. The plan requires detailed site-specific geologic hazard assessments in areas delineated with geologic hazards (seismic hazards, landslides, and liquefaction). Filled land and geologic hazards, such as landslides and shoreline erosion, are addressed in the Environmental Protection Element of the General Plan. The Element includes policies for the promotion of the highest standards of soil engineering, the correction of landslide and shore erosion conditions, and the avoidance of construction on land subject to slide or erosion.

3.8.2.2.2 San Francisco Bay Plan

The BCDC is a federally designated state coastal management agency for the San Francisco Bay. Bay shoreline construction projects, such as filling or dredging in the bay, certain tributaries to the bay, salt ponds, and managed wetlands around the bay, or grading within 100 ft (30 m) of the bay shoreline,

require permit approval from the BCDC. This agency issues an Administrative Permit for minor repairs or improvements along the bay shoreline and a Major Permit for more extensive projects. The proposed action would involve the construction of a marina, a bridge across Yosemite Slough, and various shoreline improvements. Such activities would require a permit from BCDC.

In accordance with the *McAteer-Petris Act of 1965*, the BCDC is responsible for maintaining and carrying out the policies of the Bay Plan. This plan, adopted in 1969 and more recently amended in 2008, specifies goals, objectives, and policies for existing and proposed waterfront and other BCDC jurisdiction area land uses. Part III of the Bay Plan contains findings and policies pertinent to the development of the proposed action.

3.8.2.2.3 San Francisco Department of Public Works Standard Specifications

The San Francisco Department of Public Works, Bureau of Engineering (BOE) Standard Specifications for Streets and Highways, and for Structures (San Francisco Department of Public Works, BOE 2009a and 2009b) are based on the Caltrans design specifications and provide detailed information regarding materials and procedures for road and bridge construction in the city. The BOE provides design and inspection services for city streets, infrastructure, and structures. During the construction phase, BOE would be responsible for assuring that the proposed action would be consistent with applicable codes, standards, and principles, as implemented by the project contractor.

3.8.3 Existing Conditions

The project site is located in the southeastern area of San Francisco and extends east into San Francisco Bay (Figures 1.0-1 and 1.0-2). This promontory is bounded on the south and west by the BVHP neighborhood and on the north and east by San Francisco Bay. The ground surface across the entire project site is relatively flat to gently sloping, with elevations ranging from approximately 0 to +20 ft (0 to +6 m) (San Francisco City Datum [SFCD]).

3.8.3.1 Regional Geology

San Francisco Bay and the alluvial, colluvial, and estuarine deposits that underlie much of the project site and project vicinity occupy a structurally controlled basin in the Coast Ranges geologic province of California, which consists of northwest-trending ridges and valleys. Late Pleistocene and Holocene sediments (less than 1.6 million years old) were deposited in the basin as it subsided (Schlocker 1974). At the project site, these sediments comprise estuarine deposits of Old Bay Clay, undifferentiated sedimentary deposits, Young Bay Mud, and alluvial/colluvial deposits, all of which rest on a variety of bedrock types associated with the Franciscan Complex. The latter comprises much of the basement rock of the Coast Ranges and consists of an assemblage of deformed and metamorphosed rock units. The Franciscan Complex formed in association with continuous east-dipping subduction at the margin of the North American and Pacific plates (Wahrhaftig 1984). These two plates move relative to each other, with the San Andreas Fault Zone at the junction. The Pacific Plate, on the west side of the fault zone, is moving north relative to the North American Plate on the east.

3.8.3.1.1 Hunters Point Shear Zone

The Franciscan Complex north of Yosemite Slough is part of the Hunters Point shear zone, which traverses the project site (Figure 3.8.3-1). The Hunters Point shear zone consists of a shale matrix and serpentinite mélange that contains lenses of different lithologies (rock types). Regionally, the shear zone strikes northwestward and dips northeast at shallow to moderate angles (Wakabayashi 1992). The shear zone is thought to be part of a major structural zone marked by shallow bedrock that extends across the

southeastern section of the San Francisco Peninsula, and southeast into the bay. The shear zone probably is not active, based on lack of offset of overlying sediments recorded by detailed seismic reflection studies (Marlow 1994).

3.8.3.1.2 Local Geology

Five soil and geologic units underlie the project site. In general, basement units of the Franciscan Complex are covered by Quaternary sands, Bay Mud deposits, and artificial fill on the topographically low areas bordering San Francisco Bay (Appendix L of the CP-HPS DEIR [SFRA 2009]). Table 3.8.3-1 presents general descriptions of the geologic units, described from youngest to oldest, as illustrated on Figure 3.8.3-1.

Table 3.8.3-1. Summary of Geologic Conditions at Hunters Point Shipyard

Geologic Unit	*Map Symbol*	*Age*	*Lithology*
Artificial Fill	Qaf	Historic (0-200 years old)	Mixture of sand, gravel, and some clay. Abundant debris including wood, glass, and brick.
Slope Debris and Ravine Fill	Qsr	Holocene to Pleistocene (0-1.8 million years old)	Undifferentiated deposits of alluvium/colluvium consisting of clay to sandy clay, sandy silt, clayey to silty sand, clean sand, and silty gravel.
Bay Mud Deposits	Qm	Holocene to Pleistocene (0-1.8 million years old)	Highly compressible clay with minor layers of silt and clayey sand. Some shell fragments.
Undifferentiated Sedimentary Deposits	Qu	Holocene to Pleistocene (0-1.8 million years old)	Interbedded alluvial and marine deposits, light brown to yellowish brown, fine to medium grained, clean to clayey sand, and interbedded with stiff to very stiff, lean clay. Contains shell fragments. May contain some Colma Formation (Qc).
Franciscan Complex	KJs, KJc, KJg, sp	Cretaceous to Jurassic (65 to 165 million years old)	Mixed assemblage of distinct bedrock types, including serpentinite, shale, chert, sandstone, and greenstone.

Source: Appendix L of the CP-HPS DEIR (SFRA 2009).

Artificial Fill (Qaf). Based on geotechnical borings, the project site is predominantly blanketed with artificial fill, typically ranging in thickness from approximately 1 to 50 ft (0.3 to 15 m). These deposits are thickest over closed depressions and gullies in the upper surface of the Bay Mud deposits (refer to discussion below) and thinnest over ridges in the Bay Mud surface (PRC 1997). Historical shoreline maps show artificial fill has been extended as far as 3,500 ft (1,050 m) beyond the original shoreline in some areas (Figure 3.8.3-1). The fill lies on the Young Bay Mud, on competent alluvial/colluvial deposits, or on bedrock. In some instances, the weight of the fill created "mud waves" as the fill was placed on top of the soft Bay Mud surface. In this case, the process of fill placement pushed the soft Bay Mud beneath the fill out toward the bay. This created deeper sections of fill where the Bay Mud was displaced beneath it. The fill is primarily granular in nature, generally composed of excavated Franciscan Complex bedrock, with the majority comprising a heterogeneous matrix of sand and gravel, with varying amounts of clay and silt. The density of the fill is wide ranging, from loose to very dense granular materials and soft to stiff clays and silts. The artificial fill may include man-made debris such as wood, glass, brick, concrete blocks, and other industrial debris. In the vicinity of the southeast-facing shoreline of the project site, it appears that a portion of the fill was constructed by placing dredged sand over Bay Mud. This fill consists of poorly graded (uniform) loose sands and its properties are inherently different than the fill elsewhere on site (Appendix L of the CP-HPS DEIR [SFRA 2009]; GTC 2005; Bonilla 1998).

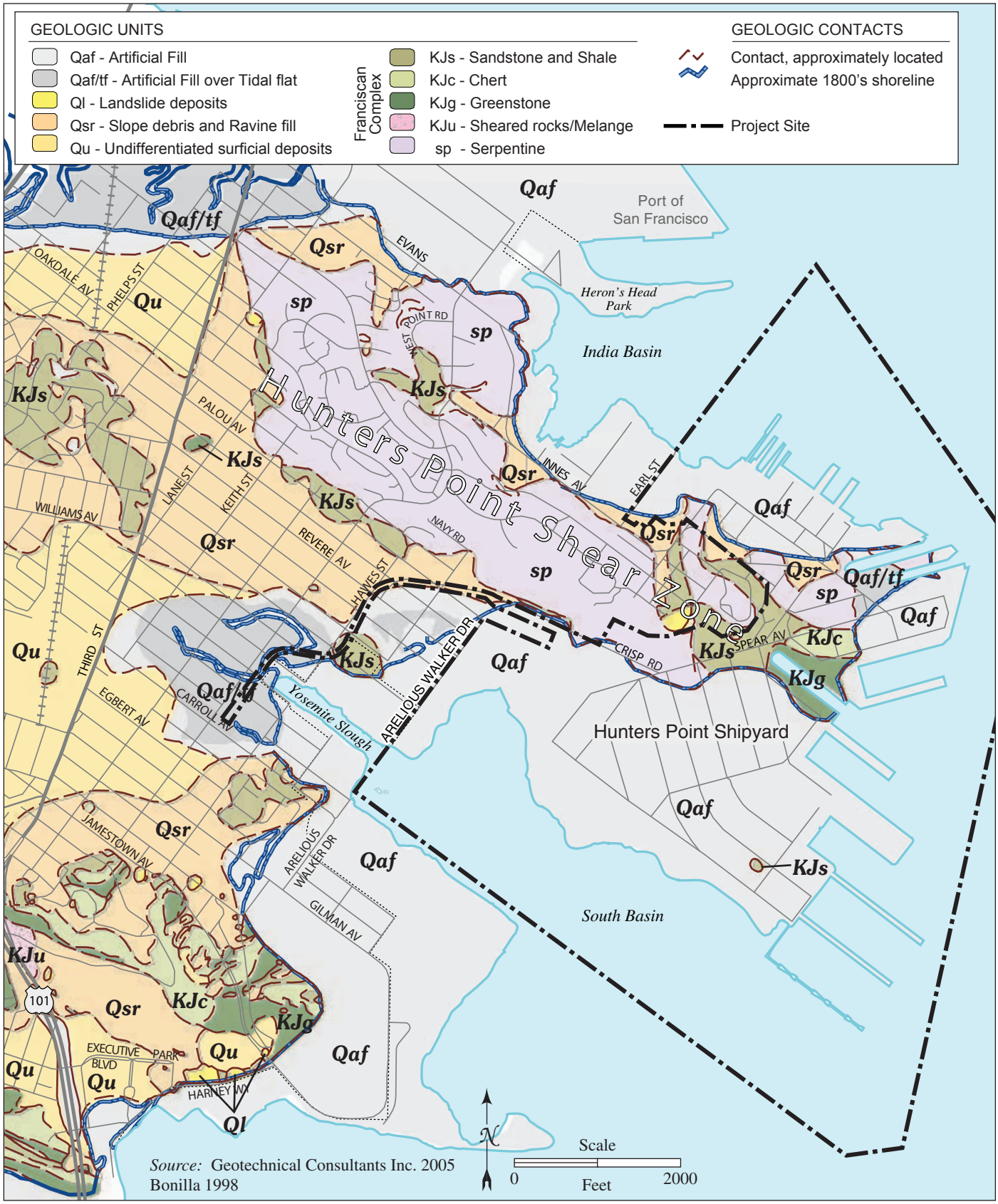


Figure 3.8.3-1. Geologic Map

Slope Debris and Ravine Fill (Qsr). At the project site, undifferentiated deposits of alluvium/colluvium occur primarily in areas immediately adjacent to bedrock exposures, at the base of slopes, and in accumulations in swales and gullies. These deposits are designated slope debris and ravine fill and consist primarily of clay to sandy clay, sandy silt, clayey to silty sand, clean sand, and silty gravel. These deposits include older colluvium that typically occurs between estuarine deposits and bedrock (CGKT, Consulting Engineers 1982; Bonilla 1998).

Bay Mud Deposits (Qm). Bay Mud is divided into younger and older deposits. Young Bay Mud underlies artificial fill in areas on which estuarine sediments were deposited and ranges in thickness from approximately 1 to 40 ft (0.3 to 12 m) (GTC 2005). The Young Bay Mud consists predominantly of high plasticity clay with minor layers of lean to sandy clay, silt to clayey silt, and clayey sand, with some peat interbeds and lenses (PRC 1997). These deposits are typically olive to dark greenish gray to blue gray, very soft to medium stiff, and contain abundant shell fragments (Bonilla 1998). The Young Bay Mud generally is normally consolidated and moderately to highly compressible. Where the Bay Mud has been further consolidated under the weight of fill, it has moderate shear strength. These deposits thin in an inland direction and thicken toward the bay (PRC 1997). In some areas, where mud waves formed during placement of fill, the Bay Mud may be thicker or thinner than the original deposit. Locally, the deeper units of older Bay Mud, known as Old Bay Clay, are overconsolidated and are composed of stiff to very stiff, silty to sandy clay, clayey silt, and clayey to silty sand.

Undifferentiated Sedimentary Deposits (Qu). These interbedded alluvial and marine deposits underlie younger Bay Mud deposits and overlie and interfinger with older Bay Mud deposits. Locally, these deposits directly overlie basement rock (GTC 2005). These undifferentiated sedimentary deposits are primarily light brown to yellowish brown, fine to medium grained, poorly graded, medium dense to very dense, clean sand to clayey sand, interbedded with stiff to very stiff, lean clay, and contain some shell fragments. Locally, these deposits may include sands of the Colma Formation (Qc) (PRC 1997).

Franciscan Complex (KJ). The Franciscan Complex is a mixed assemblage of lithologically distinct rock types that are interbedded and tectonically disturbed (Schlocker 1974). The predominant Franciscan Complex rock types beneath the project site are serpentinite, sandstone, chert, shale, and greenstone (Wahrhaftig 1984). With the exception of greenstone, each of these rock types outcrop at the project site (Bonilla 1998).

3.8.3.1.3 Soils

Soils at the project site are imported fill material, which was derived from weathered materials and underlying rock or other natural deposits (PRC 1997). Soil types on the project site were identified from soil survey data published by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS 2008). The soil types mapped at the project site are predominantly "Urban land, Orthents-cut and fill" and "Urban land, Orthents-reclaimed complex." These soils are interpreted to have a moderate corrosivity rating.

A soil erosion hazard rating determines how likely it is that a soil will erode. Ratings are based on geology, topography, soil depth, vegetative cover, soil texture, and a climatic stress factor, which is a function of mean annual precipitation. Because of the variable nature of the fill material, soil types at the project site are interpreted to have a slight to severe erosion-hazard rating.

3.8.3.1.4 Consolidation Settlement of Young Bay Mud

Consolidation settlement occurs when a fine-grained soil (silt or clay) is loaded with the weight of new fill or of improvements such as structures or roads. New loads cause increases in soil-pore water pressure. As the excess pore pressures dissipate, the soil volume decreases and water is expelled slowly. The rate of settlement depends on the permeability and thickness of the soil layers. Thick layers of clay

with low permeability can take years for pore pressures to dissipate fully. It appears that most, if not all, the Young Bay Mud underlying the project site is normally consolidated under the load of the existing fill and buildings. The deeper-lying Old Bay Clays are overconsolidated.

Compressible clays such as Young Bay Mud also exhibit secondary consolidation or compression as a function of the increased effective stress. The mechanism of secondary compression generally is thought to result from re-orientation of clay minerals under stress. Decomposition of organic content may be a factor in materials such as Young Bay Mud. Although settlement caused by secondary compression decreases over time, it will continue for an order of magnitude longer than primary consolidation.

3.8.3.1.5 Slope Stability

Slope failures include many phenomena that involve the downslope displacement of material, triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces, such as landslides, rock falls, debris slides, and soil creep. Slope stability can depend on a number of complex variables, including the geology, structure, and amount of groundwater present, as well as external processes, such as climate, topography, slope geometry, and human activity. Landslides and other slope failures may occur on slopes of 15 percent or less; however, the probability is greater on steeper slopes that exhibit old landslide features, such as scarps, slanted vegetation, and offset surfaces.

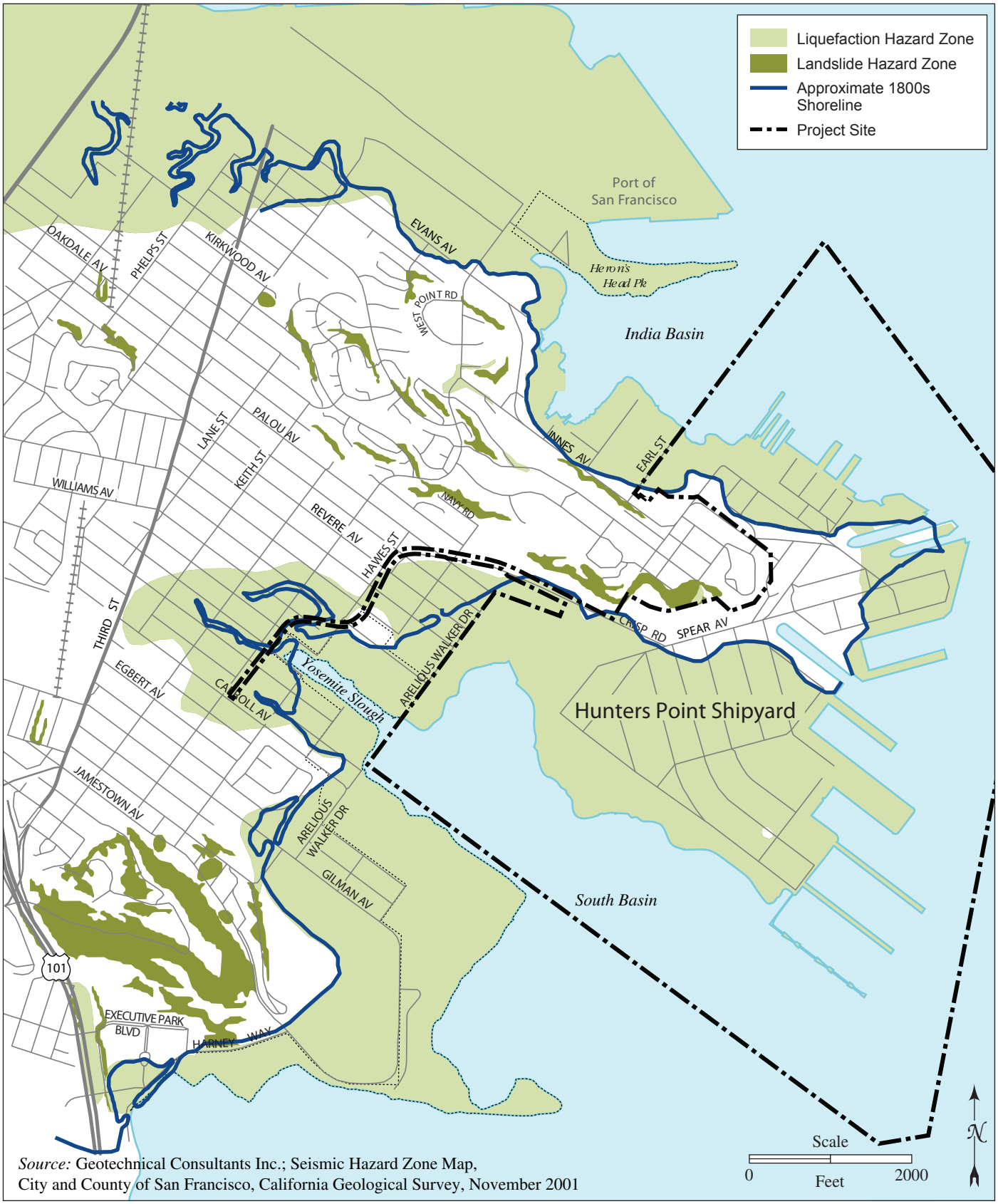
A few landslide hazards were originally present in a large serpentinite block of the Hunters Point Shear Zone, between Innes and Crisp roads, northwest of the project site (Figure 3.8.3-2) (CGS 2000). However, slopes adjacent to the project site have been rebuilt as subdrained, engineered slopes as part of on-going HPS Phase I development. Remaining potential landslide hazard areas are outside of project-site boundaries.

3.8.3.1.6 Groundwater Levels

Groundwater levels in the artificial fill and the underlying estuarine deposits generally are less than 15 ft (4.5 m) below the ground surface and experience varying degrees of tidal fluctuation. In the upland or hilly areas, immediately upslope of the project site, seasonally influenced groundwater occurs in artificial fill and alluvium/colluvium (slope/ravine deposits), at wide ranging depths below the ground surface (GTC 2005). Historically, depths to groundwater in the undifferentiated sedimentary deposits have been measured as shallow as 3 ft (0.9 m) in the lowland areas and as deep as 30 ft (9 m) below ground surface in the upland areas (PRC 1997).

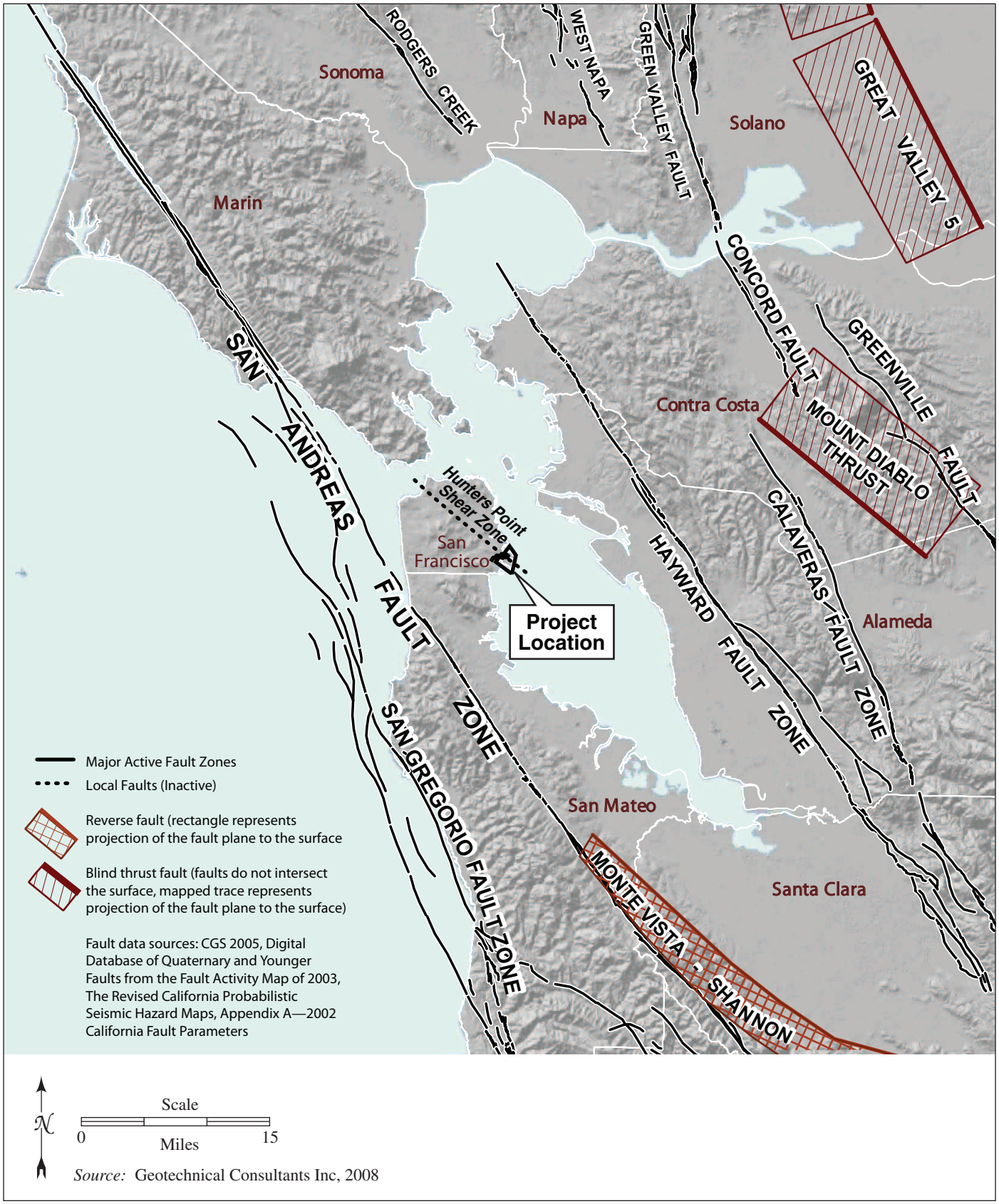
3.8.3.1.7 Faulting and Seismicity

Regional Seismicity. The Bay Area is located in a seismically active region near the boundary between two major tectonic plates, the Pacific Plate to the southwest and the North American Plate to the northeast. Since approximately 23 million years ago, about 200 miles (320 km) of right-lateral slip has occurred along the San Andreas Fault Zone to accommodate the relative movement between these two plates. The relative movement between the Pacific Plate and the North American Plate generally occurs across a 50 mile (80 km) zone, extending from the San Gregorio Fault in the southwest to the Great Valley Thrust Belt to the northeast. In addition to the right lateral slip movement between tectonic plates, a compressional component of relative movement has developed between the Pacific Plate and a smaller segment of the North American Plate, at the latitude of San Francisco Bay, during the last 3.5 million years (Fenton and Hitchcock 2001). Strain produced by the relative motions of these plates is relieved by right lateral strike slip faulting on the San Andreas and related faults, and by vertical reverse-slip displacement on the Great Valley and other thrust faults in the central California area (Figure 3.8.3-3). A reverse-slip fault is one with predominantly vertical movement in which the upper block moves upward in relation to the lower block.



Source: Geotechnical Consultants Inc.; Seismic Hazard Zone Map, City and County of San Francisco, California Geological Survey, November 2001

Figure 3.8.3-2. Seismic Hazard Map



Source: Geotechnical Consultants Inc, 2008

Figure 3.8.3-3. Regional Fault Map

The Bay Area and surrounding areas are characterized by numerous geologically young faults. Figure 3.8.3-3 illustrates the fault locations in relation to the project site. Faults can be classified as historically active, active, sufficiently active, or inactive, as defined below (CGS 2007).

- Historically Active: Faults that have generated earthquakes accompanied by surface rupture during historic time (approximately the last 200 years) and faults that exhibit seismic fault creep**;**
- Active: Faults that show geologic evidence of movement within Holocene time (approximately the last 11,000 years)**;**
- Sufficiently Active and Well Defined: Faults that show geologic evidence of movement during Holocene time, along one or more segments or branches, and if those traces may be identified by direct or indirect methods**;** and
- Inactive: Faults that show direct geologic evidence of inactivity or lack of offset, during all of Quaternary time (approximately the last 1.8 million years) or longer**.**

The California Geological Survey does not attempt to quantify the probability that an earthquake will occur on any specific fault, but this classification is based on the reasonable assumption that if a fault has moved during the last 11,000 years, it is likely to produce earthquakes in the future.

Table 3.8.3-2 lists fault data for major faults within 30 miles of the project site. The closest fault to the project site is the Peninsula branch of the San Andreas Fault, approximately 6.6 miles (10.6 km) to the west.

Table 3.8.3-2. Active Bay Area Faults

Fault Name (Branch)	*Distance from Site in miles (km)*	*Fault Length in Miles (km)*	*Maximum Earthquake Magnitude (M)*
San Andreas (Peninsula)	6.6 (10.7)	51 (85)	7.1
San Gregorio (North)	10.7 (17.2)	66 (110)	7.2
San Andreas (North Coast South)	10.8 (17.4)	114 (190)	7.4
Hayward (South)	12.0 (19.3)	32 (53)	6.7
Hayward (North)	12.4 (20.0)	21 (35)	6.4
Monte Vista—Shannon	21.3 (34.3)	27 (45)	6.7
Calaveras (North)	21.6 (34.7)	27 (45)	6.8
Rodgers Creek	25.2 (40.6)	37 (62)	7.0

Note: M = Moment Magnitude, which is directly related to average fault slip and rupture area.
Source: CGS 2003.

Ground Shaking. An earthquake is classified by the amount of energy released, which traditionally has been quantified using the Richter scale. Recently, seismologists have begun using a moment magnitude (M) scale because it provides a more accurate measurement of the size of major and great earthquakes. For earthquakes of less than M 7.0, the moment and Richter magnitude scales are nearly identical. For earthquake magnitudes greater than M 7.0, readings on the moment magnitude scale are slightly higher than a corresponding Richter magnitude.

The intensity of the seismic shaking, or strong ground motion, during an earthquake is dependent on the distance and direction between a particular area and the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions underlying and surrounding that area. Earthquakes occurring on faults closest to any given location typically generate the largest ground motions.

A review of historic earthquake activity from 1800 to 2005 indicates that 13 earthquakes of magnitude (M) 6.0 or greater have occurred in the vicinity of the project site during this time frame. The two most consequential were the earthquakes of 18 April 1906 and 17 October 1989. The 1906 earthquake caused building collapses and fires, approximately 3,000 deaths, and $524 million in damage, as far as 350 miles from the epicenter. The 1989 earthquake caused 63 deaths, more than 3,000 injuries, and an estimated $6 billion in property damage from San Francisco to Monterey and in the East Bay, including damage and destruction of buildings, roads, bridges, and freeways. There have been 25 earthquakes with magnitudes between M 5.5 and M 6.0 in this area during this time period, including numerous aftershocks of larger earthquakes (CGS 2009).

The intensity of earthquake-induced ground motions can be described using peak ground accelerations, represented as a fraction of the acceleration of gravity (g). The interactive California Geological Survey Probabilistic Seismic Hazard Assessment map provides data to estimate peak ground accelerations in California (CGS 2006). Taking into consideration the uncertainties regarding the size and location of earthquakes and the resulting ground motions that can affect a particular site, the map depicts peak ground accelerations with a 10 percent probability of being exceeded in 50 years, which equals an annual probability of 1 in 475 of being exceeded in any given year. This map illustrates that there is a 10 percent probability that ground accelerations of 0.6 g to 0.7 g will be exceeded at the project site during the next 50 years.

Fault Rupture. Faults are geologic zones of weakness. Surface rupture occurs when movement on a fault deep in the earth breaks through to the ground surface. Surface ruptures associated with the 1906 San Francisco earthquake extended for more than 260 miles (416 km), with displacements of up to 21 ft (6.3 m). Not all earthquakes result in surface rupture. The 1989 Loma Prieta earthquake caused major damage in the San Francisco Bay Area, but the fault trace does not appear to have broken at the ground surface.

Fault rupture almost always follows preexisting faults, which are zones of weakness. Rupture may occur suddenly during an earthquake or slowly in the form of fault creep. Sudden displacements are more damaging to structures because they are accompanied by shaking.

No known active faults cross the project site, making hazards from fault rupture unlikely. The Hunters Point Shear Zone, which crosses the project site, is considered inactive (refer Figure 3.8.3-1) (Bonilla 1998; CGS 2000).

Liquefaction. Liquefaction is a phenomenon in which saturated, granular, non-plastic sediments temporarily lose their shear strength during periods of strong ground shaking, such as that which occurs during earthquakes. Seismic waves traveling through soils can cause deformations that collapse the loose granular structure. This collapse of void space in turn can cause an increase in pore water pressure, reducing the effective stress between the grains. When the pore pressures reach a critical level at which the effective stress of the soil drops below the overburden stress, the previously solid granular soil loses the strength to support itself and may behave like a viscous fluid. Secondary effects associated with liquefaction include flow failures, which occur when liquefied soil moves down a steep slope with large displacement and much internal disruption of material. Soil may also lose its ability to support structures; this loss of bearing strength may cause structures founded on the liquefied materials to tilt or possibly topple over. Light structures such as pipelines, sewers, and empty fuel tanks that are buried in the ground can float to the surface when they are surrounded by liquefied soil. The susceptibility of a site to liquefaction is a function of the uniformity, depth, density, and water content of the granular sediments beneath the site and the magnitude of earthquakes likely to affect the site.

The vast majority of liquefaction hazards are associated with sandy soils and silty soils of low plasticity. Cohesive soils generally are not considered susceptible to soil liquefaction. In addition to sandy and silty soils, some gravelly soils are potentially vulnerable to liquefaction. Most gravelly soils drain relatively well, but when the voids are filled with finer particles or the gravelly soils are surrounded by less pervious soils, drainage can be impeded, resulting in vulnerability to cyclic pore pressure generation and liquefaction. In general, liquefaction hazards are most severe in the first 50 ft (15 m) below the ground surface, but on a slope near a free face or where deep foundations go beyond that depth, liquefaction potential should be considered for greater depths.

Holocene-aged alluvial sediments are especially prone to liquefaction. The project site is located in an area of San Francisco that has been designated as potentially liquefiable. As depicted in Figures 3.8.3-1 and 3.8-2, the majority of the project site is covered by lowland soils and artificial fill, which is the most susceptible soil layer for liquefaction. The granular materials in the heterogeneous fill typically are loose and saturated beneath the shallow groundwater table and may liquefy when subjected to ground shaking, resulting in loss of soil strength, settlement, and lateral spreading. Because of the heterogeneous nature of the fill, liquefaction is expected to occur in random layers and pockets, limiting the extent of seismically induced settlement and lateral spreading to localized zones within the fill. The hydraulically placed sand fill in the vicinity of the southeast-facing shoreline consists of a thick unit of predominantly uniform sand and is, therefore, more susceptible to liquefaction.

There are two general levels of liquefaction hazards: 1) large-scale displacement and 2) localized failures including lateral spreading, vertical settlement from densification, sand boils, ground oscillation, flow failures, loss of bearing strength, and buoyancy effects, as described below.

Lateral Spreading

Lateral spreading is a phenomenon where large blocks of intact, non-liquefied soil move downslope, riding on a liquefied substrate of large extent (Youd 1978; Tinsley 1985). The mass moves toward an unconfined area, such as a descending slope or stream-cut bluff, and can occur on slope gradients as gentle as one degree.

Historical soil borings indicate that materials with the potential for lateral spreading are present in the artificial fill near the free face of the Yosemite Slough shoreline (GTC 2008). In addition, the area of hydraulically placed sand fill in the vicinity of the southeast-facing shoreline of the project site (HPS South) has higher than usual susceptibility to lateral spreading.

Earthquake-Induced Settlement

Settlement or subsidence of the ground surface can be accelerated and accentuated by earthquakes. During an earthquake, settlement can occur as a result of the relatively rapid rearrangement, compaction, and settling of subsurface materials (particularly loose, uncompacted, and variable sandy sediments). Settlement can occur both uniformly and differentially (i.e., where adjoining areas settle at different rates). Localized differential settlements of up to two-thirds of the total anticipated settlements must be assumed until more precise predictions of differential settlements can be made. It is estimated that settlement between one to two percent of the zones susceptible to liquefaction, or approximately two to twelve inches (in), may occur at the project site during strong ground shaking.

Sand Boils

Sand boils occur when localized pore pressures increase to a level greater than the overburden pressure. If there is no pathway for dissipation of the excess pore pressures, the liquefied material may travel upward, following the path of a vertical fracture or zone of weakness. Sand-laden water can be ejected

from a buried liquefied layer and erupt at the surface to form sand volcanoes. The surrounding ground often fractures and settles in the vicinity of the sand boil.

Because of the heterogeneous nature of the fill, liquefaction is expected to occur in random layers and pockets on the project site, limiting the extent of seismically induced sand boils to localized areas within the fill. The hydraulically placed sand fill in the vicinity of the southeast-facing shoreline (HPS South) consists of a thick unit of predominantly uniform sand and is, therefore, more susceptible to liquefaction.

Ground Oscillation

During ground oscillation, the surface layer, riding on a buried liquefied layer, is thrown back and forth by the shaking and can be severely deformed. While the soils at the project site have been identified as potentially liquefiable, there is no evidence of a broadly spanning buried liquefiable layer on which the surface layer could be oscillated.

Seismic Slope Instability/Ground Cracking. Earthquake motions can induce substantial stresses in slopes, causing earthquake-induced landslides or ground cracking when the slope fails. Earthquake-induced landslides can occur in areas with steep slopes that are susceptible to strong ground motion during an earthquake. The 1989 Loma Prieta earthquake triggered thousands of landslides over an area of 770 square miles (mi^2) (1994 km^2). Hazards associated with seismically induced mudslides, rockslides, or landslides are not anticipated because of the relatively flat topography of the project site and the surrounding vicinity (GTC 2008).

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3.9 Water Resources

3.9.1 Background

This section describes the existing water resources within the project site and vicinity. Information sources for this section include the *San Francisco Bay Basin Water Quality Control Plan* (Basin Plan) and the Bay Plan; reference documents from federal and state agencies; and technical reports and analyses prepared by research entities and consultants as specifically referenced below.

3.9.2 Regulatory Framework

3.9.2.1 Federal

3.9.2.1.1 Clean Water Act

The *Clean Water Act of 1977* (CWA) (33 U.S.C. 1251, *et seq.*), which amended the federal *Water Pollution Control Act of 1972*, established the basic structure for regulating discharges of pollutants into Waters of the United States (U.S.) (not including groundwater) and Waters of the State of California. Waters of the U.S. (defined in 40 CFR 230.3[s]) include water bodies that are used in interstate or foreign commerce, waters that are subject to the ebb and flow of the tide, and interstate waters, as well as tributaries of such waters and wetlands adjacent to such waters. Waters of the State are defined by the State Water Resources Control Board (SWRCB) as any surface water or groundwater, including saline waters, within the boundaries of the state. Examples include rivers, streams, lakes, bays, marshes, mudflats, unvegetated seasonally ponded areas, drainage swales, sloughs, wet meadows, natural ponds, vernal pools, diked baylands, seasonal wetlands, and riparian woodlands. Impacts to Waters of the U.S. and impacts to Waters of the State can differ because of the differing laws and regulations that address these impacts. As interpreted by the USEPA and SWRCB, CWA permits and other regulatory mechanisms may refer to only one of the two categories. For example, CWA Section 401 Water Quality Certifications apply to Waters of the State, while National Pollutant Discharge Elimination System (NPDES) permits apply to Waters of the U.S.

The CWA delegates authority to the USEPA to implement pollution control programs. Under the CWA, it is unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a NPDES permit is obtained. In addition, the CWA requires each state to adopt water quality standards for receiving water bodies and to have those standards approved by the USEPA. Water quality standards consist of designated beneficial uses for a particular receiving water body (e.g., wildlife habitat, agricultural supply, fishing, etc.), along with water quality objectives necessary to support those uses.

CWA Section 303 Water Quality Standards

Section 303(c)(2)(b) of the CWA requires states to adopt water quality standards for all surface Waters of the U.S. based on the water body's designated beneficial use. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards consist of both numeric and narrative criteria for conditions where numerical standards cannot be established or where they are needed to supplement numerical standards. Water quality standards applicable to the proposed action are listed in the Basin Plan and are described in Section 3.9.2.2.2, San Francisco Bay Basin Plan.

CWA Section 303 Impaired Water Bodies and Total Maximum Daily Loads

Under CWA Section 303(d), the SWRCB is required to develop a list of impaired water bodies that do not meet water quality standards (promulgated under the National Toxics Rule or California Toxics Rule) after the minimum technology-based effluent limitations and water quality-based effluent limitations have

been implemented for non-stormwater runoff permitted point sources. Lists are to be priority ranked for development of a total maximum daily load (TMDL), which is a calculation of the total maximum daily load (or "amount") of a pollutant that a water body can receive on a daily basis and still safely meet water quality standards. The SWRCB, Regional Water Quality Control Boards, and USEPA are responsible for establishing TMDL waste-load allocations and incorporating approved TMDLs into water quality control plans, NPDES permits, and waste discharge requirements (WDRs) in accordance with a specified schedule for completion.

A mercury TMDL for San Francisco Bay has been completed, and the USEPA approved a Basin Plan amendment incorporating the mercury TMDL into the Basin Plan (RWQCB 2007). A polychlorinated biphenyl (PCB) TMDL has also been developed for San Francisco Bay, and the San Francisco Regional Water Quality Control Board (RWQCB) adopted a Basin Plan amendment on 13 February 2008, which is still pending final approval from the SWRCB and USEPA.

The mercury and PCB TMDLs include numeric targets for concentrations in suspended sediment and/or fish tissue. The TMDLs also include waste-load allocations for urban stormwater runoff and municipal and industrial wastewater discharges, with allocations apportioned for individual municipal separate storm sewer systems (MS4s)[1] and wastewater treatment plants, including those in San Francisco. For stormwater, load reductions would be required to meet the TMDL waste-load allocations within the 20 years required by the TMDLs. Load reduction efforts for TMDLs are implemented through municipal NPDES stormwater permits and individual NPDES permits (e.g., NPDES permit for water treatment plant discharges and others).

CWA Section 401 Water Quality Certification

Section 401 of the CWA specifies that states must certify that any activity subject to a permit issued by a federal agency, such as the U.S. Army Corps of Engineers (USACE), meets all state water quality standards. In California, the SWRCB and the nine RWQCBs are responsible for taking certification actions for activities subject to any permit that USACE issues, pursuant to Section 404 (or for any other USACE permits, such as permits issued pursuant to Section 10 of the *Rivers and Harbors Act of 1899*). Such certification actions, also known as a 401 certification or water quality certification, include issuing a 401 certification that the activity complies with state water quality standards, issuing a 401 certification with conditions, denying 401certification, or denying 401 certification without prejudice (should procedural matters preclude taking timely action on a 401 certification application). If the 401 certification is denied, the permit pertaining to the proposed federal action is denied as well.

In practice, most RWQCBs rely on applications for Section 401 certification to evaluate whether WDRs would also need to also be issued for a project. The RWQCB must review final documentation prior to taking an action on an application for water quality certification and/or WDRs.

CWA Section 402 Stormwater NPDES Permits

Section 402(p) of the CWA regulates point source discharges of pollutants under the NPDES program. This section of the CWA was amended in 1987 to require the USEPA to establish regulations for permitting of municipal and industrial stormwater discharges (including discharges from active construction sites) under the NPDES permit program. The USEPA published final regulations for industrial and municipal stormwater discharges on 16 November 1990. The NPDES program requires all industrial facilities and municipalities of a certain size that discharge pollutants into Waters of the U.S. to

[1] A Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): i) designed or used for collecting or conveying storm water; ii) which is not a combined sewer; and iii) which is not part of a Publicly Owned Treatment Works. The term MS4 also refers to the jurisdiction that operates such a system.

obtain a permit. Stormwater discharges into the San Francisco Bay region are commonly controlled through general and individual NPDES permits, which are adopted by the SWRCB (general permits) or RWQCB (individual permits), and are administered by the RWQCB. Water quality criteria in NPDES permits for discharges into receiving waters are based on criteria specified in the National Toxics Rule, the California Toxics Rule, and Basin Plans (discussed below). The USEPA requires NPDES permits to be revised to incorporate waste-load allocations for TMDLs when the TMDLs are approved by USEPA (40 CFR 122).

CWA Section 402 Combined Sewer Overflow Control Policy

Combined sewer facilities are subject to Section 402(q) of the CWA, which codified the Combined Sewer Overflow (CSO) Control Policy. Wet weather flows are governed by compliance with the nine minimum controls and long-term control plan requirements contained in the CSO Control Policy (59FR 18688-18698) and further described in Combined Sewer Overflows, Guidance for Nine Minimum Controls, USEPA 832-B-95-003 (May 1995). Communities with combined sewer systems are also expected to develop long-term CSO control plans that should ultimately provide for full compliance with the CWA, including attainment of water quality standards. The San Francisco Public Utilities Commission (SFPUC) implemented a Long-Term Control Plan (per the conditions of its NPDES Wastewater Discharge Permit) during the mid-1990s. The general goals for combined sewer systems under the CSO Control Policy are to provide storage capacity for wet weather flows, maximize flow to treatment facilities, and minimize CSO discharges. The requirements of the CSO Control Policy are implemented through the city's NPDES permits issued by the RWQCB.

CWA Section 404 Discharge of Fill or Dredge Materials

Section 404 of the CWA regulates temporary and permanent fill, as well as the disturbance of wetlands and Waters of the U.S. The discharge (temporary or permanent) of dredged or fill material into Waters of the U.S., including wetlands, typically requires authorization from USACE pursuant to Section 404 of the CWA through either a nationwide (general categories of discharges with minimal effects) or Individual Permit. USACE-regulated activities under Section 404 involve the discharge of dredged or fill material, including, but not limited to, grading, placing riprap for erosion control, pouring concrete, laying sod, and stockpiling excavated material into Waters of the U.S. Activities that generally do not involve a regulated discharge (if performed specifically in a manner to avoid discharges) include driving pilings, some drainage channel maintenance activities, and excavating without stockpiling. The USEPA and the USACE have issued Section 404(b)(1) Guidelines (40 CFR 230) that regulate dredge and fill activities, including the water quality aspects of such activities. Subpart C Sections 230.20 through 230.25 contain water quality regulations applicable to dredge and fill activities. These guidelines address discharges that alter substrate elevation or contours, suspended particulates, water clarity, nutrients and chemical content, current patterns and water circulation, water fluctuations (including those that alter erosion or sediment rates), and salinity gradients. The future developer or owner of the project would complete a 404(b)(1) analysis during the permitting process to demonstrate that the proposed action represents the least environmentally damaging practicable alternative (LEDPA) and complies with Section 404 of the CWA.

3.9.2.1.2 River and Harbors Act Section 10

The *Rivers and Harbors Acts of 1890* (superseded) and *1899* (33 USC 401, *et seq.*) are the legislative origin of the USACE regulatory program. Various sections establish permit requirements to prevent unauthorized obstruction or alteration of any navigable water of the United States. Regulations implementing Section 10 of the *Rivers and Harbors Act* are coordinated with CWA Section 404 regulations. Section 10 (33 USC 403) covers construction, excavation, or deposition of materials in, over, or under such waters, or any work which would affect the course, location, condition, or capacity of those waters. Activities requiring Section 10 permits include structures (e.g., piers, wharfs, breakwaters,

bulkheads, jetties, weirs, transmission lines) and work such as dredging or disposal of dredged material, or excavation, filling, or other modifications to the navigable Waters of the U.S.

3.9.2.1.3 Executive Order 11988-Floodplain Management

Executive Order 11988 requires federal agencies to recognize the values of floodplains and to consider the public benefits of restoring and preserving floodplains. Under this order, the USACE has the responsibility for reviewing flood protection projects that may affect navigable waters. The USACE is required to take action and provide leadership to avoid development in the base floodplain; reduce the risk and hazard associated with floods; minimize the impact of floods on human health, welfare, and safety; and restore and preserve the beneficial and natural values of the base floodplain.

3.9.2.1.4 National Flood Insurance Act and Flood Disaster Protection Act

The *National Flood Insurance Act of 1968* and the *Flood Disaster Protection Act of 1973* were enacted to reduce the need for flood protection structures and to limit disaster relief costs by restricting development in floodplains. The Federal Emergency Management Agency (FEMA) was created in 1979. FEMA administers the National Flood Insurance Program (NFIP) under its Flood Insurance Administration. The NFIP enables property owners in participating communities to purchase insurance as protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages (FEMA 2008).

FEMA also develops standards for fluvial and coastal floodplain delineation and prepares flood insurance rate maps (FIRMs) that identify areas subject to flood inundation, most often from a flood having a one percent chance of occurrence in a given year (also known as a "base flood" or "100-year flood"). FEMA refers to the portion of the floodplain or coastal area that is at risk from a flood of this magnitude as a Special Flood Hazard Area. For these areas, flood insurance rate maps may specify the anticipated water surface elevation during the base flood, or Base Flood Elevation (BFE). In coastal areas, the BFE may be the equivalent of the height of tidal waters during an extreme high tide event, coupled with flooding from a large storm.

3.9.2.2 State

Responsibility for the protection of water quality in California resides with the SWRCB and nine RWQCBs. The SWRCB establishes statewide policies and regulations for the implementation of water quality control programs mandated by federal and state water quality statutes and regulations. The RWQCBs develop and implement Basin Plans that consider regional beneficial uses, water quality characteristics, and water quality problems. The RWQCB implements a number of federal and state laws, the most important of which are the *State Porter-Cologne Water Quality Control Act* and the CWA.

3.9.2.2.1 Porter-Cologne Water Quality Control Act

The *Porter-Cologne Water Quality Control Act* (PCWQCA) is the principal law governing water quality in California. Under the PCWQCA, the SWRCB and the nine RWQCBs were established as statewide and regional water quality planning agencies, respectively. The PCWQCA requires the development of Basin Plans to protect the quality of surface water and groundwater. The SWRCB and RWQCBs are required to designate beneficial uses of surface waters and groundwater, establish water quality objectives to protect beneficial uses, and develop implementation programs to meet the water quality objectives. The SWRCB and RWQCBs have permitting and enforcement authority to prevent and control waste discharges that could affect Waters of the State through the issuance of NPDES permits and WDRs. The project site is located in the San Francisco Bay Basin and subject to regulatory requirements of the RWQCB.

3.9.2.2.2 San Francisco Bay Basin Plan

As a function of the PCWQCA, the Basin Plan (RWQCB 2007) identifies the beneficial uses, water quality objectives, and actions necessary to control non-point and point sources of pollution to receiving waters in the San Francisco Bay region. Existing and potential beneficial uses for the Lower Bay, as identified in the Basin Plan, are industrial service supply; ocean, commercial and sport fishing; shellfish harvesting; estuarine habitat; fish migration; preservation of rare and endangered species; fish spawning; wildlife habitat; water contact recreation; non-contact water recreation; and navigation. Existing and potential beneficial uses of groundwater in the project vicinity (Islais Valley, South San Francisco, and Visitacion Valley groundwater basins) are municipal and domestic water supply (potential), industrial process water supply (existing), industrial service water supply (existing), and agricultural water supply (potential).

Basin Plan narrative and numeric water quality objectives are used to define appropriate levels of environmental quality and to control activities that could adversely affect individual aquatic systems and the Bay Basin in general. The narrative water quality objectives describe pollution conditions to be avoided but no numeric limits are imposed. The numeric water quality objectives describe the maximum concentrations of a given pollutant that can remain in a body of water without adversely affecting the aquatic system. Beneficial uses, together with applicable water quality objectives, comprise the relevant water quality standards.

3.9.2.2.3 Water Quality Control Plan for Enclosed Bays and Estuaries

The SWRCB adopted Part 1 of the Water Quality Control Plan for Enclosed Bays and Estuaries in August 2009 to comply with the requirements of *California Water Code* Section 13393 to adopt State sediment quality objectives (SQOs). Part 1 integrates chemical and biological measures to accomplish two narrative SQOs: 1) to protect human health; and 2) to ensure that pollutants in sediments are present in quantities that, alone or in combination, are not toxic to benthic communities in enclosed bays and estuaries of California. Part 1 is not intended to address low-dissolved oxygen, pathogens, or nutrients, including ammonia.

Cleanup of contaminated sediment is subject to Resolution No. 92-49 (Policies and Procedures for Investigation and Cleanup and Abatement of Discharges under *Water Code* Section 13304). Part 1 also allows the RWQCB to develop site-specific sediment management guidelines as appropriate, for example, where toxic stressors have been identified and controllable sources of these stressors exist or remedial goals are desired.

3.9.2.2.4 State Implementation Plan for Toxics Standards for Surface Waters

In March 2000, the SWRCB adopted the State Implementation Plan (SIP) in Resolution No. 2000-015. The SIP establishes (1) implementation provisions for priority pollutant criteria promulgated by the USEPA through the National Toxics Rule (40 CFR 131.36) and through the California Toxics Rule (CTR) (40 CFR 131.38), and for priority pollutant objectives established by RWQCBs in their Water Quality Control Plans; (2) monitoring requirements for 2,3,7,8-TCDD equivalents (dioxin); and (3) chronic toxicity control provisions. In addition, this policy includes special provisions for certain types of discharges and factors that could affect the application of other provisions in this policy. A list of priority pollutants and associated criteria can be found in the 40 CFR 131 (Water Quality Standards: Establishment of Numeric Criteria for Priority Toxic Pollutants for the state of California, 18 May 2000).

3.9.2.2.5 California Toxics Rule (CTR)

In cases where the Basin Plan does not contain a standard for a particular pollutant, other criteria are used to establish a standard. These may be applied from SWRCB documents (e.g., the Inland Surface Waters

Plan and the Pollutant Policy Document) or from water quality criteria developed under Section 304(a) of the CWA (e.g., California Toxics Rule). Numeric criteria are required by the CWA for many priority toxic pollutants. However, in 1994, a state court overturned the state's water quality control plans containing criteria for priority toxic pollutants. To address the issue of toxic pollutants, the USEPA promulgated the CTR based on the Administrator's determination that numeric criteria are necessary in the state of California to protect human health and the environment. These federal criteria are numeric water quality criteria for priority toxic pollutants and other provisions for water quality standards legally applicable in the state of California for inland surface waters, enclosed bays, and estuaries for all purposes and programs under the CWA.

3.9.2.2.6 Waste Discharge Requirements (WDRs) Program

Under the PCWQCA, the RWQCBs regulate the "discharge of waste" to "Waters of the State". All parties proposing to discharge waste that could affect Waters of the State must file a report of waste discharge (ROWD) with the appropriate RWQCB. The RWQCB then responds to the ROWD by issuing WDRs in a public hearing, or by waiving WDRs (with or without conditions) for the proposed discharge.

While Section 404 permits and 401 certifications are required when an activity results in fill or discharge directly below the ordinary high water line of Waters of the U.S., any activity that results or may result in a discharge that directly or indirectly impacts Waters of the State or the beneficial uses of those waters are subject to WDRs. In practice, most RWQCB rely on applications for a 401 certification to determine whether WDRs also need be issued for a proposed project. The RWQCB has produced a combined 401 certification/waiver of the WDRs' application form to ensure that applicants do not need to file both a ROWD and an application for a 401 certification. WDRs for discharges directly to surface waters are also NPDES permits.

3.9.2.2.7 Anti-Degradation Policy

The state's Anti-Degradation Policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Waters in California (SWRCB Resolution No. 68-16), restricts degradation of surface and ground waters. In particular, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses. Under the Anti-degradation Policy, any actions that can adversely affect water quality in all surface and ground waters must 1) be consistent with maximum benefit to the people of the state; 2) not unreasonably affect present and anticipated beneficial use of the water; and 3) not result in water quality less than that prescribed in water-quality plans and policies, (i.e., should not result in exceedence of water-quality objectives) (SWRCB 1968).

3.9.2.2.8 Construction General Permit

Pursuant to the CWA Section 402, discharges from construction projects are prohibited unless such practices comply with an NPDES permit. The SWRCB adopted a statewide *NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit) (Order No. 2009-0009-DWQ, NPDES No. CAS000002) on 2 September 2009 to meet CWA requirements and the water quality goals of the PCWQCA. Every construction project that disturbs one or more acres of land surface (or that is part of a common plan of development or sale that disturbs more than one acre of land) requires coverage under the Construction General Permit. To obtain coverage under the Construction General Permit, the landowner or other applicable entity must file Permit Registration Documents (PRDs) prior to the commencement of construction activity; the appropriate documents include a Notice of Intent (NOI), Storm Water Pollution Prevention Plan (SWPPP), and other documents required by the Construction General Permit. Because the proposed action would disturb

more than one acre, construction activities would be subject to the Construction General Permit requirements.

Construction activities subject to the Construction General Permit include clearing, grading, and disturbances to the ground, such as stockpiling or excavation, that result in soil disturbances of at least one acre of total land area. The SWPPP that must be prepared by every individual construction project under the Construction General Permit has two major objectives: 1) to help identify the sources of sediment and other pollutants that affect the quality of stormwater discharges; and 2) to describe and ensure the implementation of best management practices (BMPs) to reduce or eliminate sediment and other pollutants in stormwater, as well as non-stormwater discharges. BMPs must be implemented to meet the performance standard of Best Available Technology/Best Conventional Technology (BAT/BCT).[2]

The Construction General Permit requires specific minimum BMPs, depending on the project sediment risk (Risk Level 1 through 3). Sediment risk is determined based on the sensitivity of the receiving water to sediment and the potential for site erosion and sediment transport. For moderate sediment risk projects (Risk Level 2), Numeric Action Levels (NALs) for turbidity and pH are imposed; for high sediment risk projects (Risk Level 3), Numeric Effluent Limitations (NELs) for turbidity and pH are imposed. Post-construction stormwater performance standards are also included for sites not covered by a municipal stormwater permit. The Construction General Permit requires effluent and receiving water monitoring (only for some Risk Level 3 sites) to demonstrate compliance with permit requirements, and corrective action must be taken if these limits are exceeded. The results of monitoring and corrective actions must be reported annually to the SWRCB. This permit also specifies minimum qualifications for SWPPP developers and construction site inspectors.

3.9.2.2.9 Industrial General Permit

Pursuant to the CWA Section 402(p), the SWRCB has issued a statewide *NPDES General Industrial Permit for Discharges of Storm Water Associated with Industrial Activities* (Industrial General Permit) (Order No. 97-03-DWQ, NPDES General Permit No. CAS000001). A wide range of industries is covered under the Industrial General Permit, as determined by the facility Standard Industrial Classification (SIC) code, a four-digit code that refers to the type of business conducted.

The Industrial General Permit requires control of pollutant discharges using BAT/BCT to meet water quality standards specified in the Basin Plan. The Industrial General Permit generally requires facility operators to (1) eliminate unauthorized non-stormwater discharges; (2) develop and implement a SWPPP; and (3) perform monitoring of stormwater discharges and authorized non-stormwater discharges.

Industrial stormwater discharges from HPS are regulated under the Industrial General Permit. It is possible that future tenants within the project site may include industrial facilities that would be covered under the Industrial General Permit. For example, a marina classified as SIC 4493 is required to obtain coverage under the Industrial General Permit if the marina conducts vessel maintenance activities such as rehabilitation, mechanical repairs, painting, fueling, and lubrication or equipment cleaning operations.

[2] As defined by USEPA, Best Available Technology (BAT) is a technology-based standard established by the CWA as the most appropriate means available on a national basis for controlling the direct discharge of toxic and non-conventional pollutants to navigable waters. The BAT effluent limitations guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable. Best Conventional Technology (BCT) is a technology-based standard that applies to treatment of conventional pollutants, such as total suspended solids.

3.9.2.2.10 Municipal Stormwater General Permit

The SWRCB regulates discharges from MS4s under a Phase I program for medium and large municipalities (serving 100,000 or more people) and under a Phase II program for small municipalities (serving 100,000 or less people) and governmental facilities (e.g., military bases, public campuses). The relatively small portions of the city that drain to MS4 areas (approximately 10 percent of the city) are regulated under the statewide *Phase II NPDES General Permit for Storm Water Discharges from Small MS4s* (Municipal Stormwater General Permit) (Order No. 2003-0005-DWQ).

In accordance with the Municipal Stormwater General Permit, the city must develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4 by ensuring that post-construction controls are in place to prevent or minimize water quality impacts. The Municipal Stormwater General Permit requires covered municipalities to prepare a Stormwater Management Plan with the goal of reducing the discharge of pollutants to the maximum extent possible, as defined in and implemented by the General Permit. The maximum extent possible approach is an evolving, flexible, and advancing concept, which considers technical and economic feasibility. Consequently, the definition of the maximum extent possible evolves with increased knowledge about controlling urban runoff.

The SFPUC has prepared a Stormwater Management Plan that establishes a framework for achieving the maximum extent possible standard for the discharge of pollutants from MS4s within their jurisdiction in accordance with the Phase II stormwater regulations. Additionally, the city is developing Stormwater Design Guidelines in compliance with the Municipal NPDES Permit requirements that are intended to minimize stormwater pollution from new development and redevelopment in separate storm sewer areas of the city.

During the operational phase of the project, stormwater discharging to areas served by the combined sewer system would be regulated under the Wastewater Discharge NPDES Permit, described below. However, at build out, the project site would be served by a separate storm sewer system and subject to the requirements of the Municipal Stormwater General Permit and associated Stormwater Management Plan.

3.9.2.2.11 Recycled Water General Permit for Landscape Irrigation

In July 2009, the SWRCB released General Waste Discharge Requirements for Landscaping Irrigation Uses of Municipal Recycled Water (Recycled Water General Permit), allowing municipal entities to distribute disinfected tertiary-treated recycled water to select customers for landscape irrigation (Order No. 2009-0006-DWQ). The Recycled Water General Permit is intended to further the state's Recycled Water Policy (22 CCR) and *California Water Code* Section 13552.5, both of which encourage recycled water for non-potable uses.

3.9.2.2.12 Wastewater Discharge Permit (Combined Sewer System)

Discharges from the SWPCP, NPWWF, and BWWF are regulated under the NPDES permit set forth in Order No. R2-2008-0007 and NPDES No. CA0037664. This NPDES permit does not apply to all wastewater collection systems and CSOs within the City and County of San Francisco, but is specific to the facilities referenced in this NPDES permit. Because the project would discharge to these permitted facilities, the Wastewater Discharge Permit is an applicable WDR for evaluation of potential project impacts.

The NPDES permit includes technology-based effluent limits for dry and wet weather discharges, water quality-based effluent limits for dry weather discharges from the SWPCP, receiving water limitations based on water quality objectives in the Basin Plan, and various additional provisions, such as monitoring and reporting program requirements. This NPDES permit also requires adherence to provisions consistent with the CSO Control Policy (refer to the above discussion under Federal CWA, Combined Sewer Overflow Control Policy; Section 3.9.2.1.1).

The combined storm sewer treatment program, implemented in compliance with the CSO Control Policy and the NPDES permit, provides 100 percent capture and treatment of the combined sewer flows rather than the 85 percent minimum as required by the CSO Control Policy. San Francisco has no untreated overflow events because the combined flows receive the equivalent of primary treatment within the storage/transport boxes. Primary treatment of these overflows consists of removal of floatable materials and settleable solids. Portions of the project site currently discharge both stormwater and wastewater to the combined storm sewer system.

3.9.2.2.13 Temporary Construction Dewatering Requirements for Separate Storm Sewer Areas

In general, for construction that occurs in areas not served by a combined sewer system, and depending on the nature and degree of residual groundwater contamination present when construction begins, temporary groundwater dewatering could be required. In this case, dewatering effluent would be regulated under the Construction General Permit for minor amounts of dewatering of non-polluted groundwater, one of three NPDES general dewatering permits issued by the RWQCB, depending on the residual pollutants in a particular portion of a site or an individual NPDES Permit/WDR if none of the General Permits are applicable.

3.9.2.2.14 Long-Term Management Strategy for the Placement of Dredged Material

In 1990, the USEPA, USACE, SWRCB, and San Francisco Bay Conservation and Development Commission (BCDC) joined with other interested parties to form the Long-Term Management Strategy (LTMS) program for dredged material from the San Francisco Bay Area. The goals of the LTMS are to manage dredging and dredged material disposal in an economically and environmentally sound manner, maximize the beneficial use of dredged material, and develop a coordinated permit application review process for dredging and disposal projects. Specific guidance for conducting dredging and material disposal activities is summarized in the LTMS Management Plan (USACE *et al*. 2001).

The Dredged Material Management Office (DMMO) was established as part of the LTMS to consolidate the processing of dredging permit applications by the staff of the LTMS agencies and the California State Lands Commission (CSLC). The CSLC holds title to all ungranted tide and submerged lands in California, including some tidelands and submerged lands in the project site. The DMMO provides a single application form that meets the requirements of its member agencies and unified processing of applications for dredging permits.

The process for obtaining approvals for dredging or dredged material disposal has three phases: (1) suitability determination, (2) permit process, and (3) episode approval. The suitability determination process occurs at the DMMO level. The DMMO member agencies make a joint recommendation to the individual member agencies on whether the sediments to be dredged are suitable, in terms of potential for water quality or biological impacts, for the proposed disposal or reuse site. The recommendation is usually based on the results of sediment testing. The applicant must submit results from recent sediment testing or sufficient data to support a finding by the agencies that the sediments are suitable for the proposed disposal environment. The DMMO would make a decision about where the materials can be disposed of (e.g., in-bay, ocean, or upland).

Section 404 of the CWA and BCDC's Bay Plan do not authorize aquatic disposal of dredged material unless an analysis of potential alternatives is performed first and the alternatives prove to be either environmentally unacceptable or infeasible. In order for projects proposing to discharge dredged material to Waters of the U.S. to be approved under Section 404 of the CWA, it must be shown that there is no practicable alternative to the proposed discharge that would have less impact on the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences. Applicants for permits to dispose of dredge spoils must submit a written analysis of the alternatives to the DMMO. Although the DMMO provides initial review of permit applications and suitability recommendations, applicants must eventually obtain separate approval from the appropriate DMMO member agencies (e.g., CWA Section 404 Permit from USACE, CWA Section 401 Water Quality Certification from the RWQCB, and approval by BCDC). Each agency issues permit conditions and specific requirements about how the project is to be performed.

Some permits for maintenance dredging projects authorize multiple dredging and disposal episodes over a period of several years. Such permits require that permittees obtain formal approval, after a recommendation of suitability by the DMMO, for each dredging episode under the permit. Episode approvals, when required, are issued by the individual DMMO member agencies.

3.9.2.2.15 Bay Conservation and Development Commission

The BCDC is a federally-designated, state, coastal management agency for San Francisco Bay. The role and authority of the BCDC are discussed in Section 3.4.2.2.2, Land Use and Recreation.

The Bay Plan, adopted in 1969 and more recently amended in 2008, specifies goals, objectives and policies for existing and proposed waterfront land uses use and other BCDC jurisdictions. Part III of the Bay Plan contains findings and policies pertinent to the development of the project. The proposed action would involve the construction of a marina, a bridge across Yosemite Slough, and various shoreline improvements that would require a permit from BCDC. The Bay Plan Policies No. 1, 2, 3, 6, and 7 also would apply to the proposed action because it would include construction activities that could result in erosion and turbidity. Also, pursuant to Policy No. 2 of the Bay Plan, the RWQCB certification would require authorization from BCDC.

3.9.2.3 Local

3.9.2.3.1 City of San Francisco General Plan

Objectives relevant to water quality and hydrology found in the Environmental Protection element of the General Plan (San Francisco Planning Department 2010) are listed below:

Objective 1 Achieve a proper balance among the conservation, utilization, and development of San Francisco's natural resources.

Objective 2 Implement broad and effective management of natural resources.

Objective 3 Maintain and improve the quality of the bay, ocean, and shoreline areas.

The purpose of an environmental protection element is to "…give natural environment amenities and values appropriate consideration in urban development along with economic and social considerations."

3.9.2.3.2 San Francisco Green Building Ordinance

In 2008, the city adopted Chapter 13C (Green Building Requirements) into the *San Francisco Building Code*. The purpose of the requirements is to promote the health, safety, and welfare of San Francisco residents, workers, and visitors by minimizing the use and waste of energy, water, and other resources in the construction and operation of city buildings and by providing a healthy indoor environment. The ordinance requires compliance with the applicable LEED® performance standards for New Construction, Version 2.2, criteria SS6.1 and SS6.2 for stormwater management, as well as the BMPs and Stormwater Design Guidelines of the SFPUC (1304C.0.3).

3.9.2.3.3 Floodplain Management Program

As a requirement for joining the NFIP, the city must adopt and enforce a floodplain management ordinance that governs new construction and substantial improvements to existing buildings in flood-prone areas. San Francisco subsequently adopted Ordinance No. 188-08 establishing a floodplain management program. Interim controls in this ordinance should remain in place until FEMA has published the final flood insurance rate map for San Francisco, at which time San Francisco would adopt permanent controls for floodplain management. In July 2008, the city released interim floodplain maps to implement the city's floodplain management ordinance until the final flood insurance rate maps are released by FEMA.

The NFIP regulations allow a local jurisdiction to issue variances to its floodplain management ordinance under certain narrow circumstances, without jeopardizing the local jurisdiction's eligibility in the NFIP. However, the particular projects that are granted variances by the local jurisdiction may be deemed ineligible for federally-backed flood insurance by FEMA. In correspondence between the Office of the City Administrator and FEMA dated 11 July 2008 (personal communication, Yeung 2008), the city advised FEMA of its intention to issue a variance in the permanent floodplain management controls to address the requirements for new construction and substantial improvements to structures on piers in coastal high hazard areas (V-Zones). NFIP regulations prohibit construction seaward of mean high tide in a V-Zone; however, the city would develop engineering controls to ensure that structures built in or over the water can be constructed to withstand a 100-year flood. Although resolution of this issue with FEMA is pending, development within the project site would be subject to the interim controls in the floodplain management program unless alternative requirements are adopted prior to the issuance of building permits.

In 2008, the City of San Francisco adopted an ordinance establishing a floodplain management program (Article XX, Sections 2A.280 through 2A.285 of the *San Francisco Administrative Code*), designating the City Administrator as the floodplain administrator and providing requirements for designating floodplains and for construction and development in floodplains. Development in a floodplain or flood-prone area, as designated by the Floodplain Administrator, requires a permit and demonstrated compliance with the floodplain management standards.

The Chief Harbor Engineer of the Port of San Francisco and the City Floodplain Administrator are required to consult and coordinate with FEMA to create appropriate building standards for developing any finger piers in flood prone areas within the Port's jurisdiction. The floodplain management regulations in this ordinance are consistent with the NFIP requirements for communities like San Francisco, where FEMA is in the process of preparing, but has not completed, a final flood insurance rate map. When FEMA issues a final flood insurance rate map designating SFHAs in San Francisco, NFIP regulations require that the adopted floodplain management program be reviewed and modified by the city to ensure consistency with NFIP requirements applicable to FEMA-mapped communities.

3.9.3 Existing Conditions

The following description of hydrology and water resources characterizes the existing conditions for regional as well as the HPS site-specific locations that include the proposed action and alternatives. San Francisco Bay borders the project site to the north, east, and south. The portion of the bay east of the project site is referred to in the Basin Plan as the San Francisco Bay Lower (Lower Bay) in the South Basin Hydrologic Planning Area. Major water features along the Lower Bay shoreline in the vicinity of the project site include, from north to south, Islais Creek Channel, India Basin, South Basin, Yosemite Slough, and Candlestick Cove (Figure 3.9.3-1). Candlestick Point and HPS are located on peninsulas that extend into the bay. Yosemite Slough and South Basin separate Candlestick Point and HPS.

3.9.3.1 Regional Hydrology

3.9.3.1.1 Watersheds

The terms "watershed" or "drainage basin" describe the area of land that drains downslope to a common discharge location. Figure 3.9.3-1 shows drainage basins in the BVHP neighborhood based on current hydrological conditions. Development has obscured and modified the historic drainage basin boundaries. Historically, small creeks near the project site, including Yosemite Creek and Islais Creek, flowed from the east side of the city to the Lower Bay, forming Islais Creek Basin and Yosemite Basin (SFPUC 2008a). However, most of the creeks in San Francisco were filled or converted to underground drains during development of the city and, as a result, there are no natural freshwater bodies or streams within the project site (Oakland Museum of California 2007).

Islais Creek Basin

Islais Creek Basin encompasses ten mi^2 (2,600 ha) (SFPUC 2008a) and includes the northern portion of HPS. Islais Creek originates in Glen Canyon, over three miles west and slightly north of the project site. The only remaining surface manifestation of the historic creek channel is in Glen Canyon and at the San Francisco Bay waterfront near the foot of Potrero Hill and Cesar Chavez St. Flows from Islais Creek are conveyed to the combined sewer system. Surface inflow to Islais Creek Channel occurs during the rainy season via direct stormwater runoff from areas adjacent to the channel and from treated wastewater discharged from the combined sewer system (described below) through the Quint St outfall. Four deep-water combined sewer overflow (CSO) structures are also located along the Islais Creek Channel (SFRA 2004).

Yosemite Basin

Yosemite Basin encompasses approximately three mi^2 (780 ha) (SFRA 2004) and contains the southern portion of HPS. Yosemite Creek historically originated from a hilltop spring in McLaren Park and ran through what are now the Portola and Bayview neighborhoods before discharging into San Francisco Bay via Yosemite Slough. The creek was culverted and channelized, and the channel receives direct stormwater runoff from areas adjacent to the channel and from two CSO structures with nearshore discharges.

3.9.3.1.2 Surface Waters

There are no natural freshwater bodies or streams within the project site. Surface waters adjacent to the project site, including Yosemite Slough, South Basin, and India Basin, are part of San Francisco Bay.

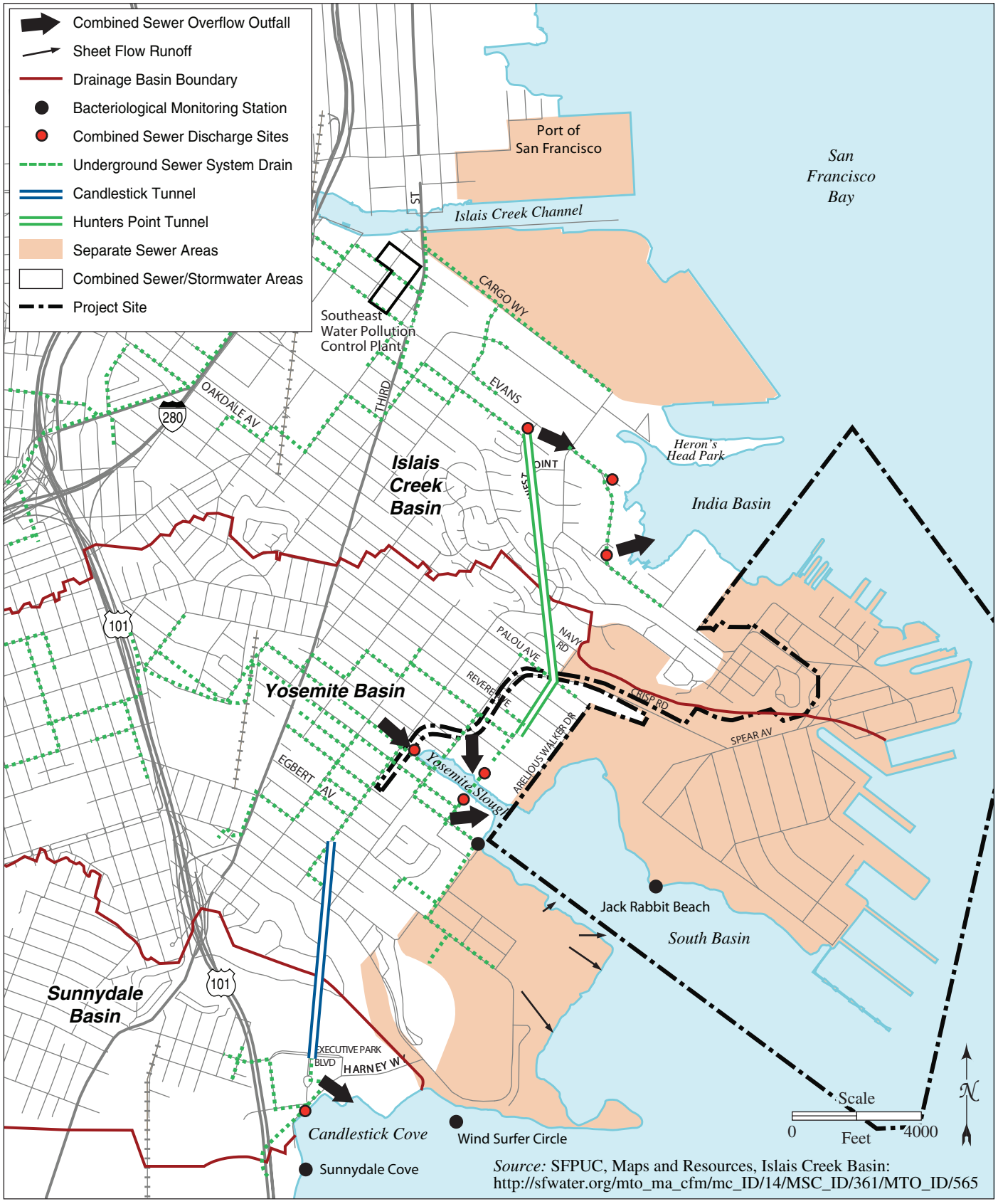


Figure 3.9.3.1. Combined and Separate Storm Sewer System and Receiving Water Bodies

Yosemite Slough

Yosemite Slough is located along the southwestern shoreline of HPS and the northern shoreline of Candlestick Point. Historically, the slough was part of a much broader tidal marsh and mudflat complex that served as the transition between Yosemite Creek to the west and the bay to the east. Starting in the late 1800s, Yosemite Slough was filled for residential and industrial use, raising the ground surface to a level approximately 5 to 20 ft (2 to 6 m) above sea level. Filling of the tidelands continued through the 1960s, until the approximate current shoreline became established in 1972 (CDPR 2006). Surface inflow into the remnant channel of Yosemite Slough occurs during the rainy season from treated wastewater discharged from the combined sewer system through three nearshore CSO structures and from direct stormwater runoff from areas adjacent to the slough. A planned restoration of Yosemite Slough includes restoring 12 ac (4.9 ha) of upland fill back to tidally influenced wetlands. The restoration project is being implemented by the California State Parks Foundation in collaboration with local environmental groups (California State Parks Foundation 2010).

South Basin

South Basin is an embayment located along the southern shoreline of HPS and the eastern shoreline of Candlestick Point. The basin has direct and open tidal exchange with the Lower Bay, although circulation is limited because its location restricts exposure to tidal action, especially when compared to other portions of the bay. Yosemite Slough flows into South Basin from the west, and South Basin also receives stormwater discharges from separate drainage systems located in HPS and Candlestick Point (SFRA 2004).

3.9.3.1.3 Stormwater

Most stormwater runoff in San Francisco is collected via a combined sewer system managed by the SFPUC. This system combines stormwater runoff and wastewater flows in the same network of pipes, conveying flows to facilities where they are treated prior to discharge to the bay or Pacific Ocean through outfall structures along the shoreline (see Section 3.10, Utilities for a detailed description of the combined sewer system). Discharges from the combined sewer system are regulated under two individual NPDES permits issued by the RWQCB. The project site discharges to the Southeast Water Pollution Control Plant (SWPCP) at Phelps St between Jerrold and Evans Aves, just northwest of the project site (Figure 3.9.3-2). Treated (disinfected), dechlorinated wastewater is then discharged through the SWPCP deep water outfall at Pier 80. The applicable NPDES Permit/WDR is discussed in Section 3.9.2, Regulatory Framework.

The combined sewer system is designed to ensure that most wastewater receives secondary treatment (removal of settleable materials and partial removal of dissolved materials). During dry weather, wastewater and any dry-weather runoff (e.g., from irrigation runoff, discharge from underground springs, or pipe leaks) from the eastern portions of the City are conveyed to SWPCP. The SWPCP has the capacity to treat up to 150 MGD to a secondary treatment standard, and it currently treats approximately 67 MGD during dry weather (approximately 80 percent of the city's total wastewater flow) (SFPUC 2009a).

If the combined wet-weather flows exceed 150 MGD, the plant can also treat an additional 100 MGD to a primary treatment standard (removal of settleable materials) plus subsequent disinfection and dechlorination (SFPUC 2008a). Wet-weather flows that are treated to the primary standard (plus disinfection) are only discharged from the SWPCP outfall, while flows treated to the secondary standard and disinfected are discharged through the Quint St outfall to the Islais Creek Channel when maximum capacity of the plant is reached.

Source: City and County of San Francisco

Figure 3.9.3-2. Existing SFPUC Major Water Quality Features

During larger storm events, excess flows that cannot be treated at the SWPCP are treated and discharged through the Bayside Wet Weather Facilities (BWWF), which consist of a series of interconnected underground tanks, tunnels, and outfall structures. The underground transport tunnels provide a total storage capacity of approximately 193 million gallons, while pumps continue to transfer combined wastewater and stormwater to the SWPCP. The BWWF was designed, in accordance with the NPDES permit, to capture and store sufficient volumes of sewage and stormwater to limit the number of discharges (CSOs) from the BWWF. The project site discharges to the system that was designed to achieve a long-term annual average of ten, eight, four, or one CSO events, depending on location. When the treatment capacity of the SWPCP is fully maximized, the wet-weather facilities retain storm flows for later treatment. The tanks allow floatable and settleable solid materials to be removed, similar to primary treatment processes. The materials retained in the storage and transport boxes are flushed to the treatment plants after storms. This level of treatment meets the minimum treatment specified by the USEPA CSO Policy I50 FR 18688; 11 April 1994.

During very large storm events that cause flow to the SWPCP to exceed 110 MGD, and when the treatment and storage capacities of the combined system are exceeded, excess flows receive "flow-through treatment," similar to primary treatment, to remove settleable solids and floatable materials. Treated flows are then discharged into the Lower Bay through any of 29 CSO structures located along the city's bayside waterfront from Fisherman's Wharf to Candlestick Point. The volume of a CSO discharge is a function of the storm intensity, storm duration, treatment rate, and available storage. CSO discharges typically consist of about 6 percent sewage and 94 percent stormwater (SFPUC and POSF 2009). All solids that settle out in the storage/transport structures are flushed to the SWPCP after the rainstorm. There are six CSO structures in the vicinity of the project site, in Yosemite Slough/South Basin and Candlestick Cove (CSO-37 through CSO-43 as depicted on Figure 3.9.3-2).

The SFPUC is preparing a long-term strategy for the management of the city's wastewater and stormwater, to be presented in a Sewer System Master Plan (SFPUC 2009a). The Sewer System Master Plan should examine the capacity, condition, and long-term management strategies for the city's combined sewer system infrastructure and facilities. As part of the long-term planning process, the SFPUC is examining alternative discharge options for treated combined sewer flows. In 2006, the SFPUC updated the Recycled Water Master Plan to develop a terrestrial discharge option for treated wastewater for landscaping purposes. The Recycled Water Master Plan identifies where and how San Francisco could most feasibly develop recycled water in the city and provides a strategy for implementing the recycled water projects (SFPUC 2009a).

Approximately 10 percent of the city is served by separate storm sewer systems or is lacking storm sewer infrastructure. Existing separate storm sewer systems do not generally provide treatment prior to discharge to the Lower Bay. Similarly, in areas lacking storm sewer infrastructure, untreated surface runoff drains directly to the bay (SFPUC and POSF 2009). The separate storm sewer systems are regulated under the NPDES, as discussed in Section 3.9.2, Regulatory Framework.

HPS had a combined sewer system in the 1940s. However, the DoN implemented a series of projects in 1958, 1973, and 1976 to separate the wastewater and storm sewer systems. Most of HPS is served by the separate storm sewer system, although areas along the shoreline drain directly to the bay via overland flow and subsurface migration of infiltrated water (SFRA 2004). The DoN has obtained Waste Discharge Identification Number (241S011455) for stormwater discharges under the Industrial General Permit (discussed in Section 3.9.2, Regulatory Framework). In accordance with this permit, HPS stormwater is discharged to San Francisco Bay through 33 storm water outfalls along the perimeter of HPS. HPS wastewater is conveyed to the SWPCP through a force main at Crisp Rd.

3.9.3.1.4 Existing Flood Risk

No flood insurance rate maps have been published by FEMA for the city; thus, the BFE for a 100-year flood event has not been formally established. However, on 21 September 2007, FEMA issued a preliminary flood insurance rate map for San Francisco. As shown on Figure 3.9.3-3, portions of HPS are within or adjacent to the following mapped 100-year flood hazard areas on the preliminary flood insurance rate map:

- Zone A: Areas with a one percent annual chance of flooding; no BFE determined; and
- Zone V: Coastal areas with a one percent or greater chance of flooding and an additional hazard associated with storm waves; no BFE determined.[3]

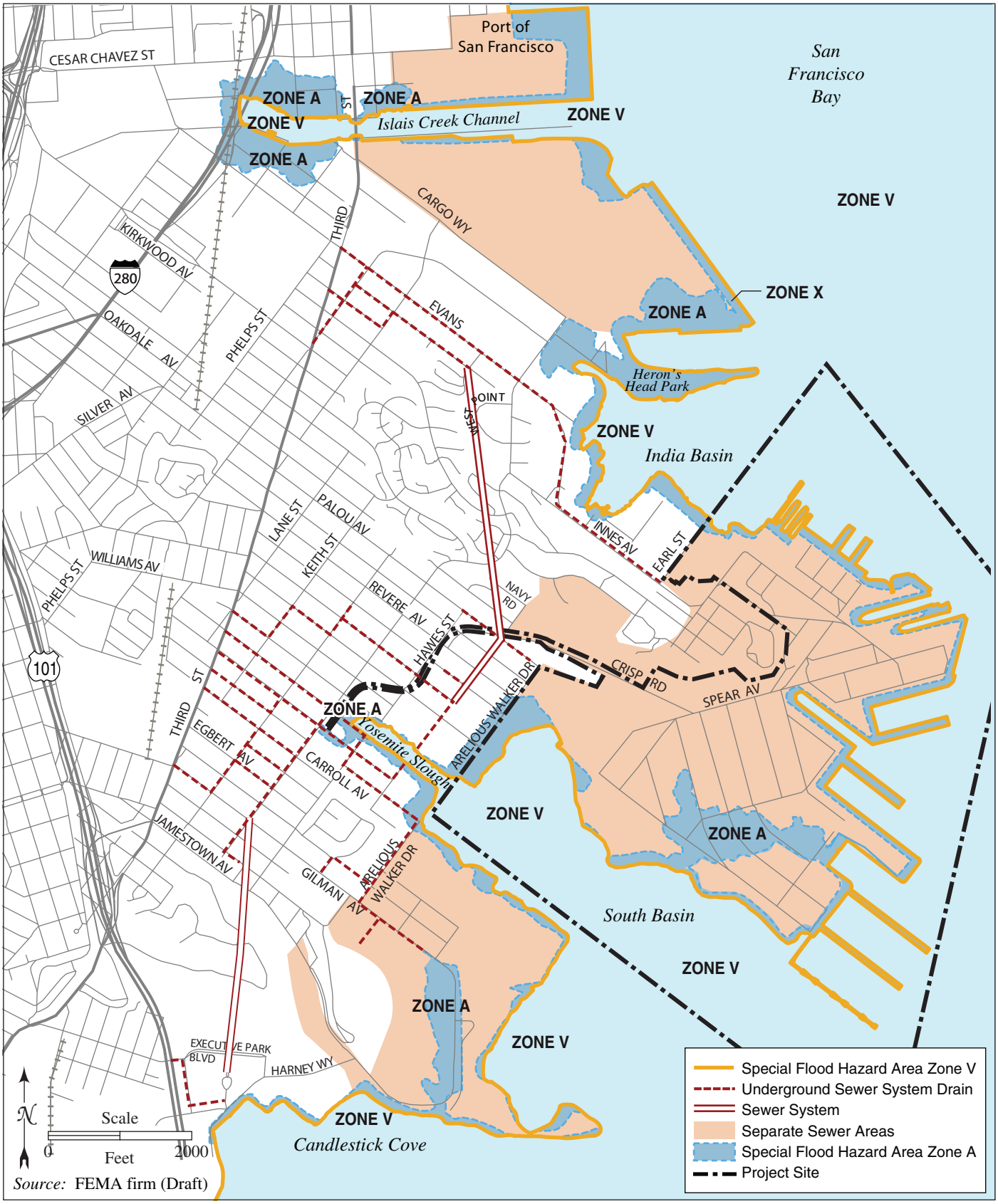
Interim floodplain maps have been prepared under the city's Floodplain Management Program to delineate SFHAs subject to the city's floodplain development requirements. The floodplain management regulations in this ordinance are consistent with the NFIP requirements for communities like San Francisco where FEMA is in the process of preparing, but has not completed, a final flood insurance rate map. The extent of designated Zone A SFHAs shown for the project site on the preliminary flood insurance rate map and the city's interim floodplain maps is essentially the same. However, the city has submitted comments to FEMA on the preliminary flood insurance rate map requesting revision of the Zone V (coastal flooding area) SFHA designation. After reviewing comments and appeals related to the preliminary flood insurance rate map, FEMA would finalize the flood insurance rate maps and publish them for flood insurance and floodplain management purposes. If final flood insurance rate maps are published prior to development of the proposed action, development within designated SFHAs would be subject to applicable FEMA floodplain development regulations, as described in Section 3.9.2, Regulatory Framework. The City Administrator has suggested the city may seek a variance from FEMA if a final flood insurance rate map retains the SFHAs identified on the preliminary flood insurance rate maps.

The shoreline along the project site consists of armored embankments (riprap of concrete debris), unprotected embankments, bulkheads, pile-supported wharves, and seawalls (Lennar Urban 2009b). The low-lying areas along the shoreline at HPS have been preliminarily mapped as Zone A SFHAs. A shoreline evaluation (Lennar Urban 2009b) determined that the shorelines adjacent to these areas need improvement because wave-induced run-up could result in coastal flooding unless the condition or elevation of the existing shoreline protection features along these areas is improved. Also, the storm drain system in low-lying areas throughout HPS is susceptible to flooding during high tides.

3.9.3.1.5 Dam Failure Inundation Risk

The project site is not within a mapped dam failure inundation area, although an area adjacent to the project site, between Yosemite Slough and US-101, has been mapped as a dam failure inundation zone for the University Mound Reservoir.

[3] NFIP regulations require coastal communities to ensure that buildings constructed in Zone V are anchored to resist wind and water loads acting simultaneously. Buildings in Zone V are subject to a greater hazard than buildings constructed in other types of floodplains. Not only do they have to be elevated above the Base Flood Elevation, they must be protected from the impact of waves, hurricane-force winds and erosion.



Source: FEMA firm (Draft)

Figure 3.9.3-3. Preliminary 100-Year Flood Zones within and Adjacent to the Project Site

3.9.3.1.6 Future Flood Risks

The potential for coastal flooding would likely be exacerbated in the foreseeable future because of rising sea levels. Globally, sea level has been rising for the past 10,000 years as the result of the end of the last glacial epoch (Gornitz 2007). The global rate of sea level rise had been relatively consistent over the last 5,000 years, at approximately 0.0039 ft/year (BCDC 1998). However, the current average rate of sea level rise for the San Francisco Bay area is 0.0066 ft/year at the San Francisco tide station (NOAA 2009). The difference between the rate of sea level rise measured in the Bay Area and the rate of global sea level rise can be accounted for by local changes in ground surface elevation, such as tectonic uplift or subsidence. The rate of relative sea level change is variable even on a local scale (Moffatt & Nichol 1988). There is also evidence that sea level rise is accelerating. The cause of the measured acceleration in the rate of sea level rise is primarily attributed to ocean warming (thermal expansion), continental ice melt, and land elevation changes (USEPA 2009b; Cayan *et al*. 2006; USACE 2009).

A project-specific sea level rise study was undertaken to develop planning and design guidance through the various phases of the project (Moffatt & Nichol 2009b). The study was based on an extensive literature review, recent guidance from regional agencies (BCDC, California Natural Resources Agency, USEPA, USACE), and knowledge of coastal processes of San Francisco Bay. The literature on sea level rise estimates varies widely, from an observed value of 8-in (20-cm) per century (historical measurements) to 33-in (84-cm) per century (Intergovernmental Panel on Climate Change [IPCC] maximum estimate). News articles and semi-empirical studies (Rahmstorf *et al*. 2007) based in part on recent measurements of ice cap melt, have stated that the increase in sea level rise over the next 100 years could be much higher than those estimated by IPCC. Even among projections considered plausible, albeit high, by the California and federal agencies participating in the Bay-Delta Program (CALFED) Independent Science Board, a sea level rise of 36 in (91 cm) would not occur until about 2075 to 2080 and by about 2100 the sea level rise could reach 55 in (140-cm). However, sea level observations since the publication date of the ice cap melt studies, although not conclusive enough to establish a new trend in sea level rise, do not show the accelerated sea level rise trajectory predicted by some of the reports (Rahmstorf *et al*. 2007). State and federal regulatory agencies review a range of possible scenarios when evaluating the potential risks and costs of sea level rise for future development projects. For planning purposes, the USACE (2009) evaluates three scenarios of sea level rise by 2100; low risk, assuming the current rate of sea level rise, or 19.7 in (0.5 m); moderate risk, assuming a sea level rise of 39.4 in (1.0 m); and high risk, assuming a sea level rise of 59.0 in (1.5 m). California Executive Order S-13-08 (14 November 2008) specifies that all state agencies planning construction projects in areas vulnerable to future sea level rise should consider a range of sea level rise scenarios for the years 2050 and 2100 to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. The BCDC recommended that Bayfront development consider risk values of 16 in (0.41 m) of sea level rise by 2050 and 55 in (1.4 m) of sea level rise by 2100 (BCDC 2009). These values were also adopted by the State Coastal Conservancy (SCC). These values are the basis for project design and environmental controls to address the risks of potential sea level rise hazards related to hydrology and flooding (see Chapter 2 of this SEIS).

Although FEMA has not formally defined the BFE for the project site, Lennar Urban (2009b) evaluated 100-year high tide at the Hunters Point tide gauge (the closest gauge to HPS) is +6.7 ft based on the extreme high tide water level elevations for the project site using NOAA tide gauge data. The estimated National Geodetic Vertical Datum (NGVD29), equivalent to -1.77 ft (-0.54 m) based on the San Francisco City Datum (SFCD). The study estimates that development at the project site constructed at a level less than +6.7 ft NGVD29 (-1.8 ft SFCD) could be susceptible to flooding associated with the 100-year extreme high tide event. However, as sea level rises, coastal flood hazards associated with storm-related flooding, extreme high tides, and/or tsunamis adjacent to or affecting the project site would increase. Assuming a 36-in (0.91 m) rise in sea level by 2075, the future base flood (100-year event)

elevation would be +9.7 ft NGVD29 (+1.2 ft SFCD). Projected inundation zones, given a 36-inch (91 cm) increase in sea level, are shown in Figure 3.9.3-4. This figure reflects the site conditions without fill or other shoreline improvements.

3.9.3.1.7 Extreme High Tide, Tsunamis, Seiches and Mudflows

Because of the proximity of the project site to San Francisco Bay, coastal flooding hazards, including tsunamis, seiches, and extreme high tides, could occur. Tsunamis are waves caused by earthquakes that disturb the ocean floor or by large submarine landslides. The expected 100-year tsunami wave run-up height at South Basin (which is adjacent to HPS) is +4.8 ft NGVD29 (-3.8 ft SFCD) (USACE 1975).

A seiche is an oscillation of a body of water. Seiches occur most frequently in enclosed or semi-enclosed basins, such as lakes, bays, or harbors, and may be triggered by strong winds, changes in atmospheric pressure, earthquakes, tsunamis, or tides. Triggering forces that set off a seiche are most effective if they operate at specific frequencies relative to the size of an enclosed basin. Coastal measurements of sea level often show seiches with amplitudes of a few centimeters and periods of a few minutes, caused by oscillations of the local harbor, estuary, or bay, superimposed on the normal tidal changes. Tidal records for San Francisco Bay have been maintained for over 100 years and during this period a damaging seiche has not occurred. A seiche of approximately 4 in (0.1 m) occurred during the 1906 earthquake, an event of magnitude 8.3 on the Richter scale. It is probable that an earthquake similar to the 1906 event would be the largest experienced in the Bay Area (Ellsworth 2003); consequently a seiche larger than 4 in (0.1 m) is considered unlikely to occur.

A mudflow is a type of landslide that occurs when runoff saturates the ground. Soil that is dry during dry weather turns into a viscous solution that slides downhill. Mudflows typically cause more damage than clear-water flooding because debris-filled water moves with greater force. The potential for landslides to occur at the project site is discussed in Section 4.8, Geology and Soils.

3.9.3.1.8 Groundwater Basins

Groundwater basins in the vicinity of the project site, as defined in the Basin Plan, include (from north to south) Islais Valley (Basin ID: 2-33; area: 9.2 mi^2), South San Francisco (Basin ID: 2-37; area: 3.4 mi^2), and Visitacion Valley (Basin ID: 2-32 area: 9 mi^2) (RWQCB 2007). Hydrologic regions and basin identification numbers are designated by DWR.

Sources of recharge into the groundwater basins include infiltration of rainfall, landscape irrigation, and leakage from water, wastewater, and storm drain pipes. The average groundwater recharge for the water year 1987 to 1988 was 1,836 acre-feet per year in Islais Valley, 696 acre-feet per year in South San Francisco, and 269 acre-feet per year in the Visitacion Valley groundwater basin (DWR 2003). Generally, the basins in the project site, which are not used for water supply, have maintained stable groundwater levels (DWR 2003). Groundwater beneath the project site flows from the west towards the Lower Bay (CE2-Kleinfelder 2009). Local anomalies in groundwater elevation can also be caused by the interaction of subsurface utilities (sanitary sewer, storm sewer, and water supply lines) with the regional groundwater regime. Storm/sanitary sewer lines and backfill in utility trenches can serve as preferential pathways for groundwater flow and can either discharge or receive water. Local anomalies in groundwater elevation have also been caused by groundwater injection/extraction activities associated with treatability studies (CE2-Kleinfelder 2009).

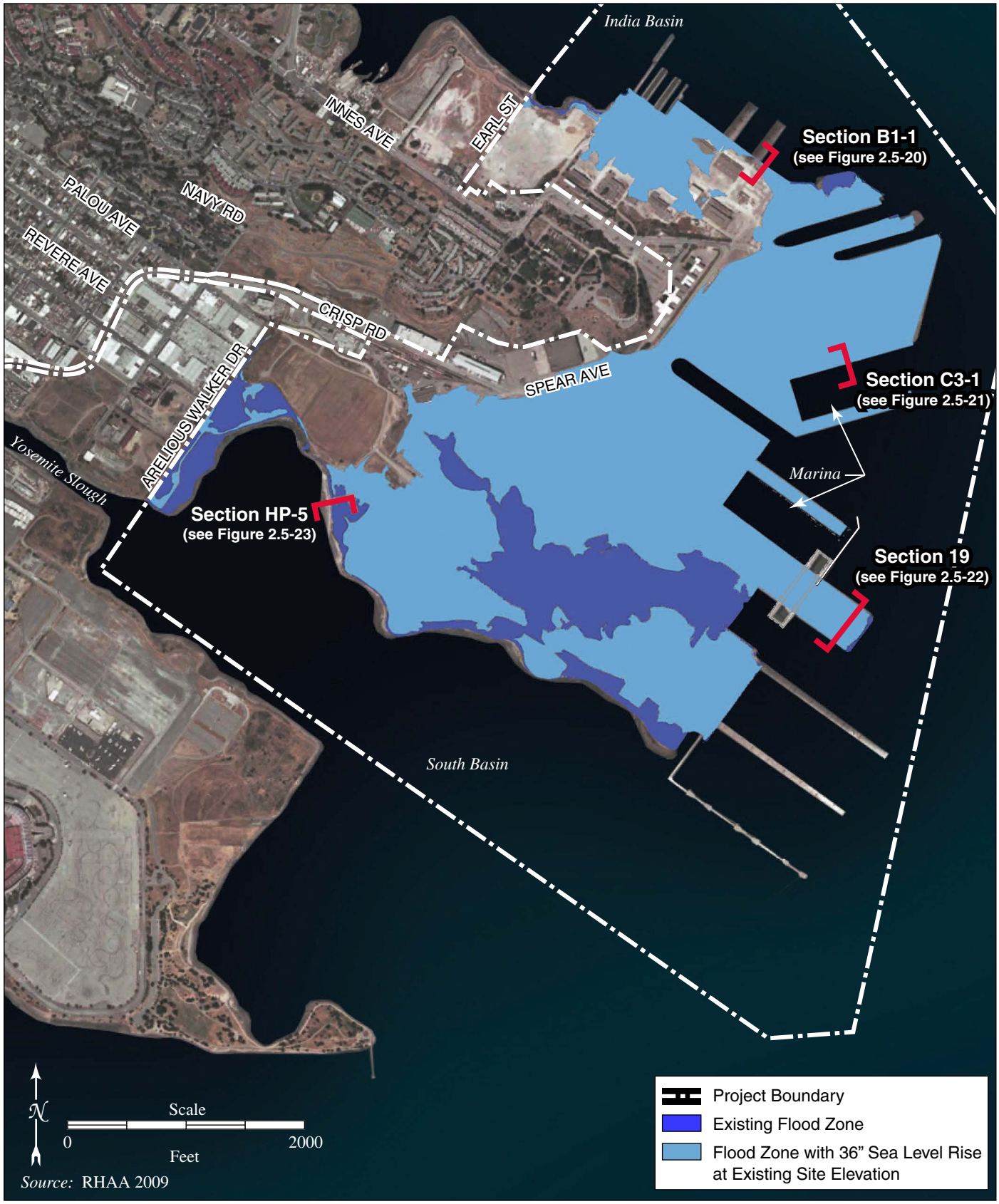


Figure 3.9.3-4. Flood Zones (Existing and with a 36-Inch Sea Level Rise)

3.9.3.2 Surface Water Quality

According to the Basin Plan, beneficial uses of the Lower San Francisco Bay, adjacent to the project site, include industrial service supply; ocean, commercial and sport fishing; shellfish harvesting; estuarine habitat; fish migration; preservation of rare and endangered species; fish spawning; wildlife habitat; water contact recreation; non-contact water recreation; and navigation. Water quality objectives for this portion of the bay, listed in Table 3.9.3-2, are intended to protect these beneficial uses.

3.9.3.2.1 Bay Water Quality

Surface water quality in the vicinity of the project site is affected by past and current land uses at the site. In 1993, the San Francisco Estuary Institute initiated the Regional Monitoring Program (RMP) for San Francisco Bay for the general purposes of assessing regional water quality conditions and characterizing patterns and trends of contaminant concentrations, as well as identifying general sources of contamination to the bay. The program has established a database of water quality and sediment quality, particularly with regard to toxic and potentially toxic trace elements and organic contaminants. There are no water quality RMP monitoring stations (fixed locations or random sites) close to the project site, so trends identified by this monitoring program reflect regional (i.e., Central Bay), rather than site-specific, water quality conditions. Concentrations for water quality parameters in the Central Bay, based on monitoring results from the RMP for 2006, are listed in Table 3.9.3-1. Based on these values, water column concentrations of chlordanes, dichloro-diphenyl-trichloroethane (DDT), and polychlorinated biphenyls (PCBs) in the Central Bay exceeded the respective 4-day average regulatory thresholds (SFEI 2007a and b).

Table 3.9.3-1. Regulatory Thresholds for Bay Water Quality and Average Conditions for Central Bay

Compound	*Units*[a]	*Concentration*[c]	*4-day Average*	*1-hour Average*	*24-hour Average*
Dissolved Arsenic	µg/L	1.5	36	69	NA
Dissolved Cadmium	mg/L	0.06	9.3	42	NA
Dissolved Copper[b]	µg/L	1.8	3.1	4.8	NA
Dissolved Lead	µg/L	0.011	8.1	210	NA
Total Mercury	µg/L	0.0051	0.025	2.1	NA
Dissolved Nickel	µg/L	1.28	8.2	74	NA
Dissolved Silver	µg/L	0.004	NA	1.9	NA
Total Selenium	µg/L	0.098	5.0	20	NA
Dissolved Zinc	µg/L	0.62	81	90	NA
Polycyclic Aromatic Hydrocarbons	µg/L	7.65	NA	NA	15
Chlordane	µg/L	0.021	0.004	0.09	NA
DDTs	µg/L	0.073	0.001	0.13	NA
PCBs	µg/L	0.081	0.001	NA	NA
Others				***Description***	
Salinity	PSU	27.1-32.7	NA	No criterion	
Dissolved Oxygen	mg/L	5.8-7.8	5.0	Minimum	
Total Suspended Solids	mg/L	10	NA	No criterion	

Notes:
NA = not applicable.
SU = Standard Unit.
PSU = Practical Salinity Unit.
NTU = Nephelometric Turbidity Unit.
MPN = Most Probable Number.
a. Where mg/L = milligrams per liter (parts per million), µg/L = micrograms per liter (parts per billion), mL = milliliters, SU = standard units, NTU = Nephelometric Turbidity Units, MPN = Most Probable Number, geometric mean = logarithmic average of at least 5 samples per month.
b. USEPA may update these values without requiring a Basin Plan amendment. Source of current limit: Central Valley Regional Water Quality Control Board, 2008, Water Quality Limits for Constituents and Parameters, A Compilation of Water Quality Goals July 2008 Edition, Available at: http://www.swrcb.ca.gov/water_issues/programs/water_quality_goals/index.shtml.
c. Source: SFEI 2007a and b.
Source: RWQCB 2007.

The Lower Bay has been identified as an impaired water body by the SWRCB, in compliance with Section 303(d) of the CWA, because it does not meet the water quality objectives of the Basin Plan, California Toxics Rule (CTR), or National Toxics Rule (NTR). The pollutants that have been identified as causing impairment in the Lower Bay are chlordane, DDT, dieldrin, dioxin compounds, furan compounds, mercury, and PCBs, as well as exotic species (USEPA 2009c). Islais Creek, north of the project site, is listed as an impaired water body because of ammonia, chlordane, dieldrin, hydrogen sulfide, polycyclic aromatic hydrocarbons (PAHs), and sediment toxicity. Potential sources of pollutants identified in the impaired water bodies adjacent to the project site include non-point sources, CSOs, industrial and municipal point sources, atmospheric deposition, ballast water, resource extraction, natural sources, and unknown sources. A TMDL for the entire San Francisco Bay has been developed for mercury and was incorporated by amendment into the Basin Plan. A TMDL for the entire San Francisco Bay has also been developed for PCBs and its adoption is pending approval by the SWRCB and the USEPA (see Section 3.9.2, Regulatory Framework).

3.9.3.2.2 Beach Water Quality

The SFPUC and the DPH collaboratively conduct a shoreline beach water quality monitoring program that consists of year-round weekly sampling at 14 locations around the perimeter of San Francisco for fecal indicator bacteria, including total coliform, *Escherichia coli*, and enterococcus bacteria. The sampling locations at Jack Rabbit Beach, Windsurfer Circle, and Sunnydale Cove are adjacent to the project site. The Windsurfer Circle and Sunnydale Cove sampling locations are nearest to CSO 43 (Candlestick Cove) and the Jack Rabbit Beach sampling location is south of CSO 42 (South Basin) (Figures 3.9.3-1 and 3.9.3-2).

Water quality in the vicinity of the three beach water quality locations is affected by both separate sewer system discharges and combined sewer discharges. Jack Rabbit Beach has the lowest fecal indicator bacteria concentrations for both wet- and dry-weather conditions, and Windsurfer Circle has the highest concentrations. Bacteria concentrations are higher in wet weather than in dry weather for all stations. Twenty wet-weather samples exceeded the Basin Plan single sample objective for total coliform (10,000 Most Probable Number [MPN] per 100 milliliters) at Sunnydale Cove; 42 wet-weather samples exceeded this objective at Windsurfer Circle; and no wet-weather samples exceeded this objective at Jack Rabbit Beach. Eleven dry weather samples exceeded the single sample objective for total coliform at Windsurfer Circle; two dry weather samples exceeded this objective at Jack Rabbit Beach; and no dry weather samples exceeded this objective at Sunnydale Cove (Tables 3.9.3-2 through 3.9.3-4).

3.9.3.2.3 Stormwater Discharge Quality

Stormwater runoff that flows over the landscape picks up dissolved chemicals, particulate material, and debris from the surface prior to discharge into a receiving water body. The effects of this runoff water on surface water quality depend upon the amount and type of material being picked up and transported, as well as the amount of water or flow rate in the receiving water. Constituents and concentrations within runoff water vary according to land cover, land use, topography, and the amount of impervious cover, as well as the intensity and frequency of irrigation or rainfall. Runoff from undeveloped areas would reflect the natural chemistry and ecology of the watershed. Runoff in developed areas typically contains oil, grease, and metals accumulated in streets, driveways, parking lots, and rooftops, as well as pesticides, herbicides, particulate matter, nutrients, animal waste, and other oxygen-demanding substances from landscaped areas. Runoff from open space areas and parks may typically contain nutrients, pesticides, organic debris, bacteria, sediment, and other contaminants. Runoff conditions associated with the project site are described below.

Table 3.9.3-2. Summary of Total Coliform Data for South Basin/Candlestick Point, 2004-2008

Sample Location	Sunnydale Cove (Station No. 300.1)		Windsurfer Circle (Station No. 301.1)		Jack Rabbit Beach (Station No. 301.2)	
	Dry	Wet	Dry	Wet	Dry	Wet
No. Samples	231	95	250	108	223	71
No. Non-Detects	8	1	10	0	18	1
No. Samples that Exceeded Quantification Range of the Analysis(1)	0	11	5	30	1	0
Average [MPN/100 mL]	413	5,772	1,729	10,010	350	947
Coefficient of Variation (CV)(2)	2.1	1.5	2.7	1.0	5.1	1.4
Median [MPN/100 mL] (Basin Plan Standard median < 240)(3)	134	1,296	193	5,794	63	345
No. samples > 10,000 MPN/100 mL (Basin Plan Standard)(4)	0	20	11	42	2	0

Notes:
MPN = Most Probable Number as quantified by multiple-tube fermentation.
"Wet" and "Dry" samples were defined based on rainfall amounts. A "Wet" sample is defined as a sample collected when the sum of the daily and 24-hour antecedent rainfall depth was ≥ 0.1 inch. A "Dry" sample is defined as a sample collected when the rainfall depth was < 0.1 inch.
The sample detection limit was used to calculate statistics for non-detect concentrations. When a result was reported as > X MPN/100 mL, X was used to calculate statistics (see also Note 1).

1. The sample result was reported as greater than the reported concentration because the result exceeded the quantification range of the analysis, and a dilution and reanalysis of the sample was not performed. Consequently, these results have a low bias.
2. The Coefficient of Variation (CV) is the ratio of the standard deviation and the average concentration. A CV greater than 1.0 generally indicates high variability in the data.
3. The Basin Plan objective is based on a minimum of five consecutive samples equally spaced over a 30-day period. This analysis compares the objective to the median of all data collected from 2004-2008.
4. The Basin Plan objective states that no single sample should exceed 10,000 MPN/ml.

Source: SFPUC 2009a.

Table 3.9.3-3. Summary of E. coli Data for South Basin/Candlestick Point, 2004-2008

Sample Location	Sunnydale Cove (Station No. 300.1)		Windsurfer Circle (Station No. 301.1)		Jack Rabbit Beach (Station No. 301.2)	
	Dry	Wet	Dry	Wet	Dry	Wet
No. Samples	231	95	250	108	223	71
No. Non-Detects	71	8	58	4	76	13
No. Samples that Exceeded Quantification Range of the Analysis(1)	0	3	0	2	0	0
Average [MPN/mL]	96	1,649	137	2,215	77	147
Median [MPN/mL]	20	121	20	245	10	41
Coefficient of Variation (CV)(2)	2.9	3.0	5.3	2.1	3.4	1.7

Notes:
MPN = Most Probable Number as quantified by multiple-tube fermentation.
"Wet" and "Dry" samples were defined based on rainfall amounts. A "Wet" sample is defined as a sample collected when the sum of the daily and 24-hour antecedent rainfall depth was ≥ 0.1 inch. A "Dry" sample is defined as a sample collected when the rainfall depth was < 0.1 inch.
The sample detection limit was used to calculate statistics for non-detect concentrations. When a result was reported as > X MPN/100 mL, X was used to calculate statistics (see also Note 1).
The Basin Plan does not include water quality objectives for E. Coli.

1. The sample result was reported as greater than the reported concentration because the result exceeded the quantification range of the analysis, and a dilution and reanalysis was not performed. Consequently, these results have a low bias.
2. The Coefficient of Variation (CV) is the ratio of the standard deviation and the average concentration. A CV greater than 1.0 generally indicates high variability in the data.

Source: SFPUC 2009a.

Table 3.9.3-4. Summary of Enterococcus Data for South Basin/ Candlestick Point, 2004-2008

Sample Location	*Sunnydale Cove (Station No. 300.1)*		*Windsurfer Circle (Station No. 301.1)*		*Jack Rabbit Beach (Station No. 301.2)*	
	Dry	**Wet**	**Dry**	**Wet**	**Dry**	**Wet**
No. Samples	231	95	250	108	223	71
No. Non-Detects	107	12	100	9	131	15
No. Samples that Exceeded Quantification Range of the Analysis[1]	0	2	0	2	0	0
Average [MPN/mL]	55	1,352	80	1,672	24	152
Median [MPN/mL]	10	98	10	217	10	31
Coefficient of Variation (CV)[2]	2.7	3.2	4.7	2.6	1.9	2.3

Notes:
MPN = Most Probable Number as quantified by multiple-tube fermentation.
"Wet" and "Dry" samples were defined based on rainfall amounts. A "Wet" sample is defined as a sample collected when the sum of the daily and 24-hour antecedent rainfall depth was ≥ 1.0 inch. A "Dry" sample is defined as a sample collected when the rainfall depth was < 0.1 inch.
The sample detection limit was used to calculate statistics for non-detect concentrations. When a result was reported as > X MPN/100 mL, X was used to calculate statistics (see also Note 1).
The Basin Plan does not include water quality objectives for Enterococcus bacteria.

1. The sample result was reported as greater than the reported concentration because the result exceeded the quantification range of the analysis, and a dilution and reanalysis was not performed. Consequently, these results have a low bias.
2. The Coefficient of Variation (CV) is the ratio of the standard deviation and the average concentration. A CV greater than 1.0 generally indicates high variability in the data.

Source: SFPUC 2009a.

Hunters Point Shipyard

Stormwater runoff from HPS currently is permitted under the General NPDES Permit for Stormwater Discharges Associated with Industrial Activities (Industrial General Permit) (Water Quality Order 97-03-DWQ; General Permit No. CAS000001). Water quality monitoring is performed according to terms specified in the Industrial General Permit (Section 3.9.2), which requires sampling of stormwater runoff from all outfalls that produce a discharge and analysis of basic indicator parameters. By comparing USEPA stormwater quality benchmarks[4] to the stormwater monitoring data from the HPS site, the extent to which stormwater pollutant concentrations are elevated above those benchmarks can be identified. Indicator parameters exceeding the benchmarks do not necessarily constitute a violation of water quality standards or an exceedence of permit conditions. Instead, benchmarks are designed to indicate a potential problem and to measure if existing BMPs are effective.

In addition to basic indicator parameters, certain facilities must analyze stormwater runoff samples for additional parameters. The additional parameters generally include heavy metals, such as copper and zinc. In addition, runoff from the industrial landfill portion of HPS is monitored for additional parameters that could potentially be present at the landfill, in accordance with the facility's Storm Water Discharge Management Plan. Additional constituents analyzed in runoff from the industrial landfill include semi-volatile organic compounds, PCBs, and metals.

Stormwater quality data from individual outfalls at HPS are summarized in Table 3.9.3-5 and compared to benchmark levels specified in the 2005 Industrial General Permit. Concentrations for conductivity, TSS, total copper, total zinc, and total lead exceeded parameter benchmarks at one or more outfalls. The benchmarks for conductivity and TSS were exceeded most frequently.

[4] The Draft Final 2005 Industrial General Permit contains parameter benchmark concentrations for certain constituents that are derived from USEPA's Multi-Sector General Permit (MSGP). The benchmarks would take effect when the Draft Final Permit is adopted. The benchmarks are not numeric discharge limits, but are used to assess if site BMPs are effective for reducing concentrations of pollutants of concern. The Draft Permit requires that if runoff concentrations are above one or more benchmarks, the discharger must revise its SWPPP to include more effective BMPs, and collect samples from the next two consecutive qualifying storms.

Table 3.9.3-5. Stormwater Quality Data From HPS Outfalls

Parameter	Outfall										
	1	7	16	19	20	33	OLF1	OLF101	DP1	DP2	Benchmark
Conductivity (mhos/cm)	12,057	9.295	8,993	976	2,600	920	435	1,340	248	160	200
Total Suspended Solids (mg/L)	433	41	154	65	97	620	357	6	149	138	100
Oil & Grease (mg/L)	5.2	5.0	4.9	5.0	5.3	5.5	5.4	4.8	4.3	4.8	15
pH (Standard Units)	7.5	7.6	7.5	6.0	6.2	7.3	7.6	7.8	7.7	7.3	6.0 – 9.0
Total Organic Carbon (mg/L)	7.7	NA	NA	13.2	13.7	25.3	NA	NA	NA	NA	110
Total Arsenic (µg/L)	NA	NA	3.3	1.3	1.1	2.2	NA	16.3	6.1	6.2	168.54
Total Cadmium (µg/L)	NA	NA	1.0	1.4	1.1	1.0	NA	5.0	4.1	5.0	15.9
Total Chromium (µg/L)	NA	NA	4.5	7.7	14.8	3.2	NA	8.2	39.7	30.1	None
Total Copper (µg/L)	NA	NA	72	66	43	148	NA	71	158	222	63.6
Total Lead (µg/L)	NA	NA	21	73	130	15	NA	5	45	53	81.6
Total Mercury (µg/L)	NA	NA	0.2	0.2	0.2	0.25	NA	0.2	0.63	0.98	2.4
Total Nickel (µg/L)	NA	NA	6.8	8.2	11.7	6.8	NA	15.6	74.1	58.2	1,417
Total Selenium (µg/L)	NA	NA	6.3	1.0	1.0	1.0	NA	10	6.0	7.5	238.5
Total Zinc (µg/L)	NA	NA	267	188	195	61	NA	31	314	339	117
PCB Aroclors (µg/L)	NA	NA	NA	NA	NA	NA	NA	<0.99	<1.3	0.57-1.1	None
SVOCs/PAHs (µg/L)	NA	NA	NA	NA	NA	NA	NA	<50	<49	<50	None

Notes:
NA = The parameter was not analyzed.
PCB = Polychlorinated biphenyl; SVOCs/PAHs = Semi-volatile organic compounds/polycyclic aromatic hydrocarbons.
Sources: BRAC no date, 2005, 2006, 2007a, 2007b, 2008.

3.9.3.3 Groundwater Quality

Portions of the Islais Valley, Visitacion Valley, and South San Francisco groundwater basins underlie the project site. Existing designated beneficial uses are industrial service and process supplies (RWQCB 2007). Potential beneficial uses of these groundwater basins include municipal and domestic supplies (drinking water) and agricultural supplies; however, the underlying groundwater is not suitable as a drinking water supply.

Principal contaminants in groundwater come from both nonpoint and point sources and include nitrates, pesticides, and industrial chemicals such as solvents (Hartner 2003). Most groundwater contamination is local in scale. The majority of groundwater pollutants from nonpoint sources are salts and nitrates, which adversely affect approximately 10 to 15 percent of California's water wells, followed by pesticides and industrial contaminants. Bacteria can also migrate to groundwater and contaminate groundwater resources. These contaminants, often associated with septic systems and animal wastes, are transported by water percolating from the soil to the water table, where they enter the groundwater (Hartner 2003).

As it passes beneath the project site, groundwater may become contaminated with bacteria and nutrients from leaky sewers, septic tanks, lawn fertilizers, pet waste, and other sources. Historic land uses within the project site may have resulted in the contamination of soil or groundwater with hazardous materials, as noted in Section 3.7, Hazards and Hazardous Substances. Finally, groundwater near the shoreline may also mix with saltwater that ebbs and flows into coastal waters with the tides (Johnson 2006).

DWR has limited information on the quality of the groundwater beneath the project site. However, there are numerous locations within the boundaries of the project site where the underlying groundwater has

been affected by releases of various inorganic and organic constituents associated with previous land uses, as noted in Section 3.7, Hazards and Hazardous Substances. Figure 3.9.3-5 depicts the locations of groundwater contamination at the project site as well as inferred depth to groundwater.

The primary contaminants of concern in groundwater include volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total petroleum hydrocarbons (TPH), PCBs, pesticides, cyanide, metals, and radionuclides (Johnson 2006). Concentrations of VOCs and certain metals in groundwater at HPS have exceeded water quality criteria. The landfill on HPS also contains radium dials that could contribute to groundwater contamination (USEPA 2009c). Refer to Section 3.7 for further discussion of groundwater quality conditions related to hazardous materials and radionuclide contamination and remediation activities.

3.9.3.4 Sediment Quality

Regional sediment sampling in San Francisco Bay is being conducted as part of the RMP. The RWQCB also conducted and/or reviewed sediment quality data as part of the Bay Protection and Toxic Cleanup Plan for sites throughout the Bay (SWRCB 1999). Lower Islais Creek was identified as a toxic hot spot[5] because of sediment contamination and impacts to aquatic life; the constituents of concern included PCBs, chlordane, dieldrin, endosulfan, hydrogen sulfide, ammonia, and PAHs. The RWQCB indicates the most likely source of pollutants in sediments is stormwater entering the channel directly or through the CSOs. Another possible source is discharges from the SWPCP outfall at Quint St. However, because of improvements in the treatment of discharges from the CSOs and the Quint St outfall, existing contaminants may reflect historical discharges from these sources to a greater extent than current discharges (SWRCB 1999).

Contaminant concentrations in sediments collected by the RMP near the project site are listed in Table 3.9.3-6. Sediments contained greater than 90 percent fines (silts plus clays), with total organic carbon (TOC) concentrations from 1.28 to 1.35 percent. Concentrations of nickel and high molecular weight PAHs were elevated relative to the corresponding effects range-median (ERM) values (SFEI 2007a and b).

As noted in Section 3.7, Hazards and Hazardous Substances, a shoreline investigation of sediment contamination was conducted for the 440 acres (180 hectares) of underwater land surrounding all portions of the HPS site to the north, east, south, and southwest (see Section 3.7 for more information).

The SFPUC (2004) evaluated ecological risk from sediment quality around Yosemite Slough. Only the southeastern portion of Yosemite Slough is within the project site. Contaminant concentrations in Yosemite Slough surface sediments are summarized in Table 3.9.3-7. Mercury and nickel in surface samples exceeded effects range median (ERM) values; however, even the SFPUC reference sites exceeded the nickel ERM. Most other heavy metal concentrations were elevated compared to reference site concentrations, but did not exceed ERMs. Metal concentrations in subsurface sediments generally decreased with depth, and concentrations at depths greater than 2 ft (0.6 m) typically were consistent with SFPUC reference site-surface sediment concentrations.

[5] According to SFEI, toxic hot spots are defined as: "Locations in enclosed bays, estuaries, or the ocean where pollutants have accumulated in the water or sediment to levels that (1) may pose a hazard to aquatic life, wildlife, fisheries, or human health, (2) may impact beneficial uses, or (3) exceed State Water Resources Control Board or Regional Water Quality Control Board-adopted water quality or sediment quality objectives." SFEI 2009, *Glossary of Terms*, website: http://www.sfei.org/rmp/rmp_glossary.html#top (accessed 30 September 2009).

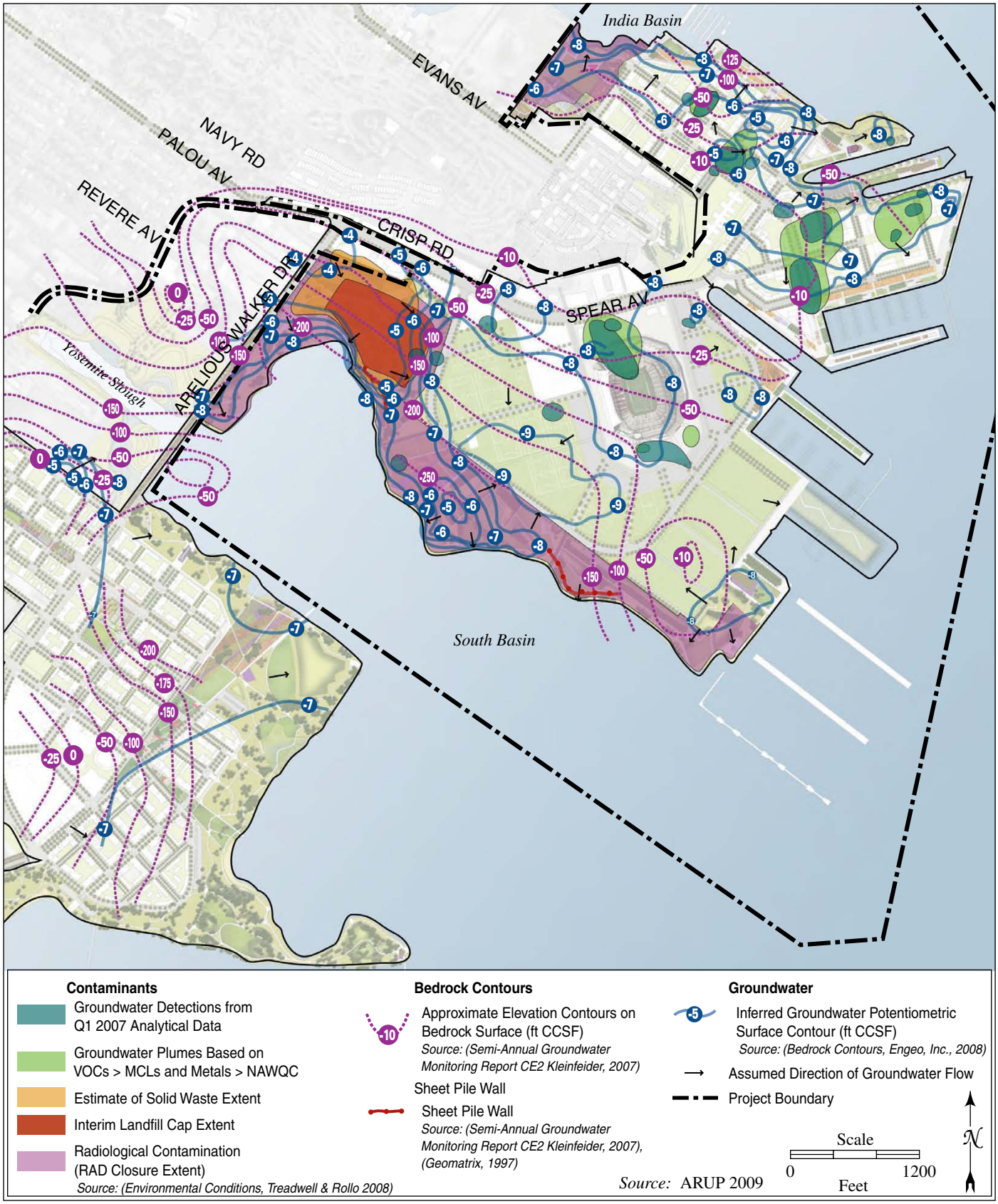


Figure 3.9.3-5. Existing Groundwater Contamination

Table 3.9.3-6. Sediment Contaminant Concentrations in the Vicinity of the Hunters Point Shipyard

Metal	Units	CB002S[1]	CB028S[1]	ERM[2]	Reference Mean[1]
Fines	%	97	91	NA	NA
Sand	%	3	9	NA	NA
TOC	%	1.35	1.28	NA	NA
Arsenic	mg/kg	5.43	7.80	70	7.29
Cadmium	mg/kg	0.142	0.171	9.6	0.32
Chromium	mg/kg			370	96.4
Copper	mg/kg	43.4	38.6	270	39.3
Lead	mg/kg	23.1	18.7	218	18.2
Mercury	mg/kg	0.349	0.245	0.71	0.24
Nickel	mg/kg	85.3	76.2	51.6	86.4
Selenium	mg/kg	0.122	0.126	NA	0.25
Silver	mg/kg	0.308	0.281	3.7	0.31
Zinc	mg/kg	119	103	410	105
LMW PAH	µg/kg	416	1,406	3,160	101
HMW PAH	µg/kg	3,802	10,072	9,600	562
Total PAH	µg/kg	4,218	11,478	44,792	663
Total DDT	µg/kg	1.13	1.20	100	4.27
Total Chlordane	µg/kg	0.21	0.14	6	0.33
Total PCB	µg/kg	3.74	5.31	180	7.84

Notes:
1. Regional Monitoring Program Database.
2. *Source*: Long *et al*. 1995.
NA = not applicable.

Table 3.9.3-7. Yosemite Slough Surface Sediment Contaminant Concentrations

Metal	Units	Minimum	Maximum	Mean	Standard Deviation	ERM[1]	Reference Mean[2]
Arsenic	mg/kg	5.16	12.0	8.95	1.68	70	7.29
Cadmium	mg/kg	0.37	1.69	0.76	0.30	9.6	0.32
Chromium	mg/kg	93.0	202	133	23.7	370	96.4
Copper	mg/kg	69.8	141	97.0	14.9	270	39.3
Lead	mg/kg	69.3	197	130	26.4	218	18.2
Mercury	mg/kg	0.35	1.21	0.59	0.17	0.71	0.24
Nickel	mg/kg	55.7	152	91.3	16.1	51.6	86.4
Selenium	mg/kg	0.16	0.96	0.39	0.16	NA	0.25
Silver	mg/kg	0.33	1.06	0.59	0.16	3.7	0.31
Zinc	mg/kg	164	316	221	32.8	410	105
LMW PAH	µg/kg	131	1731	412	NR	3,160	101
HMW PAH	µg/kg	799	6730	2209	NR	9,600	562
Total PAH	µg/kg	930	8461	2622	NR	44,792	663
Total DDT	µg/kg	4.5	142.1	58.7	NR	100	4.27
Total Chlordane	µg/kg	10.3	88.1	36.2	NR	6	0.33
Dieldrin	µg/kg	0.1	110.0	22.1	NR	8	0.67
Total PCB	µg/kg	85.0	1317.3	473.6	NR	180	7.84

Notes:
1. Source: Long *et al*. 1995.
2. Mean reference concentration for all surveys.

No surface sediment samples from Yosemite Slough exceeded the PAH ERM, and only one subsurface sample exceeded the PAH ERM. Most surface samples exceeded the ERM for PCBs, and all samples were at least an order of magnitude higher than the mean SFPUC reference site concentration. For subsurface samples, the highest concentrations generally were in the surface to one-foot (one foot below ground surface) core layers, and PCB ERMs were exceeded in almost all cases. Many chlorinated pesticides were not detected above the analytical practical quantitation limit. Total chlordane, DDT, and dieldrin were detected most frequently in samples. All concentrations were elevated compared to the SFPUC reference site mean concentrations, and most mean concentrations exceeded ERMs (SFPUC 2004). Therefore, these data indicate that sediments in Yosemite Slough have been adversely impacted by historic land uses, and sediment quality (for mercury and organic chemicals) could impair the beneficial uses of the bay.

3.10 Utilities

3.10.1 Background

This section describes the existing utilities and service systems serving the HPS site, including water supply, wastewater conveyance and treatment, solid-waste collection and disposal, energy (including electricity, natural gas, and petroleum fuels), and telecommunications.

3.10.2 Regulatory Framework

3.10.2.1 Federal

3.10.2.1.1 Water

Safe Drinking Water Act

The basic regulations governing the Regional Water System are associated with the federal and California *Safe Drinking Water Act*s. The federal *Safe Drinking Water Act* (SDWA), passed in 1974 and amended in 1986 and 1996, is the nation's primary law regulating drinking water quality and is implemented by the USEPA. The SDWA authorizes the USEPA to set national health-based standards for drinking water and requires many actions to protect drinking water and its sources, including rivers, lakes, reservoirs, springs, and groundwater wells. In addition to source water protection, the SDWA also provides for treatment, monitoring, sampling, analytical methods, reporting, and public information requirements.

Implementation and enforcement of both the federal and California *Safe Drinking Water Act*s are under the jurisdiction of the California Department of Public Health (CDPH), Division of Drinking Water and Environmental Management. Drinking water regulations are set forth in 17 and 22 CCR.

The amended federal SDWA established phases of regulation and a number of regulatory deadlines to address drinking water requirements. This amended SDWA is implemented through subsidiary rules for regulation of specific contaminants or for monitoring or treatment requirements.

3.10.2.1.2 Wastewater

Clean Water Act

The 1972 amendments to the federal CWA prohibit the discharge of pollutants to navigable waters from a point source unless the discharge is authorized by a NPDES permit. RWQCB issues NPDES permits for stormwater and wastewater outfalls (point sources). An NPDES permit contains discharge prohibitions, effluent limitations, and necessary specifications and provisions that ensure proper treatment, storage, and disposal of the waste. The permit often contains a monitoring program that provides information needed to demonstrate compliance with permit conditions. NPDES permits are issued individually for point-source discharges, which usually refer to waste emanating from a single, identifiable location; a non-point source usually refers to waste emanating from diffuse locations. Stormwater is considered a non-point source if stormwater is discharged as overland flow, not from an identifiable location such as a pipe.

Discharges from San Francisco's Southeast Water Pollution Control Plant (SWPCP), North Point Wet Weather Facility (NPWWF), and Bayside Wet Weather Facilities (BWWF), including Combined Sewer Overflows (CSOs), are regulated under the individual waste discharge requirements (NPDES Permit set forth in Order No. R2-2008-0007 and NPDES No. CA0037664). Stormwater discharges regulated under the NPDES program are discussed in Section 3.9, Water Resources. Sheet/overland flow is a non-point source that is not regulated under the NPDES program.

3.10.2.1.3 Solid Waste

With the exception of determining where disposal sites are located and operational standards, there are no applicable federal laws, regulations, or policies that pertain to solid waste.

3.10.2.1.4 Energy and Telecommunications

There are no federal regulations, plans, or policies related to energy and telecommunications that are applicable to the proposed action.

3.10.2.2 State

3.10.2.2.1 Water

Urban Water Management Planning Act

Section 10610.4 of the *California Urban Water Management Planning Act* specifies that "Urban Water Suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies." The San Francisco Public Utilities Commission (SFPUC) prepared and adopted the current Urban Water Management Plan in December 2005 (SFPUC 2005b).

Water Code Sections 10910 et seq. (Senate Bill 610)

Effective 1 January 2002, the State of California, through Senate Bill 610 (SB 610), adopted a requirement that a city or county, and the associated public water system, prepare a Water Supply Assessment (WSA) for projects that meet certain criteria, including: 1) a project creating the equivalent demand of 500 residential units; 2) a proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 ft^2 (46,452 m^2) of floor space; and 3) a commercial office building employing more than 1,000 persons or having more than 250,000 ft^2 (23,226 m^2) of floor space. The proposed action could require a WSA because it meets all of the criteria listed above.

In an effort to streamline the water supply planning process within San Francisco, the SFPUC adopted resolutions in 2002 and 2006 to allow for all development projects requiring a Water Supply Assessment under SB 610 (qualifying projects) to rely solely on the adopted Urban Water Management Plan without having to go through the process of preparing individual Water Supply Assessments. Because the Planning Department and Agency are currently engaged in planning for various proposed land development projects that go beyond the future developments considered in the 2005 Urban Water Management Plan update, the SFPUC concluded that its 2005 Urban Water Management Plan no longer accounted for every qualifying project in San Francisco. Therefore, until the 2010 Urban Water Management Plan is prepared, any qualifying projects not accounted for in the 2005 Urban Water Management Plan, including the proposed action, could require a WSA that considers the SFPUC's current and projected supplies when compared to projected demands associated with new growth not covered in the 2005 Urban Water Management Plan. The WSA prepared for the proposed action was included in Appendix Q1 of the CP-HPS DEIR (SFRA 2009).

3.10.2.2.2 Wastewater

Operation of the SWPCP is subject to regulations set forth by SWRCB and the California Water Code.

3.10.2.2.3 Solid Waste

At the state level, the management of solid waste is governed by regulations established by the California Integrated Waste Management Board (CIWMB), which delegates local permitting, enforcement, and inspection responsibilities to local enforcement agencies. In 1997, some of the regulations adopted by the SWRCB pertaining to landfills (Title 23, Chapter 15) were incorporated with CIWMB regulations (Title 14) to form Title 27 of the CCR.

California Integrated Waste Management Act

In 1989, the Legislature adopted the *California Integrated Waste Management Act of 1989*, which established an integrated waste management hierarchy that consists of the following approaches in order of importance: 1) source reduction; 2) recycling and composting; and 3) environmentally safe transformation and land disposal. The Act also required that each county prepare a new Integrated Waste Management Plan and each city prepare a source reduction and recycling element by 1 July 1991. Each source reduction and recycling element includes a plan for achieving a solid waste reduction goal of 25 percent by 1 January 1995, and 50 percent by 1 January 2000 (based on a 1989 baseline). A number of changes to the municipal solid waste diversion requirements under the Act were adopted, including a revision to the statutory requirement for 50 percent diversion of solid waste. Under these provisions, local governments were required to divert at least 50 percent of all solid waste on and after 1 January 2000. Under Project Recycle, the number of state facility recycling programs has increased from 150 in 1991 to more than 1,800 in 2010; and the amount of material recycled during this period has expanded from 2,000 tons a year to more than 63,000 tons a year. Nevertheless, the overall level of performance is far behind the percentages of local jurisdictions striving to meet the requirements of the Act. To address this need, 1999 legislation established state agency diversion mandates of 25 percent in 2002 and 50 percent in 2004, requiring each agency to also adopt an integrated plan to achieve the mandates. The CIWMB is now assisting agencies in developing their plans. The CIWMB is the driving force behind the state's Green Building Task Force, whose goal is to institutionalize sustainable building practices as part of state construction projects in an efficient, practical, and cost-effective manner (Cal/EPA 2009).

3.10.2.2.4 Energy and Telecommunications

California Code of Regulations, Title 24

New residential and non-residential buildings in California are required to conform to energy conservation standards specified in 24 CCR Part 6. Title 24 efficiency standards regulate energy consumed for heating, cooling, ventilation, water heating, and lighting on a per-square-foot basis. Title 24 standards do not regulate plug-in appliances. The standards establish "energy budgets," expressed in terms of energy consumed per year. The energy budget weights energy consumed during peak hours to place emphasis on efficiency during these periods. Title 24 standards are updated on a periodic basis; the 2008 standards were adopted in April 2009 and went into effect in January 2010.

The California Building Standards Commission adopted the nation's first green building standards in 2008. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (24 CCR). Part 11 establishes voluntary standards, which became mandatory in the 2010 edition of the Code, on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.

3.10.2.3 Local

3.10.2.3.1 Water

San Francisco Green Building Ordinance

In 2008, the Board of Supervisors adopted the Green Building Ordinance, which applies to newly constructed residential and commercial buildings and renovations to existing buildings. The Green Building Ordinance is intended to minimize the use and waste of energy, water, and other resources in the construction and operation of buildings, provide a healthy indoor environment, and reduce GHG emissions. The Ordinance specifically requires a minimum reduction of 20 percent in potable water use, rising to a minimum of 30 percent reduction in potable water use by 2011 for high-rise residential buildings, mid-size commercial buildings, and large commercial buildings (as defined in the Ordinance). In addition, the Ordinance also requires a minimum reduction of 50 percent in the use of potable water for landscaping for high-rise residential, mid-size commercial, and large commercial buildings.

3.10.2.3.2 Wastewater

San Francisco General Plan

The Environmental Protection chapter and the Community Facilities chapter of the General Plan contain the following policies relating to wastewater:

ENVIRONMENTAL PROTECTION

Objective 3 Maintain and improve the quality of the bay, ocean and shoreline areas.

COMMUNITY FACILITIES

Objective 10 Locate wastewater facilities in a manner that will enhance the effective and efficient treatment of storm and wastewater.

Bayside Systems and Facilities Operations Plan (2002)

The Master Plan for wastewater management, completed in 1971 and modified in 1982, included the Bayside Transport/Storage System (Bayside System), consisting of expansion of the SWPCP, completion of the Bayside Core System (Griffith Pump Station and Yosemite Facilities), and construction of the Sunnydale Facilities, Mariposa Facilities, and Islais Creek Facilities, each of which was completed at various times but all by 1997. The city's NPDES permit requires the city to prepare a systems and facilities Operations Plan that will:

- Maximize the volume of wastewater treated at either the Southwest treatment plant or the NPWWF and discharged via deep water outfalls, consistent with the hydraulic and treatment capacities of the discharger's storage, transport, and treatment facilities; and
- Ensure that all discharges from the diversion structures are first baffled to reduce floatables volumes.

The Bayside Systems and Facilities Operations Plan describes the operations strategy that will be implemented to meet these objectives.

3.10.2.3.3 Solid Waste

San Francisco Board of Supervisors Resolution Number 679-02

Resolution 679-02, adopted by the San Francisco Board of Supervisors in September 2002, adopted a citywide landfill diversion goal of 75 percent by the year 2010 and a long-term zero waste (100 percent

diversion) goal. The San Francisco Department of the Environment passed Resolution 002-03-COE in March 2003, setting a target date of 2020 for achieving zero waste.

Construction and Demolition Debris Recovery Ordinance

Projects that require demolition of an existing structure must submit a waste-diversion plan to the Director of the San Francisco Department of the Environment as required by the city's Construction and Demolition Debris Recovery Ordinance (Ordinance 27-06, Chapter 14, *San Francisco Environment Code*). The waste-diversion plan must demonstrate that 65 percent or more of the total construction and demolition debris produced by a project (such as wood, metal, concrete, asphalt, and sheetrock) is diverted from landfills.

Green Building Ordinance

In 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 ft^2 (465 m^2), residential buildings over 75 ft (23 m) in height, and renovations on buildings over 25,000 ft^2 (2,323 m^2) to be subject to LEED® Gold (or an equivalent standard).

The requirements of the Green Building Ordinance are provided in Appendix G (Table G-1). LEED® is a voluntary, internationally recognized green building certification procedure developed by the U.S. Green Building Council. It reflects that a building or community was designed and built using standards for energy saving, water efficiency, carbon dioxide emissions, improved environmental quality, and general stewardship of resources and sensitivity to their impacts.

Key sections of Chapter 13C pertaining to energy include Section 1304C.2.1.6, which requires enhanced building energy system commissioning for all mid-sized commercial buildings, and Section 1304C.2.1.7, which requires that permit applicants submit documentation to verify renewable onsite energy or purchase of green energy credits (effective January 2012).

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. 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® or GreenPoint Rated green building certification rating system. Medium and small residential construction would use the GreenPoint rating system, which is less stringent.

Mandatory Recycling and Composting Ordinance

In June 2009, the San Francisco Board of Supervisors passed Ordinance 100-09, a universal recycling and composting ordinance that requires all residences and commercial businesses in San Francisco to separate their refuse into dedicated bins for recyclables, compostables, and trash. This ordinance adds Chapter 19, Sections 1901 through 1912, and is entitled Mandatory Recycling and Composting Ordinance. The ordinance amended the *San Francisco Public Works Code*, Sections 291, 291.1, 291.2, 291.4, 291.7, 291.11, 291.12, 291.15, 291.17, and 293.1, repealed current Sections 291.9 and 291.16, added a new Section 291.16, and provided enforcement mechanisms and penalties for violations. According to the ordinance, recyclables, compostables, and trash may not be mixed in a single bin or placed in a bin designated for another form of refuse. Building owners or managers are required to maintain appropriate, color-coded, labeled containers in convenient locations, and educate tenants, employees, and contractors, including janitors, on how to separate materials. Failure to comply with these policies would result in fines; however, fines would not be assessed until 2011, allowing for gradual implementation of the new program.

Waste Disposal Agreement, Altamont Landfill and Resource Recovery Facility

The City has an agreement with the Altamont Landfill, the primary landfill serving the city, to match or exceed the waste-diversion thresholds required in Alameda County. The Alameda County Integrated Waste Management Plan (Goal 2, Objective 2.1) has a diversion goal of 75 percent of the solid waste generated within its municipalities by 2010.

San Francisco General Plan

The *San Francisco General Plan* contains the following policy within the Community Facilities chapter relating to solid waste:

Objective 10 Locate solid waste facilities in a manner that will enhance the effective and efficient treatment of solid waste.

3.10.2.3.4 Energy and Telecommunications

City of San Francisco Subdivision Code

Section 1636 of the City of San Francisco Subdivision Code requires that the subdivider provide electric, gas, and communication services connected to the appropriate public utility's distribution system. The future developer or owner of the property could be required to obtain approval of the improvement plans pursuant to Article 31, Section 3100 of the San Francisco Health Code, which governs development at HPS.

San Francisco General Plan

The Environmental Protection Element (San Francisco Planning Department 1997) of the General Plan includes a number of energy objectives:

Objective 13 Enhance the energy efficiency of housing in San Francisco.

Objective 14 Promote effective energy management practices to maintain the economic vitality of commerce and industry.

Objective 15 Increase the energy efficiency of transportation and encourage land-use patterns and methods of transportation which use less energy.

Objective 16 Promote the use of renewable energy sources.

3.10.3 Existing Conditions

3.10.3.1 Water

3.10.3.1.1 Water Supply

The SFPUC is responsible for supplying, treating, and distributing water to the San Francisco Bay Area. Water service in the City of San Francisco is provided by a complex water supply system stretching from the Sierra Nevada Mountains to the city that consists of reservoirs, tunnels, pipelines, and treatment systems. The SFPUC operates 22 pump stations and approximately 1,240 miles of pipelines that deliver water to local customers. Approximately 800,000 people in the city receive water from this distribution system.

SFPUC Regional Water System

The SFPUC Regional Water System currently provides an average of approximately 265 MGD (1,003 ML/d) to 2.5 million users in Tuolumne, Alameda, Santa Clara, San Mateo, and San Francisco counties.

Approximately one-third of those customers reside in San Francisco. The Regional Water System supplies water from two primary sources: 1) Tuolumne River through the Hetch Hetchy Reservoir; and 2) local runoff into reservoirs in the Bay Area and reservoirs in the Alameda and Peninsula watersheds (SFPUC 2005a). Information regarding current and Water Supply Improvement Program (WSIP) water supply allocations for the SFPUC service area (i.e., San Francisco Bay Area) is provided in Table 3.10.3-1.

Table 3.10.3-1. San Francisco Retail Water Supplies (Current and WSIP Supplies)

Water Sources	*Water Supply Allocations*	*Uses*
Regional Water System	81 MGD (307 ML/d)	Potable water
Groundwater	3.5 MGD (13.2 ML/d)	Irrigation
WSIP Supply Sources[1] (Groundwater, recycled water, and water conservation)	10 MGD (38 ML/d)	Potable water; irrigation/non-potable water uses

Notes:
1. This water supply will not be available until 2015. WSIP supply sources include: 1) recycled water (4 MGD); 2) groundwater (two MGD existing and two MGD from approved projects); and 3) WSIP Water Efficiency and Conservation (4 MGD).

Water stored by Hetch Hetchy Reservoir through the Hetch Hetchy Water and Power Project represents the majority of the water supply available to the SFPUC. On average, the Hetch Hetchy Water and Power Project provides over 85 percent of the water delivered by the SFPUC. During droughts, the water received from the Hetch Hetchy Water and Power Project can account for over 93 percent of the total water delivered.

Bay Area reservoirs provide on average approximately 15 percent of the water delivered by the SFPUC Regional Water System. The local watershed facilities are operated to conserve local runoff for delivery. On the San Francisco Peninsula, the SFPUC uses Crystal Springs Reservoir, San Andreas Reservoir, and Pilarcitos Reservoir to capture local watershed runoff. In the Alameda Creek watershed, the SFPUC constructed the Calaveras Reservoir and San Antonio Reservoir. In addition to capturing runoff, San Antonio, Crystal Springs, and San Andreas reservoirs also provide storage for Hetch Hetchy water diversions. The local watershed facilities also serve as an emergency water supply in the event of an interruption to Hetch Hetchy diversions.

Local Water Supply Sources

GROUNDWATER

San Francisco overlies all or part of seven groundwater basins, including the Westside, Lobos, Marina, Downtown, Islais Valley, South and Visitation Valley basins. The Lobos, Marina, Downtown and South basins are located wholly within the city limits, while the remaining three basins extend south into San Mateo County. The portion of the Westside Basin aquifer located within San Francisco is referred to as the North Westside Basin. With the exception of the Westside and Lobos basins, all of the basins are generally inadequate to supply a significant amount of groundwater for municipal supply due to low yield. Within the city, local groundwater is used for irrigation and non-potable purposes (San Francisco Zoo and Golden Gate Park).

LOCAL RECYCLED WATER

Currently in San Francisco, disinfected secondary-treated recycled water from the SFPUC's SWPCP is used on a limited basis for wash-down operations (i.e., water and/or chemical high-pressure cleaning processes), and is provided to construction contractors for dust control and other construction purposes. Current use of recycled water for these purposes in San Francisco is less than 1 MGD (3.8 ML/d).

LOCAL WATER CONSERVATION

SFPUC's water conservation programs range from financial incentives for plumbing devices to improvements in the distribution efficiency of the Regional Water System. In addition, SFPUC is increasing its water conservation programs in an effort to achieve new water savings by 2018. These new conservation programs include high-efficiency toilet replacements in low-income communities and water efficient irrigation systems in municipal parks. SFPUC anticipates reducing gross household consumption from 91.5 gallons per day (GPD) to 87.4 GPD by 2018, which would result in an annual conservation supply potential of approximately 4 MGD (15 ML/d).

3.10.3.1.2 SFPUC Water Planning Efforts

WATER SUPPLY RELIABILITY PLANNING

To enhance the reliability of the Regional Water System, improve dry-year supplies, diversify the water supply, and meet projected wholesale and retail demand through 2030, the SFPUC developed the WSIP. Under the WSIP as originally developed, the SFPUC proposed to meet projected 2030 average daily purchase requests in the Regional Water System service area by increasing diversions from the Tuolumne River under its existing water rights and developing approximately 10 MGD (38 ML/d) of new local resources through a combination of additional conservation, water recycling, and groundwater supply programs (SFPUC 2005a). The WSIP proposed various water facility improvement projects to achieve delivery reliability and water supply goals. The WSIP also included provisions for obtaining additional dry-year supplies. The SFPUC adopted a phased WSIP option that limits deliveries from the regional water system surface water supplies, and by 31 December 2018, the SFPUC will re-evaluate water demands and water supply options through 2030. The phased WSIP would meet projected 2018 demands by capping deliveries from the regional water system and meeting demands through water conservation, water recycling projects, and groundwater sources within San Francisco (Table 3.10.3-1).

WATER SHORTAGE AND DRY-YEAR PLANNING

The SFPUC adopted a drought planning sequence and associated operating procedures that trigger different levels of water delivery reductions relative to the volume of water stored in SFPUC reservoirs. Each year, during the snowmelt period, the SFPUC evaluates the amount of total water storage expected to occur throughout the regional water system. If this evaluation finds the projected total water storage to be less than a level sufficient to provide sustained deliveries, the SFPUC may impose delivery reductions or rationing. The amount of the reduction is specified in contractual agreements between the SFPUC and wholesale customers, as detailed in the existing Water Shortage Allocation Plan. This plan provides specific allocations of available water between the retail and wholesale customers associated with different levels of system wide shortages. For retail customers, the provisions of shortage allocations are identified in the Retail Water Shortage Allocation Plan.

3.10.3.1.3 HPS Water System

The DoN owns and maintains the water supply system at HPS and purchases the water supply from the SFPUC. The existing water supply infrastructure includes one 8-inch transmission line. The current water demand for existing uses at the project site is approximately 0.3 MGD (1.1 ML/d) as shown in Table 3.10.3-2 (SFRA 2009, Appendix Q1).

Table 3.10.3-2. Average Daily Flow for Water Usage

HPS Average Daily Flow	*Regional Water System Average Daily Flow*
0.3 MGD (1.1 ML/d)	265 MGD (1,003 ML/d)

3.10.3.1.4 Auxiliary Water Supply System

The AWSS is a separate and distinct water supply system for fire protection purposes and is operated and maintained by SFFD. HPS is not currently served by the AWSS. The SFFD could extend the existing AWSS along Crisp Ave from the intersection of Ingalls St and Revere Ave to the project boundary and along Evans Ave, Hunters Point Blvd, Innes Ave, and Donahue St from the intersection of Keith St and Evans Ave to the project boundary. A looped service along Spear Ave/Crisp Rd, a second loop in Inner Ring Rd around the Stadium Pad, and several mains extending from this loop could be connected to the AWSS extensions.

3.10.3.2 Wastewater and Stormwater

3.10.3.2.1 Regional Setting

Most wastewater and stormwater runoff in the city is collected via a combined sewer system, managed by the SFPUC. This system combines stormwater runoff and wastewater flows in the same network of pipes (combined sewer system), conveying flows to facilities where they are treated prior to discharge to the bay or Pacific Ocean through outfall structures along the shoreline. The combined sewer system includes three treatment facilities, including the SWPCP, Oceanside Water Pollution Control Plant, and NPWWTF. The combined sewer system also includes storage/transports (i.e., interconnected large underground rectangular tanks and tunnels), such as the BWWF, which prevent untreated discharges to the bay. Storage/transports capture the combined sewer system flows along the city's perimeter; hold effluent for later treatment; and provide treatment similar to the primary treatment process (i.e., settling and removal of floatable) prior to discharge when flows exceed the combined sewer system's total storage capacity. A maximum of 193 million gallons of combined sewage and stormwater can be stored in these facilities for later treatment. During dry weather, the combined sewer system currently processes approximately 85 MGD (322 ML/d) of wastewater. During wet weather, with additional facilities and increased operations, the system has a design capacity of approximately 575 MGD (2,176 ML/d) (combined flows).

All wastewater collected within the project vicinity is treated at SFPUC's SWPCP, located northwest of the project site on Phelps Street between Jerrold and Evans Avenues. The SWPCP provides primary and secondary treatment capabilities. Treated effluent is disinfected, dechlorinated, and discharged into San Francisco Bay through a deep-water outfall at Pier 80 or through the Quint Street outfall (SFPUC 2009b). Existing demand and capacity information for SFPUC Combined Sewer System facilities are provided in Table 3.10.3-3.

Table 3.10.3-3. SFPUC Combined Sewer System Facilities in the Project Vicinity

Facility	*Existing Demands (MGD/ML/d)*	*Design Capacity (MGD/ML/d)*
SWPCP	67/254 (dry)	150/568 (dry)
NPWWTF[(a)]	Varies depending on storm event	150/568 (secondary treatment): 100/378 (primary treatment)
Storage/Transports[(a)]	Varies depending on storm event	193 million gallons
Pier 80 Outfall	Varies depending on storm event	110/416 (wet)
Griffith Pump Station	Minimal[2]	10/38 (dry); 120/454 (wet)
Hunters Point Tunnel Sewer	6/23 (dry)	120/454 (dry)
Sunnydale Transport/Pump Station Facilities[1]	Varies depending on storm event	50/189

Notes:
1. These facilities only operate during wet weather conditions.
2. Dry-weather flows from the Griffith Pump Stations are relatively small (SFPUC 2002).

The NPWWF is operated as-needed during wet weather to supplement the treatment capacity of the SWPCP. During larger storm events, excess flows that cannot be treated at the SWPCP are treated at the NPWWF, which provides primary treatment and disinfection capacity for wet-weather flows (domestic and industrial wastewater and stormwater runoff) (Table 3.10.3-3). Treated effluent from the NPWWF are discharged through four deep-water outfalls that terminate approximately 800 ft (244 m) from shore and 18 ft (5 m) below mean low water. If the combined wet-weather flows exceed 150 MGD (568 ML/d), the NPWWF can also treat an additional 100 MGD (378 ML/d) for primary treatment (SFPUC 2008b).

In the event that the capacities of the SWPCP, the NPWWF, and wet weather facilities and storage structures (i.e., BWWF) are exceeded, combined flows, after receiving the equivalent of wet weather primary treatment in the transport structures/boxes, are discharged to the bay through one of the 29 shoreline CSO structures. There are six CSO structures in the project vicinity located in Yosemite Slough (South Basin) and Candlestick Cove.

3.10.3.2.2 Project Site Setting

Stormwater

All of HPS is served by a separate storm sewer system. This system is covered by the General Industrial Stormwater Permit (Waste Discharge Identification Number 2411011455). In accordance with this permit, HPS stormwater is discharged to San Francisco Bay through 33 storm water outfalls along the perimeter of HPS; however, not all outfalls are a part of the stormwater monitoring plan. The DoN is in the process of removing the onsite stormwater system pipes as part of the environmental remediation program.

Wastewater

The project site is served by the Bayside Transport/Storage System, which consists of the Hunters Point and Yosemite Transport Systems, Griffith Pump Station, and Sunnydale Transport and Pump Station Facilities (SFPUC 2002). This transport/storage system holds the combined flows for later treatment at the SWPCP and is sized to accommodate both dry- and wet-weather flows. The Griffith Pump Station receives all wastewater effluent via gravity flow, which is then pumped to the Hunters Point tunnel sewer. Griffith Pump Station and Hunters Point Tunnel sewer capacities are provided in Table 3.10.3-2. The Sunnydale Transport and Pump Station facilities are used only for wet weather. During wet weather, combined sewage is diverted from the gravity system to the transport system and then flows to the Sunnydale Pump Station.

HPS wastewater flows previously were conveyed to the SWPCP through a force main at Crisp Rd, but that has been disconnected from service since 2007. Sewage lines are no longer in use at the project site, with the exception of wastewater from temporary bathrooms for the artists' studios on Parcels A & B and wastewater flows from the SFPD crime lab via a temporary sewage line. Based on meter data from January 2000 to August 2002, the HPS site generated an average of 0.154 MGD (0.583 ML/d) of wastewater flows. Thus, the majority of the HPS does not currently contribute substantial wastewater flows to the combined sewer system. The DoN is removing the entire wastewater system at HPS as part of the environmental remediation program.

3.10.3.3 Solid Waste

3.10.3.3.1 Collection, Transfer, and Disposal

Municipal solid waste collection, recycling, and disposal within the city is managed by SF Recycling & Disposal Incorporated (Inc.), a private company and subsidiary of Norcal Waste Systems, Inc. Residential and commercial solid waste generated at the project site is collected by Sunset Scavenger Company, which delivers it to the SF Recycling Center where the solid waste stream is sorted to remove

recyclables and organic materials. Organic waste is sent to the Jepson Prairie composting facility, which has the capacity to process approximately 300 tons per day, or approximately 5,200 tons of food waste (food scraps) from commercial premises and 2,000 tons of green waste per month.

Municipal solid waste remaining after sorting is currently transported to the Altamont Landfill in Livermore. Altamont Landfill serves a number of jurisdictions; however, San Francisco is the largest single contributor to the landfill. In 1988, the City of San Francisco entered into an agreement with what is now Waste Management of Alameda for the disposal of 15 million tons of solid waste at Altamont. Through August 2009, the city has used 12,579,318 tons of this capacity. The city projects that the remaining capacity would be reached no sooner than August 2014 (assuming an average yearly disposal of 467,000 tons) (personal communication, Assman October 2009). The landfill's total capacity is 62 million cubic yards (MCY), of which 73.7 percent (45.7 MCY) is remaining as of August 2009 (CIWMB 2009a). According to the CIWMB Solid Waste Information Database, the landfill would reach capacity in January 2032 if disposal continues at current rates; however, as the Altamont Landfill's permit expires in January 2029, it is currently scheduled for closure before it would reach capacity (CIWMB 2009a).

The city has issued a Request for Qualifications to solicit bids for a new contract to accommodate the city's disposal capacity beyond the expiration of the current agreement. The city has identified three landfills that have the capacity to meet the city's future needs and is in the final stages of the selection process. The agreement will be for an additional 5 million tons of capacity, which could represent 20 or more years of capacity for San Francisco's waste.

3.10.3.3.2 Hazardous Waste Disposal

This section focuses on regional hazardous waste disposal capacity. Refer to Section 3.7, Hazards and Hazardous Substances, for a full discussion of the regulatory framework for the handling, transport, and disposal of hazardous materials in California. Section 4.7, Hazards and Hazardous Substances, analyzes safety risks as a result of handling, transport, or disposal of hazardous materials.

Hazardous waste in the Bay Area is treated by registered Treatment, Storage, and Disposal Facilities (TSDs). Several counties in the Bay Area have TSDs; however, the City and County of San Francisco have no TSDs. In 2006, no San Francisco hazardous waste generators exported over 1,000 tons of hazardous waste (Bay Area Hazardous Waste Management Facility Allocation Committee 2009). However, in 2007, 50,214 tons of waste were generated, including 44,222 tons of inorganic solid waste (lead-contaminated building materials and soil) from the Presidio, a former military base. For household hazardous waste, SF Recycling & Disposal, Inc. operates a permanent facility for residents to safely dispose of the hazardous waste generated from their homes. All hazardous waste disposal is conducted in compliance with federal, state, and local regulations.

There is no state agency that establishes a ceiling on the amount that a hazardous waste treatment facility can process in a year, although some treatment facilities are regulated by Air Quality Management District Permits, which may limit capacity. All regional TSDs have capacity that exceeds the actual amounts of wastes that they treat (Bay Area Hazardous Waste Management Facility Allocation Committee 2009). However, it should be noted that the treatment processes locally available do not match the treatment processes needed (these processes may include combustion or incineration, which is used to destroy hazardous organic constituents and reduce the volume of waste, or the disposal of liquid hazardous waste in underground injection wells) in the region. Therefore, many tons of hazardous waste are treated elsewhere in California or in other states.

3.10.3.3.3 Construction Waste

Under the City and County of San Francisco's Construction and Demolition (C&D) Ordinance, at least 65 percent of C&D debris (e.g., wood, metal, concrete, asphalt, and sheetrock) taken from a site must be hauled by a registered transporter to a registered construction recycling facility; C&D debris cannot go to a landfill. This ordinance maximizes the recycling of mixed construction and demolition debris and applies to all commercial and residential construction projects. SF Recycling & Disposal Inc. operates a registered facility specifically designed to recycle construction debris. In addition, Section 1304C.1.3.4 of the city's Green Building Ordinance requires documentation to ensure that at least 75 percent of a project's construction debris is diverted.

3.10.3.3.4 Recycling and Diversion

According to the CIWMB, San Francisco households generate approximately one pound of solid waste per resident per day, while commercial uses generate 4.7 pounds per employee per day (CIWMB 2008). In 2008, the city produced a total of 594,732 tons of solid waste (CIWMB 2009b). In 2008, approximately 72 percent of the city's total waste stream, by volume, was diverted (CIWMB 2008). Of the wastes that were not diverted, up to 65 percent of the total volume consisted of recyclable or compostable materials, such as paper and food scraps (Department of the Environment 2008). The remainder of the wastes consisted of materials such as household items and furniture, hazardous wastes, and construction wastes. The city has prepared a number of strategies to divert additional solid waste and achieve citywide diversion goals.

3.10.3.3.5 Existing Project Site Solid Waste Generation

Based on CIWMB solid waste generation factors, the existing HPS artists' studios generate approximately 91 tons of solid waste annually. This generation rate was calculated according to the following formula using CIWMB waste generation factors: [100 persons (5 lbs/day)(365 days/year)] divided by (2,000 lbs/ton) (CIWMB 2008). This represents a nominal percentage of the city's annual solid waste generation of 594,732 tons per year in 2008.

3.10.3.4 Energy and Telecommunications

Utilities within the project site are located above and below ground. Above-ground utilities include overhead electrical distribution and transmission lines. Underground utilities include electrical, gas, TV/cable, fiber optics communications, and telephone.

3.10.3.4.1 Electricity

Regional Setting

The city receives approximately 76 percent of its electricity from Pacific Gas & Electric (PG&E) (City and County of San Francisco 2009). The remaining electricity is generated by Hetch Hetchy Water and Power Project hydroelectric facilities that operate in the western Sierra Nevada Mountains (16 percent) and by small local generation facilities (8 percent) (City and County of San Francisco 2009). Energy demand by land-use type in San Francisco is provided in Appendix G, Utilities Resource Data. Commercial uses account for nearly 60 percent of all electricity consumption, while residential uses account for approximately 28 percent of the usage (Rocky Mountain Institute 2009). A total of 5,155 million kWh are consumed annually in San Francisco.

Project Site Setting

PG&E currently provides electricity services to HPS. The project site has an electrical loop system that includes meters and a 12 kV electrical connection to the PG&E grid. This connection is capable of supporting an operating load of approximately 9MW. The existing demand for electricity at the project site is approximately 1,302 MWh.

3.10.3.4.2 Natural Gas

Regional Setting

Natural gas in San Francisco is supplied by PG&E. As shown in Appendix G, Utilities Resource Data (Table G-6), it is consumed largely by residential uses (54 percent) and commercial uses (34 percent) (CEC 2007). A total of 28,918,000 million British thermal units (MBtu) are consumed annually in the city.

Project Site Setting

The project's onsite infrastructure has been disconnected and abandoned in-place. Currently, natural gas services are not provided to the project site. Natural gas infrastructure closest to the project site includes existing distribution lines at Crisp and Griffith, Innes and Donahue, and at Harney Way.

3.10.3.4.3 Petroleum Fuels

Regional Setting

In 2007, approximately 158 million gallons of gasoline and 11 million gallons of diesel were consumed in San Francisco for transportation (Caltrans 2009). By 2030, consumption of transportation-related fossil fuels is expected to increase by about 57 percent citywide.

Project Site Setting

According to the *Candlestick Point–Hunters Point Shipyard Phase II Development Plan Transportation Study* (CHS Consulting Group, *et al.* 2009), there are currently no annual VMT to and from the project site. Therefore, the existing uses at the project site do not result in a demand for gasoline and diesel fuels.

3.10.3.4.4 Telecommunications

Telephone, television, and internet services could be provided by any one of a number of service providers in the City of San Francisco.

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3.11 Public Services

3.11.1 Background

This section describes the existing public services, including police protection, fire and emergency medical services, schools, and libraries, in the project vicinity.

3.11.2 Regulatory Framework

3.11.2.1 Federal

There are no federal regulations, plans, or policies related to public services that are applicable to the proposed action.

3.11.2.2 State

3.11.2.2.1 California Fire Code

State fire regulations are set forth in Sections 13000, *et seq*. of the *California Health and Safety Code*, which include regulations concerning building standards (as also set forth in the *California Building Code*), fire protection and notification systems, fire protection devices (such as extinguishers and smoke alarms), high-rise building and childcare facility standards, and fire suppression training.

3.11.2.2.2 California Senate Bill 50 (SB 50)

Prior to passage of SB 50 and Proposition 1A in November 1998, the major source of funding for school construction and modernization was the State School Construction Program. SB 50 and Proposition 1A provided a comprehensive school facilities financing and reform program, which authorized a $9.2 billion school facilities bond issue, as well as school construction cost containment provisions and an eight-year suspension of the *Mira*, *Hart*, and *Murrieta* court cases. SB 50 prohibits local agencies from denying either legislative or adjudicative land-use approvals on the basis that school facilities are inadequate and reinstates the school facility fee cap for legislative actions (e.g., general plan amendments, specific plan adoption, zoning plan amendments), as was allowed under the *Mira*, *Hart*, and *Murrieta* court cases. According to *Government Code* Section 65996, the development fees authorized by SB 50 are deemed to be "full and complete school facilities mitigation." The legislation also recognized the need for the fee to be adjusted periodically to keep pace with inflation. These provisions are in effect and will remain in place as long as subsequent state bonds are approved and available. As a result of this legislation, school districts would continue to levy a school fee under existing rules (*Government Code* Sections 65995, 65995.5, and 65995.7).

3.11.2.3 Local

3.11.2.3.1 San Francisco Fire Code

The *San Francisco Fire Code* incorporates by reference the *California Fire Code*, with certain local amendments. The *San Francisco Fire Code* was revised in 2007 to regulate and govern the safeguarding of life and property from fire and explosion hazards arising from the storage, handling, and use of hazardous substances, materials, and devices, and from conditions hazardous to life or property in the occupancy of buildings and premises; provide for the issuance of permits, inspections, and other SFFD services; and provide for the assessment and collection of fees for those permits, inspections, and services. In coordination with the San Francisco Department of Building Inspection, the SFFD conducts

plan checks to ensure that all structures, occupancies, and systems outlined above are designed in accordance with the *San Francisco Building Code* (SFFD 2009a).

Section 511 (Local Fire Safety Feature Requirements) of the *San Francisco Fire Code* requires that buildings 200 ft (61 m) or more in height must provide at least one elevator approved by SFFD for firefighter use under fire conditions. The section also requires that for buildings having floors used for human occupancy located more than 75 ft (23 m) above the lowest level of SFFD vehicle access, a permanent air replenishment system shall be installed to provide a means for firefighters to refill air bottles for self-contained breathing apparatus. The system shall be tested and maintained pursuant to the Fire Department Administration Bulletin.

3.11.2.3.2 SFUSD School Impact Fees

The San Francisco Unified School District (SFUSD) collects fees for all construction and building permits issued within the city to mitigate impacts associated with enrollment growth (e.g., new residential development). Developer fee revenues are used, in conjunction with other SFUSD funds, to support efforts to complete capital improvement projects (SFUSD 2009).

3.11.3 Existing Conditions

3.11.3.1 Police Protection

3.11.3.1.1 Regional Setting

The San Francisco Police Department (SFPD) provides police protection services in the County and City of San Francisco. The location of SFPD stations within the project vicinity is illustrated in Figure 3.11.3-1. The SFPD Bayview Station, located at 201 Williams Ave near Third St, approximately two miles from the northwest boundary of HPS, provides primary service in the project vicinity. Currently, Bayview Station does not meet the needs of existing police operations (PSSG 2008). The ratio of police officers to city population is 1 officer per 665 people (PSSG 2008).

The type of police response required varies according to the nature and urgency of the call. Calls for services are categorized as Priority A (highest priority), B (second priority), and C (lowest priority). There are no adopted response-time requirements for Priority A, B, or C calls. From 2008 to 2009, the overall average response time in the Bayview District improved (decreased) (SFPD 2009), and was better than the citywide averages identified in 2007 (SFPD 2007) (Table 3.11.3-1).

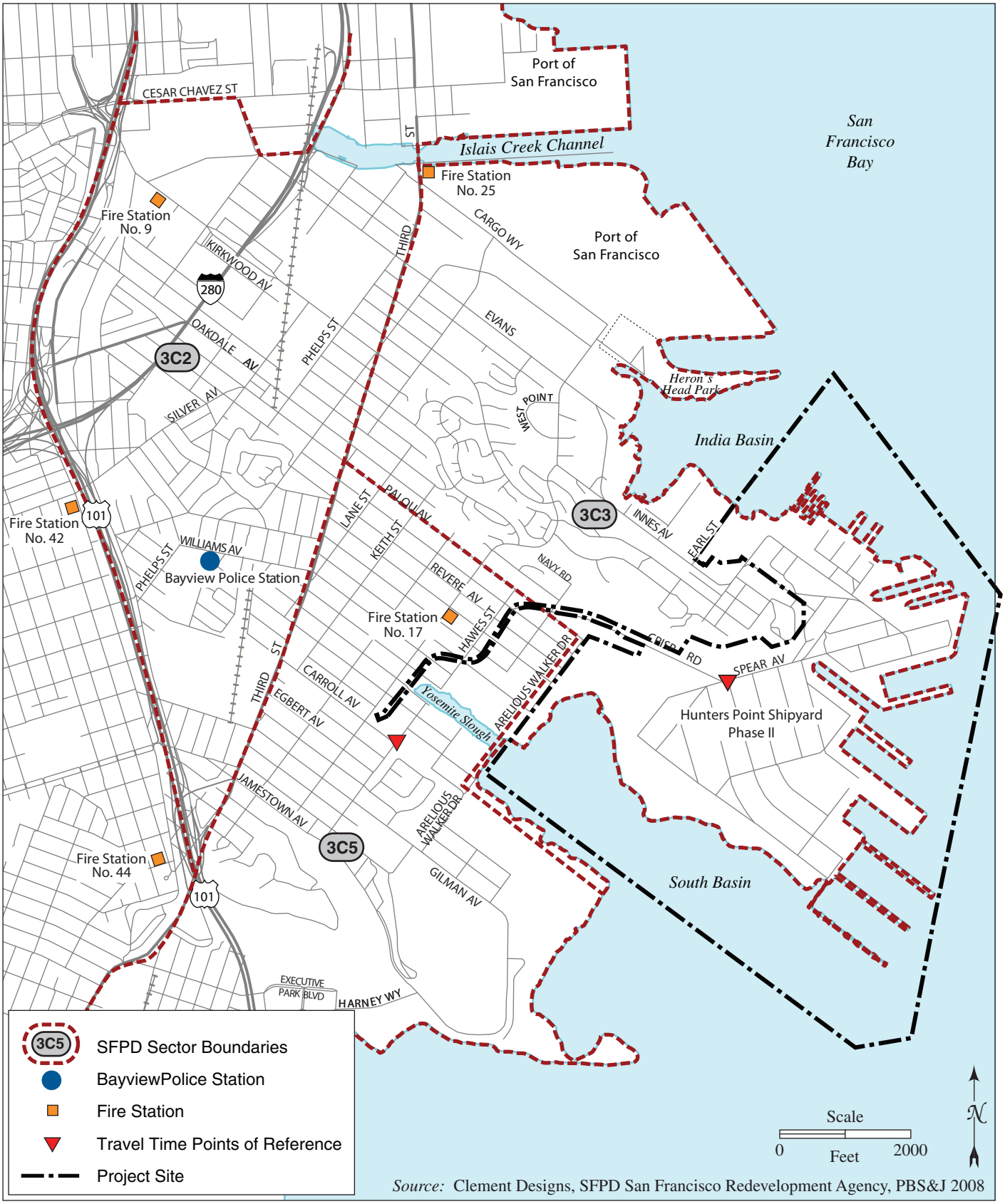
3.11.3.1.2 Project Site

Existing security and police protection services at HPS are provided by DoD police and the SFPD. The project site is located in two of the five sectors within SFPD's Bayview District, both of which have been identified as high-demand areas (i.e., areas with high volumes of Priority A calls). Additional private security services for HPS are provided via a cooperative agreement between the DoN and the SFRA. Currently, SFPD leases space on Parcel D-1 in Building 606 as a crime laboratory.

Table 3.11.3-1. SFPD Citywide and Bayview District Response Times (Minutes)

	2007 Citywide	***2008 Bayview***	***2009 Bayview***
Priority A	4:36	4:42	2:58
Priority B	8:02	8:31	6:28
Priority C	11:37	14:43	11:40

Sources: SFPD 2007 and 2009; PSSG 2008.



Source: Clement Designs, SFPD San Francisco Redevelopment Agency, PBS&J 2008

Figure 3.11.3-1. Police and Fire Stations in the Project Vicinity

3.11.3.2 Fire and Emergency Medical Services

3.11.3.2.1 Regional Setting

SFFD provides fire and emergency medical services in the County and City of San Francisco. SFFD has 43 station locations distributed throughout the City of San Francisco (SFFD 2009b). Total daily staff for all SFFD stations is currently 315 (personal communication, PBS&J 2008a). Of the 43 SFFD fire stations located throughout the city, five of these stations are located in southeast San Francisco (Table 3.11.3-2). No SFFD stations are located within the project site (Figure 3.11.3-1). Stations located in the project vicinity (i.e., east of US-101 in southeast San Francisco) include the following:

- Station 9 is located at 2245 Jerrold Ave between Napoleon St and Upton St;
- Station 17 is located at 1295 Shafter Ave at the corner of Ingalls St; and
- Station 25 is located at 3305 Third St, between the bridge over the Islais Creek Channel and Cargo Way.

Stations west of US-101 in southeast San Francisco include the following:

- Station 42 is located at 2430 San Bruno Ave between Silver Ave and Silliman St; and
- Station 44 is located at 1298 Girard St at the corner of Wilde Avenue, about a half block west of San Bruno Ave.

Table 3.11.3-2. Fire Stations in Southeast San Francisco

Station	*Location*	*Nearest Major Street*	*Paramedic Capable*	*Equipment*	*Number of personnel per shift*
9	2245 Jerrold Ave.	Napoleon St.	Yes	Engine, Ladder Truck, Battalion Chief	10
17	1295 Shafter Ave.	Ingalls St.	Yes	Engine, Ladder Truck	9
25	3305 Third St.	Cargo Way	Yes	Engine	4
42	2430 San Bruno Ave.	Silver Ave.	Yes	Engine	4
44	1298 Girard St.	San Bruno Ave.	Yes	Engine	4

Notes:
The number of personnel per shift depends on the equipment at each station. Fire engines require four staff per shift, ladder trucks require five staff per shift, Battalion Chief requires one staff per shift, and ambulances require one staff per day.
An engine carries one officer (a captain or a lieutenant) and three firefighters, one of whom is either a designated Emergency Medical Technician (BLS/basic life support) or a Paramedic (ALS/advanced life support).
Sources: Personal communication, Zanoff 2009; Personal communication, Tam 2009.

Stations located east of US-101 respond to calls within the Bayview Hunters Point neighborhood. The stations west of the US-101 may also respond; however, the freeway creates an obstruction that makes access to areas east of the freeway more difficult from this location. Travel times (i.e., response times) from fire stations near HPS are listed in Table 3.11.3-3. The SFFD target response time goal for Code 1 (non-emergency) calls is 8 minutes, 20 minutes for Code 2 (non life-threatening fire and medical emergencies), and 4.5 minutes for Code 3 (life-threatening fire and medical emergencies) calls.

Table 3.11.3-3. Access to HPS from Nearby Fire Stations			
Station	***Location***	***Miles from HPS***	***Estimated Minutes to HPS***
9	2245 Jerrold Ave.	3.1	10
17	1295 Shafter Ave	2.0	8
25	3305 Third St.	2.5	8
42	2430 San Bruno Ave.	3.8	14
44	1298 Girard St.	3.4	12
Source: Distances and travel times were estimated by Mundie & Associates (Personal communication, Zanoff 2009).			

Water supply for fire suppression in San Francisco is provided by an AWSS. Water for the AWSS is distributed through a network of pipes that receive water from a collection of reservoirs and pumping stations throughout the city. The proposed action would extend the existing AWSS to the project site. Refer to Section 3.10, Utilities, for additional information regarding water infrastructure, including the AWSS.

3.11.3.2.2 Project Site

Existing fire and emergency medical services at HPS are provided by the SFFD via a cooperative agreement with the DoN.

3.11.3.3 Schools

3.11.3.3.1 Regional Setting

The SFUSD provides education facilities in San Francisco. The SFUSD comprises 37 preschools, 104 schools, 10 alternative schools, and 2 public charter schools. During the 2008/2009 school year, approximately 56,000 students attended public schools in San Francisco (Table 3.11.3-4) (California Department of Education 2009a). Over the past decade, student enrollment in the SFUSD has been declining by 0.1 percent annually (California Department of Education 2009a). Consequently, SFUSD has been closing schools because of recent declines in enrollment.

Table 3.11.3-4. Existing SFUSD School Capacities and Enrollment (2008/2009)			
Type of School	***Number of Schools***	***Capacity***	***Enrollment***
Elementary Schools	63	29,260	24,939
Middle Schools	13	11,700	11,816
High Schools	16	17,575	19,688
Alternative Schools (varying grade levels)	10	3,900	—
Public Charter Schools (varying grade levels)	2	1,400	—
Total	***116***	***63,835***	***56,443***
Sources: SFUSD 2009; SFUSD 2008.			

As shown in Table 3.11.3-4, there is capacity for 63,835 students in existing SFUSD facilities (California Department of Education 2009b). Although neighborhoods with a high population of school-age children generate a proportionally high level of demand for nearby schools, SFUSD assigns students to schools based on a lottery system. This system ensures that student enrollment is distributed to facilities that have sufficient capacity. The SFUSD provides bus transportation to students who attend schools outside of the neighborhood in which they reside (SFRA 2008). Currently, SFUSD is in the process of planning improvements to upgrade and modernize existing educational facilities.

3.11.3.3.2 Project Vicinity

Schools located in the project vicinity are listed in Table 3.11.3-5. Schools in the project vicinity are generally located in the Bayview neighborhood, but also include facilities to the north in the Mission neighborhood and to the west in the Visitacion Valley neighborhoods. Public school locations in the project vicinity are illustrated in Figure 3.11.3-2.

Table 3.11.3-5. SFUSD Facilities in the Project Vicinity

Facility	*2008/2009 Capacity*[a]	*2008/2009 Enrollment*[b]	*2008/2009 Remaining Capacity*	*Percentage of Capacity Remaining*
Bret Harte Elementary (K–5)	500	261	239	48%
Malcolm X Academy Elementary (K–5)	500	118	382	76%
Dr. George Washington Carver Elementary (K–5)	500	266	234	47%
Dr. Charles R. Drew Elementary (K–3)	600	267	333	56%
Willie L. Brown Jr. Elementary (K–5)	325	221	104	32%
Subtotal Elementary Schools	*2,425*	*1,133*	*1,292*	*53%*
Dr. Martin Luther King Jr. Middle School (6–8)	525	500	25	5%
Horace Mann Middle School (6–8)	825	330	495	60%
Visitacion Valley Middle School (6–8)	850	306	544	64%
Subtotal Middle Schools	*2,200*	*1,136*	*1,064*	*48%*
Thurgood Marshall High School (9–12)	1,275	712	563	44%
Subtotal High Schools	*1,275*	*712*	*563*	*44%*
Total	***5,900***	***2,981***	***2,919***	***49%***

Sources:
SFSUD 2008, California Department of Education 2009a.

During the 2008/2009 school year, schools in the project vicinity had a combined enrollment of 2,981 students and an existing capacity of 5,900 spaces. The remaining capacity in the 2008/2009 school year (2,919 students) includes 1,292 elementary students, 1,064 middle school students, and 563 high school students (Table 3.11.3-5). As shown in Table 3.11.3-5, schools in the project vicinity have adequate capacity to serve existing enrollment.

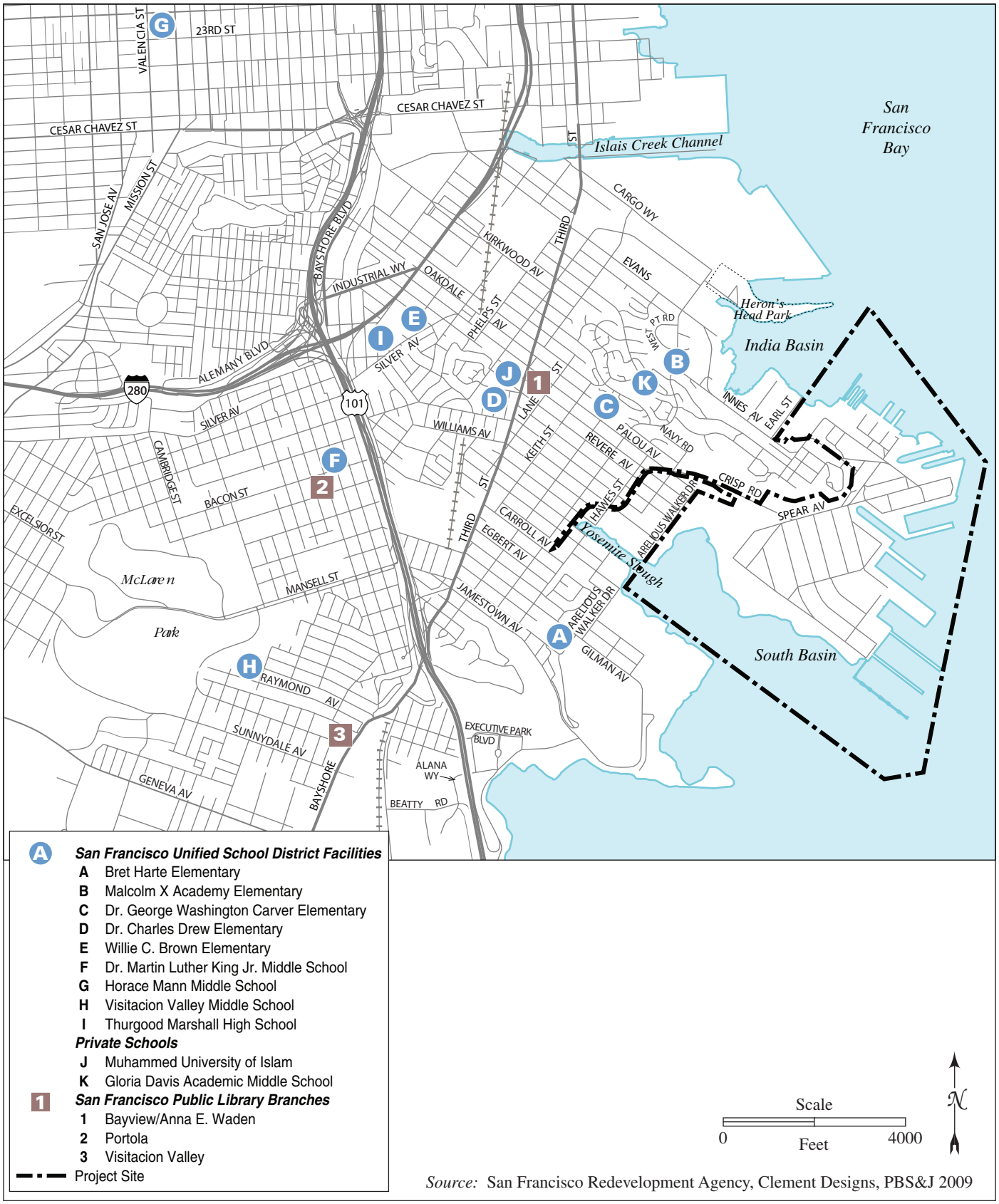
3.11.3.4 Libraries

The SFPL provides library services for the City of San Francisco. SFPL operates the Main Library at the Civic Center and 28 neighborhood branches distributed throughout San Francisco. There are three branch libraries within a 2-mile radius of HPS: the Bayview/Anna E. Waden Branch; the Portola branch; and the Visitacion Valley branch (Table 3.11.3-6). SFPL facilities in the project vicinity are illustrated in Figure 3.11.3-2.

Table 3.11.3-6. Library Branches in the Project Vicinity

Branch	*Location*	*Distance from Project Site (miles)*	*BLIP Improvements*	*Size of New Collection at Opening*
Bayview	5075 3rd Street	0.5	New Branch. Not Yet Begun.	43,000 to 45,000 volumes.
Portola	380 Bacon Street	1.5	New Branch. Opened February 2009.	33,000 volumes
Visitacion Valley	45 Leland Avenue	1.0	New Branch. Reopened 2010.	35,000 to 40,000 volumes

Note:
All branches have room for 10 to 15 percent growth.
Sources: SFPL 2009; Personal communication, Bannon 2009.



Source: San Francisco Redevelopment Agency, Clement Designs, PBS&J 2009

Figure 3.11.3-2. Schools and Libraries in the Project Vicinity

The Branch Library Improvement Program (BLIP) was launched as a result of a bond measure passed in November 2000 to provide funding to upgrade San Francisco's branch library system, and Proposition D, which passed in November 2007, authorizing additional funding to improve the branches. The BLIP is intended to provide the public with seismically safe, accessible, technologically updated, and code-compliant city-owned branch libraries in every neighborhood (SFPL 2009). One of the priorities of the BLIP was to replace four branches located in leased facilities with city-owned branches, two of which are located in the Portola and Visitacion Valley neighborhoods. New Portola and Visitacion Valley branches have since been constructed or are currently being constructed. The new one-story, 6,300 ft^2 Portola branch opened in February 2009. The branch opened with a collection of 33,000 items and has room to grow 10 to 15 percent. Construction of the new Visitacion Valley branch began in 2009 and is scheduled to be completed in 2011. The new branch will be approximately 8,500 ft^2 with a collection of between 35,000 and 40,000 volumes and facilities to accommodate an additional 10 to 15 percent in collection size.

The Bayview/Anna E. Waden branch, one of the branches serving the Bayview neighborhood and the project site, was also identified for renovation under the BLIP. SFPL decided to build a new Bayview branch library that will be located at the same site as the existing branch and occupy an adjacent site. The new branch will be approximately 9,000 $ft^2$and will open with a collection of 43,000 to 50,000 volumes with room to grow its collection by 10 to 15 percent. Construction is scheduled to begin in 2010 and open in late 2011.

3.12 Cultural Resources

3.12.1 Introduction

Cultural resources include districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture (16 U.S.C. 470a[a]). Archaeological resources (both prehistoric and historic), historic architectural resources (physical properties, structures, or built items), and traditional cultural resources (those important to living Native Americans for religious, spiritual, ancestral, or traditional reasons) are considered in this section. In particular, maritime cultural resources can include submerged prehistoric sites, shipwrecks and associated debris, and materials that were intentionally dumped or lost during historic use of the bay and its shoreline. This section also discusses paleontological resources, which are the fossilized remains or impressions of prehistoric plants and animals and are used to document the existence of extinct life forms and to reconstruct the environments in which they lived.

The cultural resources section is based on the following primary technical studies: *Historic Context and Inventory and Evaluation of Buildings and Structures, Hunters Point Shipyard, San Francisco, California* (JRP Historical Consulting Services 1997*);* and *Archaeological Inventory and Assessment of the Hunters Point Shipyard, San Francisco County, California* (Hamusek-McGann, *et al*. 1998). These reports were supplemented by the following studies: *Historical Context for the Archaeology of the Bayview Waterfront Project, San Francisco, California* (Archeo-Tec 2008); *Archaeological Research Design and Treatment Plan for the Bayview Waterfront Project, San Francisco, California* (Archeo-Tec 2009); *Historic Context for the Bayview Waterfront Plan* (Circa Historic Property Development 2008); and the *Bayview Waterfront Plan Historic Resources Evaluation, Volume II: Historic Resources Survey and Technical Report* (Circa Historic Property Development 2009). The technical studies incorporate archival research and site reconnaissance, and they provide an historic context for evaluating the significance of buildings and structures located at the HPS.

The paleontological setting is based on database searches of the University of California, Museum of Paleontology; the American Museum of Natural History, Division of Paleontology; the North American Mammalian Paleofaunal Database, in July 2009; as well as a review of published studies by the U.S. Geological Survey, as well as other agencies and organizations. This research was completed to identify previously reported fossil finds in the vicinity of the project site or in the same geologic units that occur at the project site. Ground surface reconnaissance and ground-disturbing activities to identify paleontological resources were not conducted.

3.12.2 Setting

3.12.2.1 Prehistoric Context

Until the late 1980s, the greatest concentration of documented prehistoric sites in San Francisco was in the BVHP area. Dominant assumptions during this time were that San Francisco had a low prehistoric site density and that this was the result of either sparse prehistoric occupation or of modern destruction of prehistoric deposits. It was also assumed that prehistoric sites in San Francisco were virtually restricted to the bay littoral zone with a few temporary food procurement camps along the coast. In the last 20 years, prehistoric sites have been discovered in San Francisco with unexpected frequency and with locations, depths, age, range of types, and an abundance that was not foreseen. New research tools (such as geoarchaeology and Geographic Information Systems [GIS]) have been employed in the study of these recent sites that have resulted in better predictability of vertical and horizontal site locations, and new comparative interpretations of shell middens have resulted in a greater understanding of the complexity of construction and site interrelationships of Bay Area shell midden sites. Very little is known of the

prehistoric sites in southeast San Francisco as they have been subject to almost no field investigation since Nelson (1909) first surveyed them in the early 1900s (Archeo-Tec 2008). Because of their poor documentation, prehistoric sites of the Hunters Point area have an unclear relationship to the better-researched, more recently known concentration of San Francisco prehistoric sites in the South of Market area of San Francisco.

Humans have been present within the urban area now known as San Francisco for at least 6,000 years and within the greater Bay Area for a period of time nearly twice as long. As prehistoric sites beneath the bay and ocean floor or buried beneath late Holocene sand dune deposits are investigated in the future, the advent of local human prehistory may be pushed back even further in time. The earliest people currently known to have inhabited the Bay Area comprised widespread but sparse populations of hunter-gatherers whose subsistence was based on large game, seeds, and nuts as evidenced by the presence of large projectile points and milling stones (*manos* and *metates*). These people lived in small nomadic bands that made less use of shoreline and wetland resources than later prehistoric populations. Soon after 2,000 B.P. (years before present), bayshore- and marsh-adapted people who were Utian language-speaking (of the Miwok-Costanoan language family) people began to migrate into the Bay Area from the Central Valley, displacing the earlier Hokan language-speaking populations. The new inhabitants were different than the older resident populations in a number of respects, including language; larger and more sedentary settlements; a subsistence based on acorns, shellfish, and small game; mortuary practices; personal ornaments; and perhaps the fabrication of coiled basketry. It is assumed that the Costanoan representatives of this Utian dispersal reached the northern end of the San Francisco peninsula no later than 2,450 B.P.

There are currently about 50 documented prehistoric sites in San Francisco. These sites include several large settlement sites (inhabited up to 1,000 years), cemeteries, food-procurement camps, and tool workshops. One prehistoric site, dated to nearly 6,000 years B.P., was encountered 75 ft (22.8 m) below the modern ground surface. In contrast to prehistoric shellmound sites found elsewhere in the Bay Area, many shellmounds discovered in San Francisco have remarkable integrity because they have been buried beneath native sand dune deposits. The high density and number of prehistoric sites in San Francisco provide the opportunity to study these sites as regional and sub-regional systems.

3.12.2.2 Prehistoric Chronology

The following chronology was summarized from Archeo-Tec (2008), unless otherwise noted.

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

There are few human sites in San Francisco Bay Area dating from this period and none have, as yet, been documented in San Francisco. Populations from this time probably lived in small groups that migrated frequently in accord with the annual patterns of preferred game and plants. Early Holocene sites may contain handstones, milling slabs, cutting and scraping tools, bifaces, dietary remains, or human burials.

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

The earliest evidence for human occupation in San Francisco is roughly 6,000 B.P. The earlier focus on big-game hunting shifted to gathering a wider array of food resources, especially plants and seeds, during this period. Groups moved seasonally to different environments to use resources as they became available. The greater reliance on seeds is reflected in the kinds and number of artifacts recovered from sites dating to this period, such as relatively large numbers of grinding tools. Investigations of sites located in Santa Clara County indicate that during this period people became increasingly reliant on acorns for food. Sites dating to this period are often deeply buried.

3.12.2.2.3 Late Holocene (4,000-230 B.P.)

Nearly all the prehistoric sites discovered in San Francisco are Late Holocene sites, although some of the prehistoric deposits in the southeast part of San Francisco may prove to pre-date the Middle Holocene period. Studies of prehistoric occupation and chronology based on chronologic methodologies such as radiocarbon dating, obsidian hydration, and the results of artifact seriations from archaeological deposits within the project area remains largely undocumented, although relative dating of a nearby prehistoric site indicate that it was occupied from approximately 1,650 B.P. to 650 B.P. (Late Holocene).

During this period, there was a general trend throughout California for groups to adapt to local environmental conditions. Shellmounds are the dominant type of site in the Bay Area that date to this interval, as represented by over 400 recorded sites. Shellmounds are typically found near or along the open bay and next to streams flowing into the bay. Artifacts found in shellmound sites include stone net sinkers, mortars, and pestles for grinding seeds and other plant material, bone tools, rectangular shell beads, stone arrowheads, and stone knives.

Four prehistoric sites are known or believed to be located within the project site area. All are reported as likely shellmounds or shell midden (an archaeological deposit which may contain copious amounts of mollusk shell in addition to stone debris from tool manufacture, animal bone, plant material, and other artifacts associated with past human occupation). The sites were originally documented in the early 1900s; however, since that time the project site has been extensively developed. The natural and man-made landmarks which were used to locate the sites have vanished, and today the exact site locations are unknown (see Section 3.12.4, Existing Conditions, for more information).

3.12.2.2.4 Ethnographic Period

The project site lies within the traditional territory of the indigenous Ohlone (Costanoan) people. The northern tip of the San Francisco peninsula was once within the Yelamu tribal territory (Milliken 1995). The Yelamu were one of a number of smaller tribal groups within the larger Ohlone language family. At the time of European contact, the Ohlone were organized into clans and lived in extended families that were patrilineal; that is, they traced their descent through the male line (Archeo-Tec 2008).

The staple food for the Ohlone people in the Bay Area was the acorn. Acorns were pounded into flour using stone mortars and pestles. They were then leached of tannic acids and made into a mush or bread. The nuts of the buckeye tree were also eaten and prepared similarly to acorns. Other plant species that were used include a variety of berries, roots, shoots, and seeds from wild onion, cattail, wild carrot, tarweed, chia, and many others. Controlled burning of land was practiced to help ensure future wild plant harvests. Shellfish, including clams, ocean and bay mussels, and oysters, was also important components of the diet. Other sources of protein included various game birds, waterfowl, and large terrestrial and sea mammals (Archeo-Tec 2008).

Tule reeds (*Scirpus acutus*) are freshwater sedge used by Native Americans to make structures and watercraft (e.g., canoes or balsas). Watercraft were used for transportation across San Francisco Bay and for exploiting marine and wetland resources (Jones and Klar 2007). Balsa canoes were used to hunt waterfowl, for fishing, and probably for hunting sea mammals. Canoes were also used for travel and trade across the bay and salt marshes. Fiber from plants was used to make a variety of baskets including cooking containers, utensils, storage containers, seed beaters, water jugs, cradles, fish traps, and burden baskets. Animal bones were used to make awls, pins, daggers, scrapers, knives, and other tools. Pelts and feathers were used for clothing, sinew for bows, and feather, bone, and shell for several different kinds of ornamentation including beads, pendants, hair bangles, septum inserts, and earrings. Local and imported stone and minerals were used to make a large number of tools. Local commodities used in trade

included cinnabar (red mercury sulfide or native vermillion), hematite (the mineral form of an iron oxide), salt, shellfish meat, and shell for ornament manufacture (Archeo-Tec 2008).

As noted above, the Ohlone people who occupied the northern end of the San Francisco peninsula in the late eighteenth century were associated with the tribelet of Yelamu. The people associated with Yelamu were composed of at least five settlements located within present-day San Francisco: Chutchi, Sitlintac, Amuctac, Tubsinte, and Petlenuc (Archeo-Tec 2008).

Some of the Yelamu people may have conducted their seasonal rounds within the South Bay area at Sitlintac, which was possibly located on the bayshore near the large tidal wetlands of the Mission Creek estuary, and at Chutchui, which was located near the lake (Laguna de los Dolores) east of the current Mission Dolores, two to three miles inland. Other Yelamu people seasonally used the village sites of Amuctac and Tubsinte, which were located in present-day Visitation Valley. Tubsinte may prove to be identified with archaeological site CA-SFR-7[1], located west of Candlestick Point, or the Ralston Mound, in present-day Visitation Valley. A third Yelamu group associated with Petlenuc may have had a small settlement near the Presidio (Archeo-Tec 2008).

Within less than two months after the Spanish began construction of the first Mission Dolores in 1776, all of the Yelamu villages in San Francisco were attacked and burned by an expedition sent by the Ssalson tribe, the Ohlone tribe of the San Mateo area. The Yelamu survivors abandoned all of the San Francisco settlements, seeking refuge with other groups in the east bay and in present-day Marin County. After they were missionized in the late eighteenth century, the Yelamu only returned to San Francisco for occasional hunting. Prehistoric Ohlone and/or pre-Ohlone people may have maintained settlements or specialized activity sites (shellfish processing, hunting blind, ritual, burial sites) within the project site area (Archeo-Tec 2008).

3.12.2.3 Historic Context

3.12.2.3.1 Settlement Overview

The following section was summarized from Archeo-Tec (2008), except where otherwise noted. No occupation or use of the area within the project site has been documented for the Hispanic and Early American Periods (1776–1848). However, with the initiation of the Gold Rush in 1849 and subsequent statehood a year later, San Francisco's population and geographic area grew rapidly over a short period of time. The area around the entrance to San Francisco Bay was planned for more intensive development while the Hunters Point area remained primarily pasture land (Hamusek-McGann, *et al*. 1998).

From the 1880s through 1910, this area was the center of design and construction of scow schooners of which the Bay Area Scow Schooner represents a specialized regional type. Drydock development (an uncommon ship construction facility type in San Francisco) also began by the late 1860s and continued until the early 1900s.

On Hunters Point, Italian and Chinese farmers moved into the area to grow vegetables for the growing city center located four miles to the north. Known as "truck farmers," these agriculturalists grew fruit and vegetables on small plots of land and then transported their product to the urban markets to sell. By the turn of the twentieth century, Italians dominated this industry, but as the century progressed agricultural endeavors within the area began to decline. The Chinese also began to establish fish and shrimp farms along the Hunters Point, as discussed in more detail in the Historic Context Themes section (Section 3.12.2.3.3, Historic Context Themes).

[1] CA-SFR-## is a designation assigned to archaeological sites in San Francisco County, California. For example, CA-SFR-7 means that it was the seventh site recorded in the county.

Some progress toward attracting additional settlement was achieved with the construction of the Bay View Park racetrack in 1863 and Long Bridge in 1865. Despite this, access to the interior of the present project site remained difficult in the early years of settlement due to lack of established roads. Nevertheless, favorable weather and freshwater access enticed real estate speculators to the area during the 1860s.

One of the earliest real estate partnerships was between Jose Bernal's family and two land speculators, John Townsend and Corneille de Boom. Townsend and de Boom convinced Bernal to subdivide the land located at Hunters Point into lots and call the new homestead "South San Francisco." To sell this idea, two brothers, Robert Eugene and Philip Schuyler Hunter, were brought in from the East Coast. Even with the supply of underground freshwater, well-made plans, and abundant advertising, the area was simply located too far from the city center to be viable. Despite the failure of the real estate venture, the Hunter brothers (for whom the area is named) stayed at Hunters Point as a pioneering family operating dairy and gardening ventures. They also sold spring water to ships by leasing water rights to the Independent Water Company. The Hunter family occupied the area until they sold it in the 1870s.

Although some early homesteading attempts in the project site enjoyed modest success, by the early 1900s most of the area was still largely undeveloped. The population was still predominantly Italian, with a number of Irish, Maltese, Portuguese, and Chinese settlers. These ethnic groups formed small enclaves within the larger community, sponsoring their own churches and social clubs. In the aftermath of the 1906 San Francisco earthquake and fire, Hunters Point, which was spared from the worst of the disaster, became an area of respite from the smoke, chaos, and debris.

The Southern Pacific Railroad finished constructing the Bayshore Cutoff in 1908, opening a direct rail line to the area. The railroad eventually included a 4,110-ft (1,253-m) long bridge over Islais Creek north of Custer St between Islais St and Tulare St. While general access to the area had steadily improved, there were still impediments to industrial and residential development that had yet to be adequately addressed. The biggest problem was topography.

By the mid-1920s, the character of the project vicinity started to shift from a mix of industrial and pastoral uses to a more organized urban environment. However, the boatyards, drydocks, greenhouses, and farms in the project vicinity continued to dominate the landscape and shape where people settled. By the 1930s, city government officially recognized Hunters Point as a separate district. In 1939, after fighting for years for paved streets, parks, sewer-line extensions, and public transportation, residents near the India Basin boatyards formed the Hunters Point Improvement Association to achieve needed community improvements.

3.12.2.3.2 Hunters Point Shipyard Development

In 1885, President Cleveland's administration saw San Francisco Bay as second in importance only to New York Harbor for the nation's security. This view shaped the development in the Hunters Point area for most of the twentieth century. Expansion of military facilities in San Francisco during the first half of the twentieth century included Fort Winfield Scott (1912), Crissy Army Air Station (1921), Treasure Island (1941), and Hunters Point (1941). Many more military facilities were established throughout the East Bay and North Bay regions of the San Francisco Bay Area. San Francisco served as a primary shipbuilding and supply center, as well as one of the main westward points of embarkation throughout World Wars I and II.

What would become HPS began in 1864 as the brainchild of A.W. Von Schmidt, a German engineer. He approached the South San Francisco Homestead and Railroad Company, which was formed in 1862, with the idea that a drydock in such close proximity to their land would bring industry (and workers needing

housing) to the area. They readily agreed and donated ten acres. However, financing for the construction was more difficult to secure. Eventually, Von Schmidt partnered with a number of investors, including William Ralston and Lloyd Tevis, to form the California Dry Dock Company. The first drydock constructed (Drydock 1) was largely cut from solid rock at the northeastern tip of Hunters Point. When it was completed in 1868, the California Dry Dock Company was well situated, with deep water and in close proximity to the thriving scow schooner boatyards at India Basin (Hamusek-McGann, *et al*. 1998).

At Hunters Point, the California Dry Dock Company operated through the end of the nineteenth century with limited government contracts and as a repair facility for DoN ships returning from the Pacific. Around 1901, the company changed its name to the San Francisco Dry Dock Company and commenced construction of a second drydock (Drydock 2). Completed in 1903, the facility became the most modern drydock on the bay (Hamusek-McGann, *et al*. 1998).

World War II

In the decades prior to the beginning of the war, the DoN had solidified its relationship with the Bethlehem Steel drydocks at Hunters Point, and subsidized construction of new, larger facilities at Hunters Point in exchange for prioritized access to the privately owned site. This arrangement enabled Bethlehem Steel to construct Drydock 3 in 1918 at the former site of the first drydock (Drydock 1), which functioned to accommodate the largest vessels that could pass through the Panama Canal. Drydock 3 greatly increased the ship repair capabilities at Hunters Point, including the ability to repair battleships (PRC 1996).

Just prior to World War II, the DoN again contracted with the drydocks at Hunters Point. The drydocks were expanded twice in response to the DoN's shipyard needs. The drydocks were one of the DoN's primary shipyard resources on the Pacific Coast. This eventually prompted the DoN to purchase the Union Iron Works Dry Docks from Bethlehem Steel (the parent company of Union Iron Works) in 1939. Improvements made to the drydocks by the DoN included a new assembly building just south of Drydock 2, a 50-ton (45.35-mt) crane, and an 800-ft (244-m) long quay-wall as well as smaller service buildings. These projects were still under construction when the government terminated its lease to Bethlehem Steel in October 1941. The DoN took full control of the shipyard on 18 December 1941, just 11 days after the bombing of Pearl Harbor (JRP Historical Consulting Services 1997).

When the United States entered World War II at the end of 1941, the DoN had just completed its takeover of the drydocks at Hunters Point. From this time, construction ensued for the next five years, dramatically increasing the dry landmass around the end of the Hunters Point and changing the topography of the entire area through reclamation efforts.

HPS was rapidly expanded and developed during the first years of United States involvement in World War II. Dozens of buildings were constructed for various purposes for the war effort and beyond. Between 1939 and 1945, the shipyard was expanded from 48 ac (19.4 ha) to 583 ac (236 ha). This major expansion included construction of a 1,092-ft (333-m) long drydock (Drydock 4), three 420-ft (128-m) long drydocks for submarines (Drydocks 5, 6, and 7 near India Basin), the leveling of a good portion of Hunters Point Hill, and the construction of dozens of buildings. The resulting eight million cubic yards (226,535 cubic meters) of earth was used to fill in the bay north and south of Hunters Point to create a submarine service area and a large flat area between Hunters Point and Yosemite Creek for future development (Hamusek-McGann, *et al*. 1998).

The first building constructed by the DoN in World War II was Building 231, the Inside Machine Shop. Constructed in 1942 by the San Francisco-based firm of Barrett & Hilp and situated adjacent to Drydock 2, the curtain-wall building was for a brief period the only major functional shop at the shipyard as the

United States headed into the war. Building 211 was also one of the first erected by the DoN. The building was the original Shipfitters Shop and is a good representation of the typical semi-permanent, monitor-roof shop building constructed throughout the shipyard during the World War II era. Building 224, a concrete air raid/bomb shelter building built in 1944, and later used as an annex for the Naval Radiological Defense Laboratory (NRDL), is a unique representative of its type at the shipyard. The only building within the district completed after World War II is the Optical, Electronics and Ordnance Building, Building 253, finished in 1947 and attached to the west elevation of Building 211. This concrete frame curtain-wall building was designed for the DoN by Kump, a local architect, and was a highly specific repair and research facility.

All of the construction was centered on the stated mission of HPS. This mission included interim docking, shaft and propeller repairs, and repairs of major underwater damage for all classes of vessels; and interim overhaul of about three to four weeks comparable to overhaul by repair vessels afloat for carriers. A numbering system was instituted during the war, and each series of numbers generally referred to a specific functional grouping of buildings (Figure 3.12.2-1):

- 100s—Chiefly administrative buildings located near the Main Gate;
- 200s—Industrial shops and ancillary buildings;
- 300s and 400s—Industrial and warehouse buildings;
- 500s and 600s—Primarily residential;
- 700s and 800s—Industrial support or storage buildings or Naval Radiological Defense Laboratory-related; and
- 900s—Officers Mess, greenhouses and garden sheds, a bank and garage facilities.

In addition to military construction conducted as part of the war effort, demands for housing for the workers at the shipyard resulted in the construction of over 12,000 housing units in the immediate area. Every portion of the project site was affected by these housing projects. The population increase transformed the rural Bayview and Hunters Point neighborhoods into an urban center almost overnight. Demographic shifts from Italian to African-American predominance, economic shifts from agriculture to heavy industry, and social shifts from multi-generational families to transient settlers, all occurred during this highly tumultuous time.

The Atomic Bomb and Nuclear Research

During World War II, HPS was at times used to load and outfit ships prior to embarkation. On 15 July 1945, the USS *Indianapolis* was docked at Hunters Point awaiting orders. On that date, components of the atomic bomb "Little Boy" were loaded aboard the *Indianapolis* for transport to the South Pacific. It was reported to have contained half of the available uranium in the United States. The ship left Hunters Point at 6:30 A.M. the next morning but was held in San Francisco, awaiting the results of the first atomic weapons test in New Mexico. The test was a success and the *Indianapolis* sailed out of the Golden Gate at 8:30 A.M. and transported the bomb to Tinian in the Marianas Islands. On 6 August 1945, the bomber Enola Gay dropped "Little Boy" on Hiroshima, essentially ending World War II.

Nuclear weapons development was the impetus for the DoN's decision to research protection devices to shield soldiers and civilians from exposure to radioactivity. A nuclear research facility was developed at HPS beginning in 1944 due to its advantageous geographic, political, and logistical attributes. Called the Naval Radiological Defense Laboratory or NRDL, it became a leader in nuclear testing. NRDL personnel were involved in all atomic weapons tests between 1950 and 1958, providing test support, primarily related to radiation safety and monitoring (Circa Historic Property Development 2008). After 1951, the

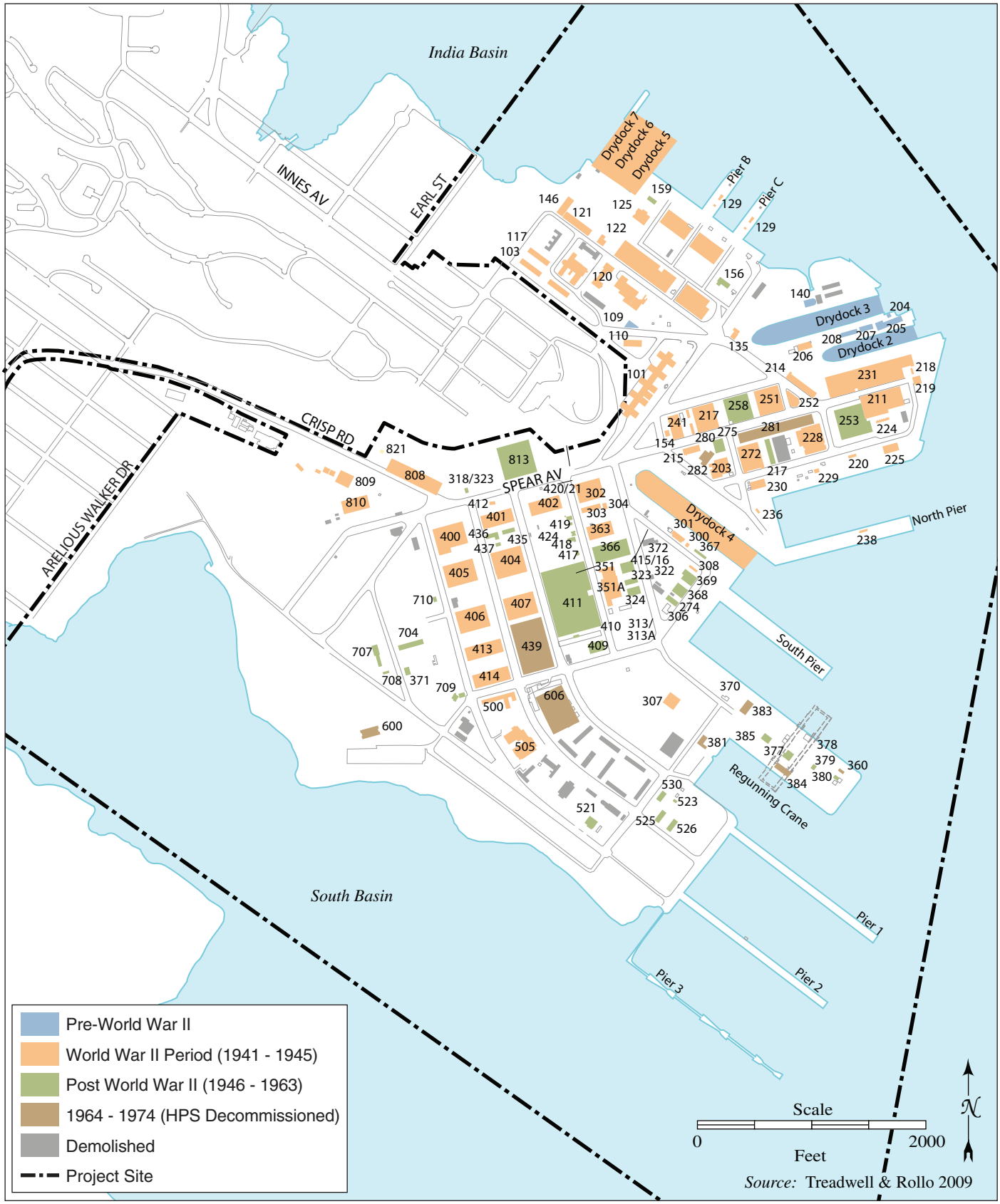


Figure 3.12.2-1. HPS Structures

NRDL took over many of the buildings on the southern half of the shipyard. The NRDL closed in 1969. Other activities at the shipyard declined in the 1960s and early 1970s, and the DoN officially closed the shipyard in 1974. After 1976, most of the shipyard was leased to Triple A Machine Shop, a private ship-repair operation. In 1986, the DoN reclaimed the shipyard for the purposes of environmental remediation with the eventual goal of removing the property from federal ownership (refer to Section 3.7, Hazards and Hazardous Materials of this SEIS for a detailed discussion of the cleanup activities).

The number of jobs associated with shipyard activities decreased after World War II. A sizable peacetime workforce was needed, but not in the around-the-clock fashion that was common during the war. The decrease in work prompted some families to leave the area. Additionally, the post-war period in San Francisco was marked by an extreme shortage of quality housing, especially for low-income segments of population. Many of the temporary housing units built by the DoN around Hunters Point became apartment units managed by the SFHA, transforming the area into the highest concentration of low-income housing in San Francisco. The history of the post-war period within the project site is largely a story of the transition of this housing stock and its impact on the more well-established surrounding community.

3.12.2.3.3 Historic Context Themes

Context themes provide a basis for the evaluation of resources and can be arranged either geographically or thematically. The two context themes below, Chinese Shrimp Camps and Maritime History, represent important themes in the history of the Hunters Point related to extant resources. The following is summarized from Hamusek-McGann, *et al*. (1998) and Archeo-Tec (2008), unless otherwise noted.

Chinese Shrimp Camps

The Chinese Shrimp Camps played an important role in the history of Hunters Point and San Francisco Chinese community. Between the 1870s and the 1900s, Chinese Shrimp Camps flourished in San Francisco and elsewhere around the bay. Most of the fishing camps were started by workers who were out of work after the completion of the transcontinental railroad in 1869. The Chinese developed the shrimp fishing industry, created largely by the presence of shrimp at their fishing locations and the use of bag nets. Before the late 1860s, fishermen caught a variety of fish. By the late 1860s, the Chinese shrimp fishing was a fully developed industry. Dried fish, abalone, abalone shells, and shrimp were exported to China.

The amount of San Francisco fish and shrimp exported overseas led fishermen of other ethnicities to petition the state to levy taxes on Chinese commercial fishing. In 1885 and 1886, 600 Chinese were arrested for tax reasons. The federal government revived old trade-laws and applied them to the dried fish and shrimp trade. Chinese vessels were seized and their captains fined.

The number of Chinese camps around the bay decreased from 50 in the 1880s to 26 in 1896. The 1900 United States Census lists one Chinese fisherman at Hunters Point, but there is no evidence of large-scale fishing camps in the area. The State Legislature outlawed the bag net in 1910, and most of the shrimp fishermen subsequently abandoned the industry. A redesign of the bag net, which permitted trolling for shrimp, was introduced in the 1920s. By the 1930s the empty fishing villages were again active and at least 12 fishing camps were present along Hunters Point shoreline at this time.

In 1939, the San Francisco Health Department, responding to complaints about the pungent smell of the fishing camps, declared the camps unsanitary and ordered several of them burned. The fishing activity declined as well because of the filling of the bay and pollution, and due to the DoN's move to Hunters Point in the 1940s. One camp, the Hunters Point Shrimp Company, closed as late as 1959.

Chinese Shrimp Camps have been recorded at the project site, primarily at Hunters Point. Two possible locations for a fishing camp that dates to the 1860s have been identified in HPS (see Section 3.12.4, Existing Conditions, for more information).

Maritime History

The project site's shoreline with its access to deep water became an early center for maritime activities. Small shipyards, crowded out of the waterfront closer to the city's center, began operating in and adjacent to the project site as early as the 1860s. By the end of the nineteenth century, the project site contained shipyards, a drydock, and other related enterprises along the northern shore of Hunters Point. Most of the boats built and repaired at Hunters Point were scow schooners (a boat with a broad, shallow hull instead of a deep keel), and two boatyards adjacent to the project site in India Basin are known to have built junks (a boat with a flat bottom, no keel, and a very large rudder) for Chinese fishermen.

The drydock facilities at Hunters Point were the largest enterprise within the project site in the late nineteenth century. The California Dry Dock Company constructed the first drydock (Drydock 1) in 1867. A second drydock (Drydock 2) was built in the early 1900s by the San Francisco Dry Dock Company. After the second dock was constructed, DoN ships came to the area for drydock service. In 1908, the Union Iron Works, a division of the Bethlehem Shipbuilding Company, purchased the operation from the San Francisco Dry Dock Company, which later became the Union Iron Works Dry Docks.

3.12.3 Regulatory Framework

3.12.3.1 Cultural Resources

3.12.3.1.1 Federal

Federal regulations for cultural resources are primarily governed by the *National Historic Preservation Act of 1966* (16 U.S.C. 470 et seq.) (NHPA), which applies to actions taken by federal agencies, including projects that take place on federally controlled land or facilities, require federal agency permits, or receive federal funding. Section 106 of NHPA directs federal agencies to take into account the effects of a federal undertaking on historic properties, as outlined in the Advisory Council on Historic Preservation's regulations, "Protection of Historic Properties" (36 CFR Part 800). Section 106 of NHPA defines an undertaking as any project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; and those requiring a federal permit, license, or approval (36 CFR 800.16[y]).

Section 106 of NHPA defines historic properties to include any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (National Register), as well as artifacts, records, and remains related to such properties (36 CFR 800.16[l]). The National Register criteria (36 CFR 60.4) state that eligible resources comprise districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and any of the following:

- Are associated with events that have made a significant contribution to the broad patterns of our history;
- Are associated with the lives of persons significant in our past;
- Embody the distinctive characteristics of a type, period, or method of construction, or that possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction; or
- Have yielded or may be likely to yield, information important to history or prehistory.

Memorandum of Agreement

An MOA was executed on 11 January 2000 among the DoN, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer (SHPO), and concurred with by the city and the SFRA, regarding the interim lease and disposal and protection of historic properties (Drydock 4 and the *Hunters Point Commercial Drydock Historic District*) at HPS. The MOA identifies the actions to be taken by the DoN before property transfer and by the city and SFRA after transfer to ensure appropriate treatment of these cultural resources.

Under the stipulations of the MOA, the DoN evaluated all buildings and structures on the shipyard in consultation with the SHPO (Stipulation 1a); agreed to prepare National Register Registration Forms (Stipulation 1b) and Historic American Engineering Record documentation (Stipulations 4a and 4b) for the *Hunters Point Commercial Drydock Historic District* and Drydock 4; and coordinated the disposal of remaining shipyard documents consisting of records, drawings, plans, and photographs with the National Archives Pacific-Sierra Region (Stipulation 3). The DoN is currently preparing the National Register Registration Forms for both the *Hunters Point Commercial Drydock Historic District* and Drydock 4. The Historic American Engineering Record documentation for both historic properties has been completed and was accepted by the National Park Service on 26 October 2010 (Jackson-Retondo 2010). The DoN also completed an Archeological Inventory and Assessment (Stipulation 2a), which identified Archaeologically Sensitive Zones where archaeological sites may be buried deep beneath the fill on which the shipyard was constructed. However, the MOA acknowledged that it is unlikely that significant archaeological resources (i.e., National Register-eligible properties) would be discovered while excavating within these sensitivity zones (Stipulation 2b). See Section 3.12.4 below for more information about the two historic properties and the Archaeological Sensitivity Zones at HPS.

The MOA (Stipulation 6) also established requirements for tenants of historic properties to follow the Secretary of the Interior's *Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (U.S. Department of the Interior 1992) for maintaining or adapting the historic properties for use, as well as requirements for consultation with the San Francisco Landmarks Advisory Board (now the San Francisco Historic Preservation Commission) and the Certified Local Government. These requirements ensure that adaptive reuse of historic properties and adjacent new development conform to the provisions of the *Hunters Point Shipyard Redevelopment Plan*, *Design for Development*, and the State Historic Building Code after the property is transferred out of federal ownership.

3.12.3.2 Paleontological Resources

A variety of federal regulations and policies protect paleontological resources, including NEPA, the *Federal Land Policy and Management Act*, the federal *Antiquities Act of 1906*, and the National Natural Landmarks Program. The Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508) do not specifically require that paleontological resources be addressed. Rather, these regulations simply require that unspecified, potentially significant environmental impacts be addressed in the EIS. Identifying which environmental impacts would mostly likely occur, as a result of the proposed action, occurs during the scoping process.

3.12.4 Existing Conditions

HPS is located in the southeastern area of San Francisco and is bounded by the San Francisco Bay to the east, India Basin to the north, Candlestick Point to the south and the Bayview District to the west (Figures 1.0-1 and 1.0-2). HPS is comprised of dry lands that contain extant buildings and structures largely associated with the early drydock facilities at the turn of the century, through World War II and the immediate post-war era; as well as submerged lands in the San Francisco Bay surrounding the central portion of the HPS to the north, east and south.

The Area of Potential Effects (APE) of an undertaking is defined at 36 CFR 800.16(d) as, "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist." The APE for the present project includes the Hunters Point Shipyard and the adjacent submerged lands. The APE comprises approximately 421 ac (170 ha) of dry land, and approximately 440 ac (178 ha) of submerged lands are contained in San Francisco Bay surrounding the central portion of HPS to the north, east, and south. The shipyard includes 137 buildings and structures on shipyard property, which also includes five residential buildings and 15 non-residential buildings, together with 24,000 linear ft (7,315 m) of pier, wall and wharf space, 21 repair berths, 10 additional deep water berths, 6 drydocks, and a 225-ton (204 mt) crane. The APE boundaries encompass all potential subsurface and submerged archaeological resources, including the above-ground historic industrial and maritime resources constructed within the HPS.

3.12.4.1 Expected Archaeological Resources within the APE

Archival research, an archaeological survey, and predictive modeling of the HPS were conducted for the proposed action (Hamusek-McGann, *et al.* 1998). No prehistoric or historic archaeological resources were identified within the project site. However, predictive modeling was used to delineate Archaeological Sensitivity Zones for HPS for those areas where it is possible that subsurface deposits or features exist that could contribute to a greater understanding of Hunters Point's prehistory or early history (Figure 3.12.4-1). These deposits, if they exist, are currently covered by fill or historic/modern construction.

Before filling, the bay in this area was relatively shallow, less than 10 ft (3.0 m) deep. Thus, the highest potential for intact cultural deposits is below the fill and above the original bay floor. During the late nineteenth and early twentieth centuries, the Waters of San Francisco Bay covered all but the northernmost portion of HPS. In the northern upland portion of the shipyard, the bedrock is shallow and is close to the surface. Before filling, the bay floor was much shallower in the northern portion (near the original Hunters Point peninsula) than in the southern portion. In areas originally underwater, the area of the highest sensitivity ranges from about 20 ft (6.0 m) to about 60 ft (18.2 m) below the present ground surface.

3.12.4.1.1 Prehistoric Resources (Zone 1)

Based on archival research and predictive modeling, the following four prehistoric sites (Nelson shellmound sites) are known or are believed to be located within the boundaries of the project site or APE and are represented as Zone 1 on Figure 3.12.4-1. The predicted locations are based on careful analysis of historical maps showing the original shoreline and topography at HPS in conjunction with what little data exists on the sites, themselves. These sites have not been evaluated for eligibility for listing on the National Register, since most are under fill or on areas that have been developed. The likelihood of encountering intact deposits is relatively low due to historic and modern construction activities. However, if a site or portion of a site contains intact archaeological deposits, it would be considered a significant archaeological resource.

CA-SFR-11

Site CA-SFR-11 is a shell midden recorded by Nelson (1909) as Site #390 on the south side of Hunters Point. As described above, Hamusek-McGann, *et al*. (1998) used an archaeological predictive model to identify the likely location of the site in HPS. However, the MEA Shellmound Archaeo GIS Project map also places the site at another location - one immediately northeast of the project boundary (MEA Shellmound Archaeo GIS Project 2007). This appears to support Olmsted's original observation that the site Nelson designated as Mound #390 was situated on Palou Ave near the shoreline (Olmsted, *et al*. 1980). Although these two alternative locations fall outside the APE, their location and boundaries are not precisely known. Given the vagaries of overlaying historic and modern maps, the latter alternative location lies close to, and may extend into the APE. If Hamusek-McGann, *et al*. (1998) has the correct location, it is possible the site may have experienced less impact from Naval operations than some of the other sites.

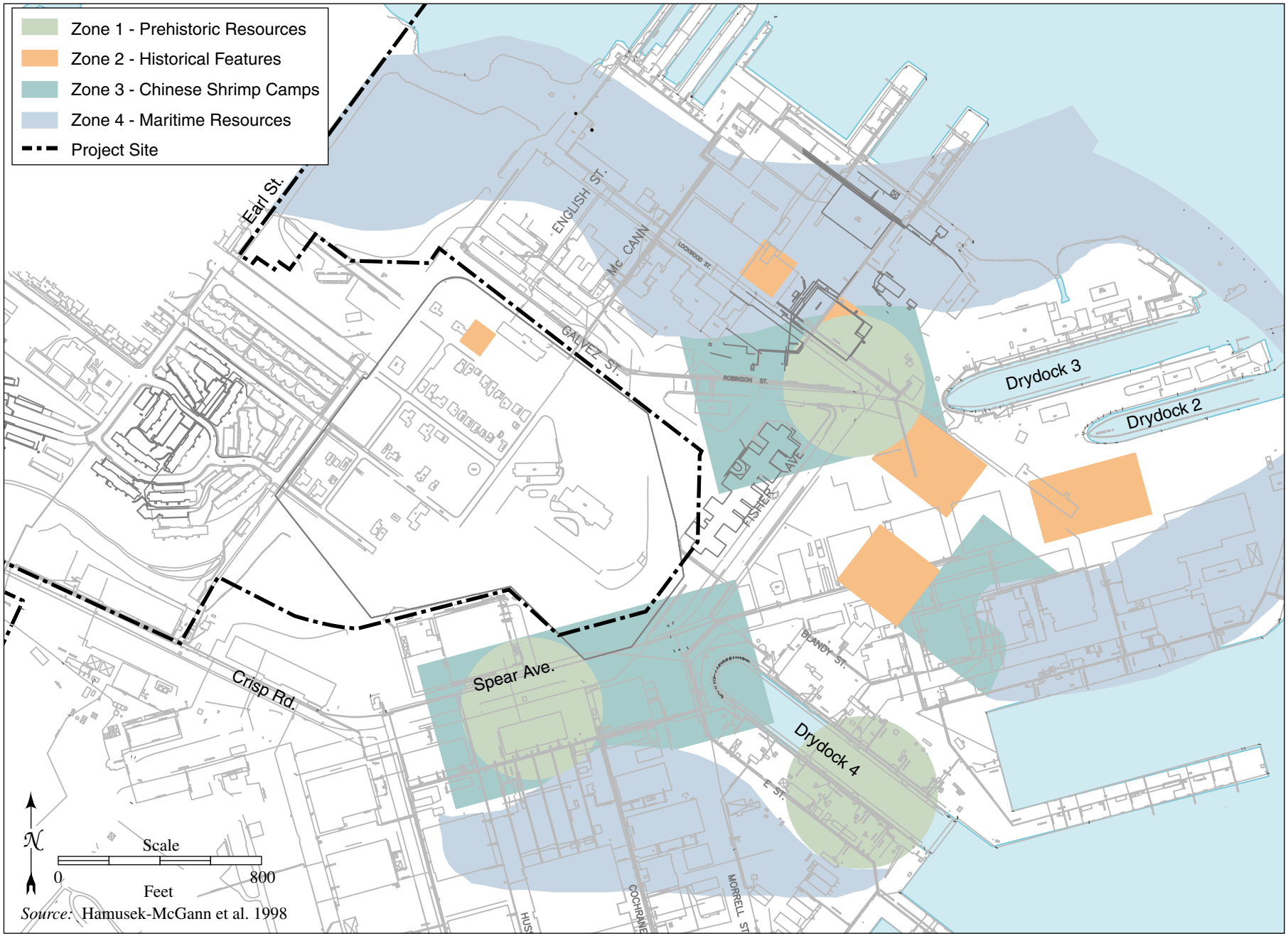


Figure 3.12.4-1. Hunters Point Archaeological Sensitivity Zones

CA-SFR-12

Site CA-SFR-12 is a shellmound recorded by Nelson (1909) as Site #391 on the south side of Hunters Point. Hamusek-McGann, *et al*. (1998) identified the likely location of the site in HPS, and they suggest that historical impacts to the site might have occurred as early as the late 1800s with Chinese and later Euroamerican occupation.

CA-SFR-13

Recorded by Nelson (1909) as Site #392, site CA-SFR-13 may be located at the eastern end of Hunters Point. Hamusek-McGann, *et al*. (1998) identified the likely location of the site in HPS and determined that the probable location of this site would have placed it at the original shoreline where Drydock 4 was later built. Due to extensive excavations that occurred during construction of the drydock, Hamusek-McGann, *et al*. (1998) assumed that it is likely CA-SFR-13 was destroyed.

CA-SFR-14

Site CA-SFR-14 is a shellmound recorded by Nelson (1909) as Site #392a on the northeast end of Hunters Point. Hamusek-McGann, *et al*. (1998) identified the likely location of the site in HPS, and they suggest that historical impacts to the site might have occurred as early as the late 1800s with Chinese and later Euroamerican occupation.

3.12.4.1.2 Historic Resources (Zones 2 through 4)

Historical Features (Zone 2)

Zone 2 on the Archaeological Sensitivity Map (Figure 3.12.4-1) represents the locations of historic-era structures based on an analysis of historical maps and photographs dating from 1852 to 1929 (Hamusek-McGann, *et al*. 1998). Although there are no standing structures or other features on the ground surface, it is possible that there are buried features associated with the remains of boarding houses, saloons, domestic dwellings, ranch complexes, cisterns and/or wells, latrines, sheds, restaurants, and detached kitchens. As noted by Hamusek-McGann, *et al*. (1998), intact deposits from these time periods would be important in examining dietary habits and other social and economic behavior of the early settlers and shipyard workers.

Chinese Shrimp Camps (Zone 3)

The remains of many Chinese Shrimp Camps may still exist within the APE, and are represented by Zone 3 on Figure 3.12.4-1. Camps and villages at HPS date from the early to mid-1870s to the 1940s (Hamusek-McGann, *et al*. 1998). Camp locations would have included a range of domestic and work-related structures associated with the shrimp industry. Most camps followed a similar layout, although this would have changed over time as population, technology, and social conditions changed. Typically, a camp consisted of several small shacks at the water‘s edge, a wharf, a processing area with boilers, drying grounds, storehouses, and living quarters.

Since Chinese Shrimp Camps were located near the bay, the original shoreline and adjacent beach should be considered sensitive for these types of resources. Chinese Shrimp Camp sites within the APE that contain intact archaeological deposits would be considered significant archaeological resources. The archaeological resources would be the remnant cultural materials that could provide important information regarding the Chinese inhabitants of the project site and the role of Chinese fishermen in the greater San Francisco Chinese community.

Maritime Resources (Zone 4)

Zone 4 on the Archaeological Sensitivity Map (Figure 3.12.4-1) is focused on maritime activities from about 1835 through 1939 (Hamusek-McGann, *et al*. 1998). A variety of maritime-related resources are the most likely potential historic archaeological resources within the APE, including boatbuilding and small craft repair facilities; large ship repair and drydock facilities; buried ships (shipwrecks and ship graveyards); and maritime-related waterfront infrastructure. Boatbuilding resources may include tools used to build and repair the ship; remnants of wood, metal, textiles, and rope used to build the ship; and discarded items related to the ship carpenter, ship laborers, and apprentices.

The Independent Water Company constructed a wharf in the 1860s, and the California Dry Dock Company, later the San Francisco Dry Dock Company, constructed a pier and docking facilities by 1867 on the easternmost point of Hunters Point (Hamusek-McGann, *et al*. 1998). Sailors and passengers frequented boarding houses built near the drydocks. It is possible that refuse from the drydock operations, its employees, ship crew, and passengers may exist beneath the modern fill. Drydock resources may include the dock, hardware related to the construction of the dock, personal items, and refuse associated with boarding houses that were frequented by sailors and passengers while the ship was at dock.

Numerous ships have been found buried in San Francisco, most of which were buried as the city's shoreline was extended during land filling operations. A search of the California State Lands Commission's online shipwreck database revealed six ships were wrecked in or in close proximity to Hunters Point. Fragments of these wrecks and their cargo may have washed ashore or may have been used as landfill and may be buried within the APE as the shoreline was filled in. Few shipwrecks that date to the nineteenth century have been archaeologically studied and documented. Most of the studies have involved only the portion of the wreck that was encountered or the bottom of the hulls, and documentation of complete vessels is extremely rare.

As noted by Hamusek-McGann, *et al*. (1998), remnants of early docking facilities could provide important comparative data to ongoing maritime studies, and the research potential of buried ships and other maritime resources could provide information on the technology of historic shipbuilding as well as artifact collection.

3.12.4.2 Hunters Point Shipyard Buildings and Structures

The HPS site contains buildings and structures with identified historic significance. Since shipyard decommissioning in 1974, two studies evaluated historic resources at the shipyard for National Register eligibility. In 1988, a report concluded that four properties were eligible for listing on the National Register: Drydock 4; Building 253; the Re-Gunning Crane; and the *Hunters Point Commercial Dry Dock Historic District* (including Drydock 2, Drydock 3, the remnants of Drydock 1, and Buildings 140, 204, 205, and 207) (Bamberg 1988). The Deputy California SHPO concurred with the findings of the 1988 report.

In 1997, JRP Historical Consulting Services completed an updated report for HPS. The study confirmed that Drydock 4 and the potential *Hunters Point Commercial Dry Dock Historic District* appeared eligible for listing in the National Register (JRP Historical Consulting Services 1997) (Figure 3.12.4-2; Table 3.12.4-1). The study concluded that Building 253 and the Re-Gunning Crane, identified in the 1988 study, were not eligible due to integrity issues (JRP Historical Consulting Services 1997). In 1998, the SHPO concurred with the findings that Drydock 4 and the potential *Hunters Point Commercial Dry Dock Historic District* appeared eligible for inclusion in the National Register (Wall 1998).

Table 3.12.4-1. Buildings and Structures with Historic Significance		
Resource	***Year Built***	***National Register***
Building 140	1916-1918	Historic District Contributor
Building 204	1903-1904	Historic District Contributor
Building 205	1901-1903	Historic District Contributor
Building 207	ca. 1930-1939	Historic District Contributor
Drydock 2	1901-1903	Historic District Contributor
Drydock 3	1916-1918	Historic District Contributor
Drydock 4	1943	Individually Eligible
Source: JRP Historical Consulting Services 1997, 2009a, and 2009b.		

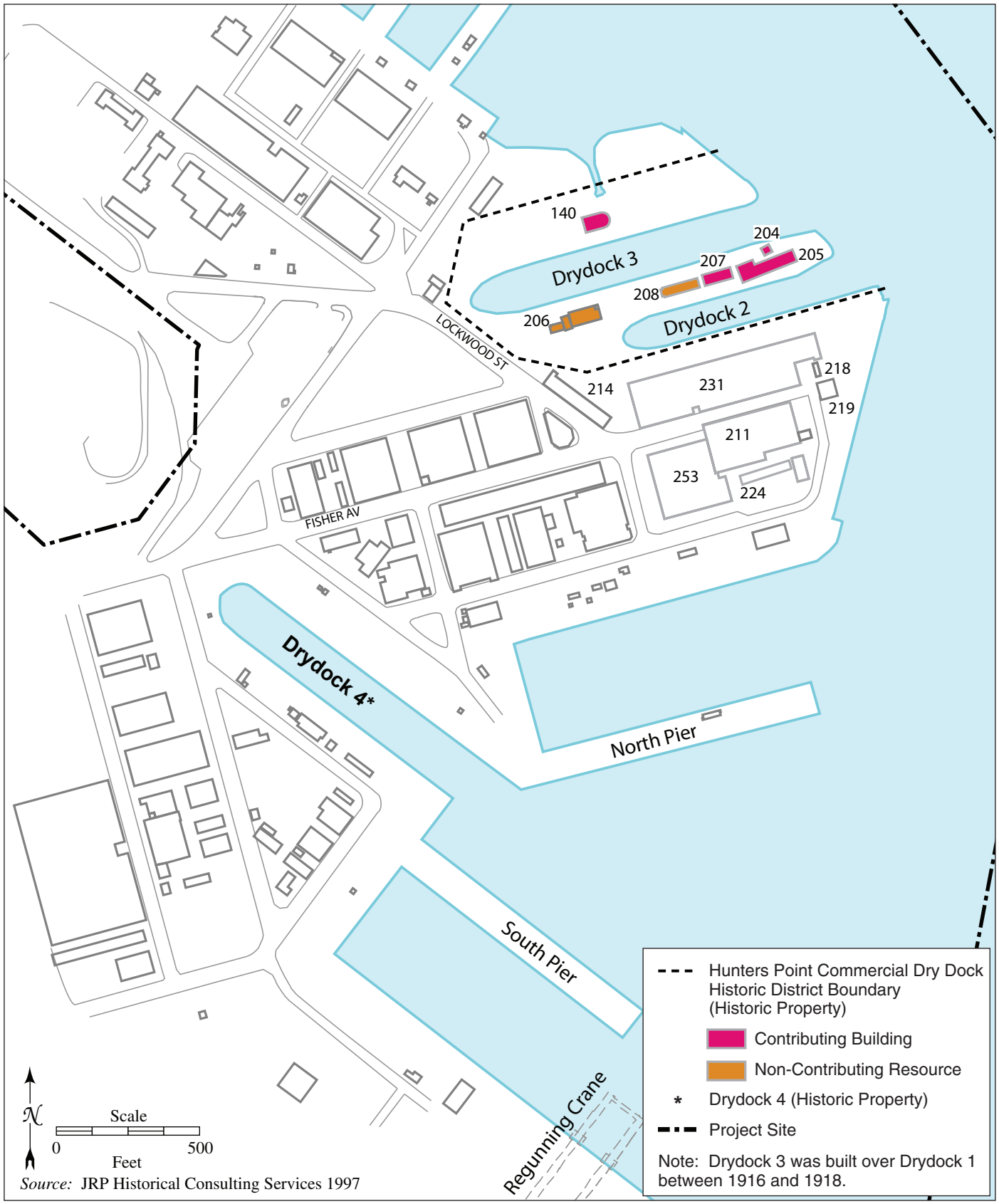
Drydock 4 was and is one of the largest structures of its type on the West Coast and made a significant contribution to the American war effort during World War II. It was found to qualify for the National Register under Criterion A at the national level for its association with events and patterns identified with the defense of the United States during World War II, and under Criterion C at the national level as an important example of wartime marine engineering (JRP Historical Consulting Services 1997, 2009a). Drydock 4 also retains a high degree of integrity to its period of significance from 1942 to 1945 (JRP Historical Consulting Services 2009a). The *Hunters Point Commercial Dry Dock Historic District* was found to qualify for the National Register under Criterion A at the state level for its important association with the development of commercial shipping and ship-repair in the Bay Area (JRP Historical Consulting Services 2009b). It was also found to qualify under Criterion C at the state level as a significant example of marine engineering, as the work of master engineer, Howard C. Holms, and as a significant example of Neoclassical Revival architecture used for industrial buildings. The historic district's period of significance dates from 1901 through 1941, at which point the DoN took occupancy of the site and it ceased operations as a private shipyard. The DoN is currently nominating the *Hunters Point Commercial Dry Dock Historic District* and Drydock 4 to the National Register, as per the 2000 MOA (described in Section 3.12.3, Regulatory Framework).

Regarding Drydock 1, the 1997 study (JRP Historical Consulting Services 1997) concluded that the remnants of Drydock 1 may or may not exist with sufficient potential to yield information to make the property eligible for the National Register, which only can be proven through subsurface testing; therefore, the location of Drydock 1 (underneath Drydock 3) should be treated as an archaeologically sensitive area and as a potential contributing element of the *Hunters Point Commercial Dry Dock Historic District*. The SHPO concluded, however, that the remnants of Drydock 1 were not eligible for listing in the National Register, and the drydock is not a contributing element to the historic district (Wall 1998).

3.12.4.3 Expected Paleontological Resources

The project site is a rock and soil promontory in southeastern San Francisco, extending east into San Francisco Bay. The ground surface in the waterfront area across the entire project site is relatively flat, with elevations ranging from approximately 0 ft to +20 ft (0 m to +6 m) San Francisco City Datum (SFCD). Maximum ground surface elevation in the project vicinity is in the vicinity of HPS Phase I, approximately +165 ft (+49 m) SFCD.

Alluvial, colluvial, and estuarine sediments of the Late Pleistocene and Holocene Epochs (less than one million years old) underlie much of the project vicinity and were deposited in a structurally controlled basin (San Francisco Bay), as the basin subsided. These sediments consist of estuarine deposits of older Bay Mud; undifferentiated sedimentary deposits, comprised of interbedded freshwater and marine sand, clayey sand, and very stiff, lean clay containing shell fragments; younger Bay Mud; and alluvial/colluvial deposits, including slope debris of clay, sandy clay, sandy silt, sand, and silty gravel. These deposits lie on a variety of deformed and metamorphosed bedrock types associated with the Franciscan Complex of



Source: JRP Historical Consulting Services 1997

Figure 3.12.4-2. Hunters Point Historic Properties

the Early Cretaceous Period (between 97 million and 113 million years old in the vicinity of the project site). Section 3.8, Geology and Soils, includes detailed descriptions of the soils and rock units.

Based on geotechnical borings, much of the project site is covered with artificial fill, typically ranging in thickness from approximately one to 50 ft (0.3 to 15 m) (Figure 3.8.3-1 in Geology and Soils). These deposits are thickest over closed depressions and gullies in the upper surface of the Bay Mud deposits and thinnest over ridges in the Bay Mud surface (PRC 1997). Historical shoreline maps show artificial fill has been extended as far as 3,500 ft (1,050 m) beyond the original shoreline in some areas (Figure 3.8.3-1 in Geology and Soils). The fill lies on the Young Bay Mud, on competent alluvial/colluvial deposits, or on bedrock.

Fossils are typically found in river, lake, and bog deposits, but may occur in nearly any type of sedimentary or metasedimentary (i.e., sedimentary rocks that have been metamorphosed) deposits. The Franciscan Complex is composed of sedimentary and metasedimentary rocks. The predominant rock types in the project vicinity are serpentinite, chert, sandstone, and shale of the Franciscan Complex. Although uncommon in the low-grade metamorphic Franciscan rocks, fossils from widely scattered localities have been important in sorting out the depositional history of the Franciscan Complex. A Cretaceous ammonite was found in Franciscan shale in northeastern San Francisco, as were fossil plant remains (usually reported as carbonaceous matter or carbonaceous particles and layers), and thin shells resembling parts of arthropods. Tiny shark's teeth are the only known vertebrate fossils reported from the Franciscan Complex.

The undifferentiated Late Pleistocene sediments may include deposits of the Colma Formation, which contains marine and terrestrial fossils, including bones and teeth of mammoth and extinct bison and ground sloth, juniper, and red cedar. Holocene pollen, plant, and shell fossils have been reported in the Bay Mud. Remains of extinct land mammals (mammoth, bison, and horse) have been reported from localities in younger alluvium along the bay margin, south of the Bay Bridge San Francisco Anchorage. No fossils have been reported from artificial fill in the Bay Area.

3.13 Biological Resources

3.13.1 Background

This section describes the regulatory setting and presents information on existing biological resources in and around the HPS project site. Biological resources include plant and wildlife species and habitats (both marine and terrestrial) and federally listed threatened and endangered plant and wildlife species and habitats. Because the project site is on federal lands currently owned by DoN, the discussion of biological resources is focused on species and habitats protected under federal laws and regulations. Common or regionally sensitive species or habitats recognized by the State of California are also included for additional context where appropriate. Further analysis of locally- and state-protected resources can be found in the Candlestick Point-Hunters Point Shipyard Phase II Draft EIR (CP-HPS DEIR), prepared by the City and County of San Francisco in 2009 (SFRA 2009).

This biological resource analysis relies on studies and surveys conducted for the EIR covering developed and undeveloped portions of HPS, as well as open water and aquatic habitats adjacent to the project site, including Yosemite Slough (Figure 3.13.2-1 and Figure 1.0-2). Because wildlife are not sedentary and their home ranges often are larger than project sites, wildlife species considered in this section include those within an approximate five-mile radius of the project site.

The following discussion is based on information and data collected from Appendix N1 of the CP-HPS DEIR – Candlestick Point/Hunters Point Shipyard Project Biological Resources Technical Report, including reconnaissance-level surveys of the project site conducted on 9 August 2007, 5 May 2008, and 8 July 2008 (SFRA 2009). Surveys focused on mapping vegetation communities, special-status species or their potential habitat, and other biotic resources including potential wetlands or "other Waters of the U.S." The Yosemite Slough Watershed, the Candlestick Point State Recreation Area (CPSRA), and adjacent open water areas between HPS and the peninsula that forms the eastern extension of CPSRA (LSA 2004) have also been surveyed (Figure 3.13.2-1). The Yosemite Slough Watershed Wildlife Survey provides the most comprehensive data set available on wildlife in the area, and is utilized extensively in the descriptions of existing conditions. Because the majority of the project site is developed and thus lacks natural habitat, wildlife communities in those areas are less diverse and abundant than in Yosemite Slough. Existing conditions are described for plant species, vegetation communities, common aquatic habitats (i.e., mud flats, open water, and eelgrass [*Zostera marina*] beds), common wildlife (i.e., invertebrates, reptiles, amphibians, birds, and mammals), common aquatic resources (i.e., fish, shellfish, and mollusks), and federally listed threatened and endangered species and associated habitats.

3.13.2 Regulatory Setting

3.13.2.1 Section 404 of the *Clean Water Act*

Section 404 of the CWA regulates temporary and permanent fill, as well as the disturbance of wetlands and Waters of the U.S. A permit must be obtained from the USACE prior to dredging or discharging dredged or fill materials into any "Waters of the United States" or wetlands. Waters of the U.S. are broadly defined in the USACE regulations to include navigable waterways, their tributaries, lakes, ponds, and wetlands. Wetlands are defined as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that normally do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (USACE 1986). Wetlands that are not specifically exempt from Section 404 regulations (such as drainage channels excavated on dry land) are considered to be "jurisdictional wetlands." The USACE is required to consult with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), USEPA, and SWRCB in carrying out its discretionary authority under Section 404 of the CWA.

Before any redevelopment is implemented, the future developer or property owner would need to obtain a CWA Section 404 permit. As part of the permitting process, the permittee would prepare a Section 404(b)(1)

analysis in accordance with 40 CFR 230 to demonstrate that the proposed project represents the least environmentally damaging practicable alternative (LEDPA). Section 404(b)(1) Guidelines specify that discharges of dredged or fill material into Waters of the U.S., including wetlands, should not occur unless it can be demonstrated that such discharges, either individually or cumulatively, would not result in unacceptable adverse effects on the aquatic ecosystem. Additionally, "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 CFR 230.10(a)). Consequently, the applicant is required to evaluate opportunities for use of non-aquatic areas and other aquatic sites that would result in less adverse impact on the aquatic ecosystem. A Section 404 permit can only be issued for the LEDPA (except as provided for under Section 404(b)(2) when the Corps determines a project is necessary for navigation and anchorage). (http://water.epa.gov/lawsregs/guidance/wetlands/flexible.cfm)

Compensatory mitigation would be required to ensure no net loss to wetlands. Any compensatory mitigation proposed to offset unavoidable impacts to aquatic resources must conform to regulations specified in 40 CFR 230 (http://www.epa.gov/owow/wetlands/pdf/wetlands_mitigation_final_rule_4_10_08.pdf). Compensatory mitigation can be achieved through four methods: restoration of a previously-existing wetland or other aquatic site, enhancement of an existing aquatic site's functions, creation of a new aquatic site, or preservation of an existing aquatic site. The mechanisms for providing compensatory mitigation are permittee-responsible compensatory mitigation, mitigation banks, and in-lieu fee mitigation.

3.13.2.2 Section 402 of the Clean Water Act

The primary mechanism in the CWA regulating the discharge of pollutants is the NPDES, which is administered by USEPA. Under the NPDES program, a permit is required from USEPA or an authorized state for the discharge of any pollutant from a point source into the Waters of the U.S. (33 U.S.C. 1342). Storm water pollution prevention plans must be prepared for construction activities as part of the NPDES permitting process.

3.13.2.3 Section 401 of the Clean Water Act

Section 401 of the CWA requires a state-issued Water Quality Certification for all projects requiring a CWA Section 404 permit or other federal permit or license. The Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, issues Section 401 Water Quality Certifications for projects conducted in San Francisco Bay. A Section 401 Water Quality Certification requires a determination that the proposed action would comply with state water quality standards.

3.13.2.4 Federal Endangered Species Act (ESA)

The *Endangered Species Act* (ESA) was enacted in 1973 (7 U.S.C. 136, 16 U.S.C. 1531 *et seq*.). Under the ESA, the Secretary of the Interior and the Secretary of Commerce have the authority to list a species as threatened or endangered (16 U.S.C. 1533[c]). The ESA is administered by both NMFS and USFWS. NMFS is accountable for animals that spend most of their lives in marine waters, including marine fish, most marine mammals, and anadromous fish such as Pacific salmon. USFWS is accountable for all other federally listed plants and animals.

Pursuant to the requirements of ESA, a federal agency authorizing, funding or carrying out a project within its jurisdiction must determine whether any federally listed threatened or endangered species may be present in the project site and determine whether the agency's action could affect any federally listed species (16 U.S.C. 1536(a)(2), (3)). If the action would likely affect a listed species, the agency must consult with the USFWS or NMFS under Section 7 of the ESA to determine whether the action is likely to jeopardize the continued existence of the species or result in the destruction or adverse modification of designated critical habitat (16 U.S.C. 1536(a)(2)). Species subject to ESA are addressed in Section 3.13.3.4.

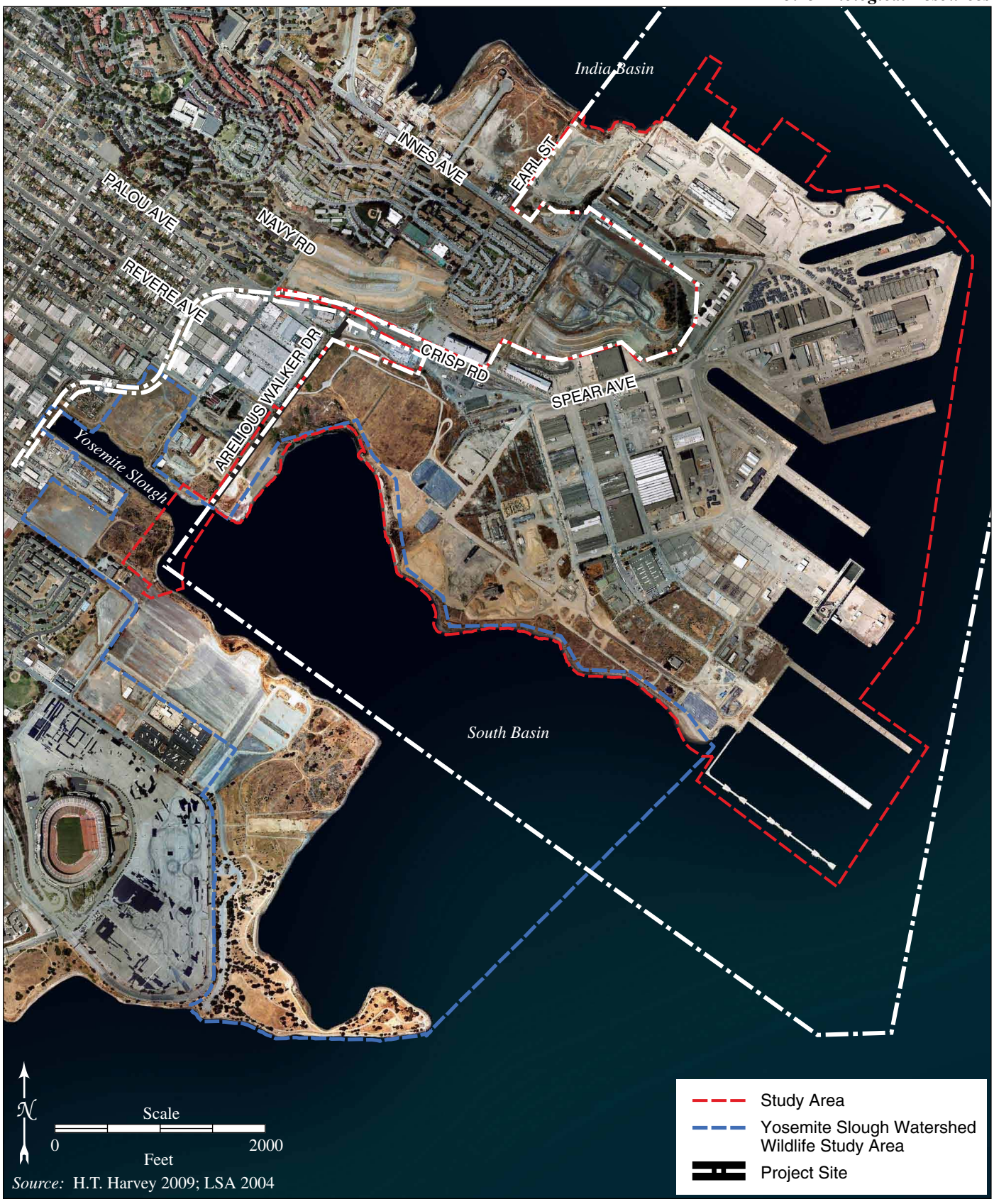


Figure 3.13.2-1. Biological Resources at the Project Site and Vicinity

3.13.2.5 Migratory Bird Treaty Act (MBTA)

The federal *Migratory Bird Treaty Act* (MBTA; 16 U.S.C. 703, Supplement I, 1989) protects native birds and their active nests that may occur in the project vicinity. It is an international treaty for the conservation and management of bird species that migrate through more than one country, and is enforced in the United States by the USFWS. This Act provides protection to over 1,000 species in the U.S.

3.13.2.6 Marine Mammal Protection Act (MMPA)

The *Marine Mammal Protection Act* (MMPA) was enacted in 1972 and amended through 2007 (16 U.S.C. 1631). All marine mammals are protected by the MMPA, which prohibits their take in U.S. Waters. Take is defined in the MMPA as "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect" [16 U.S.C. 1631 Section 3(13)]. Under the MMPA, "harassment" is further defined as any action that has the potential to injure or disturb a marine mammal in the wild including alteration of behavior patterns such as migration, breathing, nursing, breeding, feeding, or sheltering [16 U.S.C. 1631 Section 3(18)(A)].

This section includes species that occur in the San Francisco Bay on a regular basis that are protected by the MMPA. The MMPA would apply to the proposed action and alternatives because in-water construction activities such as pile driving could harass these animals.

3.13.2.7 Magnuson-Stevens Fisheries Conservation and Management Act

The NMFS has the authority to implement the *Magnuson-Stevens Fisheries Conservation and Management Act* (MSA; Public Law 94-264). The MSA was amended and reauthorized on 12 January 2007, by the *Magnuson-Stevens Fisheries Conservation and Management Reauthorization Act* (PL 109-479). The MSA was put into place to promote conservation and management of the Nation's fishery resources. The MSA established the Pacific Fishery Management Council, which was tasked with creating the Pacific Coast Groundfish Fishery Management Plan (FMP) (PFMC 2006). The FMP develops recommendations for the management of groundfish fisheries, and in some cases, it contains specific fishery management recommendations. In addition, the FMP addresses provisions in the MSA relating to Essential Fish Habitat (EFH) to ensure that fishery resources are managed through adequate regulations. The MSA defines EFH as "...those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" [16 U.S.C. 1802 MSA Section 3(10)]. The terms in this definition have been further defined to include:

- Aquatic habitat and associated physical, chemical, and biological properties that are used by fish (historically used areas may be included);
- Sediment, stream substrates, instream structure, and associated biological communities;
- Habitat required to support a sustainable fishery including that particular species' place in a properly functioning ecosystem; and
- Habitat required to support a full life cycle for the species under consideration.

The tidal aquatic habitats adjacent to the project site are considered by NMFS to be EFH for species including anchovies, sardines, rockfish, sharks, sole, and flounder (NMFS 2006a, 2008). Areas supporting the native Olympia oyster found in San Francisco Bay are also considered EFH by NMFS because these beds generally are associated with increased fish abundance. NMFS consults with federal action agencies under the MSA in a process similar and often parallel to the Section 7 ESA consultation. Because the proposed action would modify designated EFH, coordination with NMFS under the MSA is anticipated and would be initiated by the USACE during the permitting process for the project.

3.13.2.8 Section 10 of the Rivers and Harbors Act of 1899

Section 10 of the *Rivers and Harbors Act of 1899* (33 U.S.C. 403) gives the USACE jurisdiction over tidal Waters of the U.S. from the Mean High Water (MHW) elevation seaward (33 U.S.C. 403.382.4(b)). Specifically, it prohibits the construction, dredging, or fill of any navigable water without a permit from the USACE. This includes construction of breakwaters or marinas, installation of pilings, docks, or bridges, and excavation of existing substrates.

The proposed action would require placement of fill for bridge construction, shoreline revetments, breakwaters, installation of pilings and marina floats, and installation of gangways for access to the docks. All of these activities would be subject to the USACE jurisdiction under Section 10 of the *Rivers and Harbors Act*. USACE authorization of these activities must be obtained through the permitting process for the project.

3.13.2.9 McAteer-Petris Act (Act)

The McAteer-Petris Act (Act) created the San Francisco Bay Conservation and Development Commission (BCDC). The primary purpose of the Act is to promote responsible planning and regulation of San Francisco Bay. The BCDC issues permits for non-federal projects or federal consistency determinations under the Coastal Zone Management Act for shoreline development, dredge or fill activities, or other types of projects within its jurisdiction. BCDC's jurisdiction generally extends to all areas of the bay that are subject to tidal action, including a 100-ft (30.5-m) shoreline band surrounding the bay, sloughs and marshlands, saltponds, managed wetlands, and certain designated waterways as defined in the Act. Bay Plan includes several policies relevant to the conservation, protection, and/or restoration of The biological resources and habitats, including Fish, Other Aquatic Organisms, and Wildlife Policy 1; Tidal Marshes and Tidal Flats Policy 1; and Subtidal Areas Policy 2.

Section 66605 of the McAteer-Petris Act sets forth criteria for BCDC to authorize fill in the bay. These criteria specify that fill and the uses proposed on it serve a water-oriented use or minor fill for improving public access and enhancement of shoreline appearance, that there is no upland alternative for the uses proposed on fill, and that the fill would not adversely affect bay resources. Also, any work at piers pre-dating BCDC's establishment in 1965 that would involve replacement of all or a substantial portion of a pier, additional coverage of the bay, significant extension of the life of a structure, or a substantial change in use, would be considered work within BCDC's jurisdiction.

3.13.3 Existing Conditions

3.13.3.1 Vegetation Communities and Habitats

The project vicinity has largely been disturbed historically or developed and most remaining vegetation was introduced as landscape plants or is non-native and/or weedy. Much of the project site is located on bay fill. Botanical habitat assessments were conducted at HPS on 29 October 2004, 1 March 2006, 6 October 2006, and 17 May 2007 (Jones & Stokes 2009). Subsequently, biological reconnaissance surveys occurred in August 2007 and July 2008 and a rare plant survey was conducted in May 2008 (SFRA 2009, Appendix N1).

Vegetation communities are defined according to the California Department of Fish and Game (CDFG) Wildlife and Habitat Data Analysis Branch List of California Terrestrial Natural Communities (CDFG 2003), the wetland delineation conducted for HPS (H.T. Harvey & Associates 2009), and the Biological Technical Report included in Appendix N1 of the CP-HPS DEIR (SFRA 2009). As depicted in Figure 3.13.3-1, the project site contains three ecological communities that support vegetation: non-native annual grassland, salt marsh, and seasonal freshwater wetland, also listed in Table 3.13.3-1. In addition, 368.80 ac (149.25 ha) of the project site is defined as "urban" or previously disturbed by development. This land type is not classified as a vegetation community even though landscape plants have been added and remain on these sites. A description of each of the vegetation communities follows.

Table 3.13.3-1. Vegetation Communities at the Project Site			
Habitat Type	***Hunters Point Shipyard***	***Yosemite Slough***	***Total Acreage***
Non-native Annual Grassland [a]	44.19 (17.88)	—	44.19 (17.88)
Salt Marsh	3.56 (1.44)	0.06 (0.02)	3.62 (1.46)
Seasonal Freshwater Wetland [b]	0.20 (0.08)	--	0.20 (0.08)
Mud Flats/Open Water [c]	169.29 (68.51)	4.43 (1.79)	173.72 (70.30)
Totals	**217.24 (87.91)**	**4.49 (1.82)**	**221.73(89.73)**

Notes:

All units are: acres (hectares). Acreage discrepancies between the data contained herein and the total approximate acreage of the project site are due to the conversion of data from non-GIS to GIS data. This table does not include the acreage for developed/urban areas (368.80 ac) because this classification is not a recognized vegetation community for purposes of this SEIS.

a. Vegetation that covers disturbed areas on bay fill, primarily composed of invasive annual grasses and forbs.

b. Wetlands without marine influence and dependent upon rain water and/or groundwater.

c. Open waters located outside of the project boundary include those adjacent to Hunters Point Shipyard and Yosemite Slough.

Sources: Appendix N1 of the CP-HPS DEIR (SFRA 2009); H.T. Harvey & Associates 2009.

3.13.3.1.1 Non-Native Annual Grassland

Patches of non-native annual grassland habitat are found throughout the project site (Figure 3.13.3-1) and comprise 44.19 ac (17.88 ha) (Table 3.13.3-1). Invasive, non-native grasses characterize the community at HPS, primarily due to the disturbance associated with the DoN's ongoing remediation efforts. The vegetation in this grassland consists of a mixture of invasive annuals such as wild oat (*Avena fatua*), rip-gut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*), rat-tail fescue (*Vulpia myuros*), and hare barley (*Hordeum murinum var. leporinum*). Broad-leaf species occurring in the grasslands consist of wild radish (*Raphanus sativus*), painted charlock (*R. raphanistrum*), black mustard (*Brassica nigra*), Mediterranean linseed (*Bellardia trixago*), cut-leaf plantain (*Plantago coronopus*), spring vetch (*Vicia sativa*), red valerian (*Centranthus ruber*), and Italian thistle (*Carduus pycnocephalus*). Additionally, garland chrysanthemum (*Chrysanthemum coronarium*) has naturalized across much of the grasslands and stands of these flowers are present throughout the entire CPSRA (CPSRA 2005). Small, distinct colonies of native perennial bunch grasses occur in a few areas at HPS. Clusters of single species or a combination of species including purple needlegrass (*Nassella pulchra*), blue wild rye (*Elymus glaucus*), and red fescue (*Festuca rubra*) grow sporadically throughout the project site. These isolated occurrences of native grasses are not large enough to warrant identification as a separate vegetation community.

Portions of the project site, including uplands along Yosemite Slough, include ruderal, non-native vegetation such as fennel (*Foeniculum vulgare*) intermixed with non-native grasses such as wild oats and Italian rye (*Lolium multiflorum*). Some native shrubs, mainly coyote brush (*Baccharis pilularis*), are scattered throughout the upland area surrounding Yosemite Slough.

3.13.3.1.2 Salt Marsh

Salt marsh habitat totals 3.56 ac (1.44 ha) in the project site boundary and 0.05 ac (0.02 ha) in the biological resources project site outside of the project site (i.e., areas of Yosemite Slough outside of the project boundary; Figure 3.13.2-1) (H.T. Harvey & Associates 2009). Salt marsh occurs in narrow patches along the shoreline where riprap does not extend to the waterline and prohibits the growth of vegetation, and in several nontidal areas in the southwestern portion of HPS. These patches vary in length from 20 to 100 ft (6.1 to 30.5 m), and occur sporadically along the shoreline and throughout Yosemite Slough (H.T. Harvey & Associates 2009). Figure 3.13.3-2 shows the location of salt marsh habitats.

Salt marshes are subject to tidal influences, and species composition of tidal salt marsh vegetation varies along gradients based on elevation and the amount of time an area is inundated. The highest elevations typically support almost pure stands of pickleweed (*Salicornia virginica*), which also dominates the patches of nontidal salt marsh on HPS. Associated native species that occur in the zone near the high tide elevation include salt grass (*Distichlis spicata*), coastal gumweed (*Grindelia stricta*), and sea lavender (*Limonium californicum*)

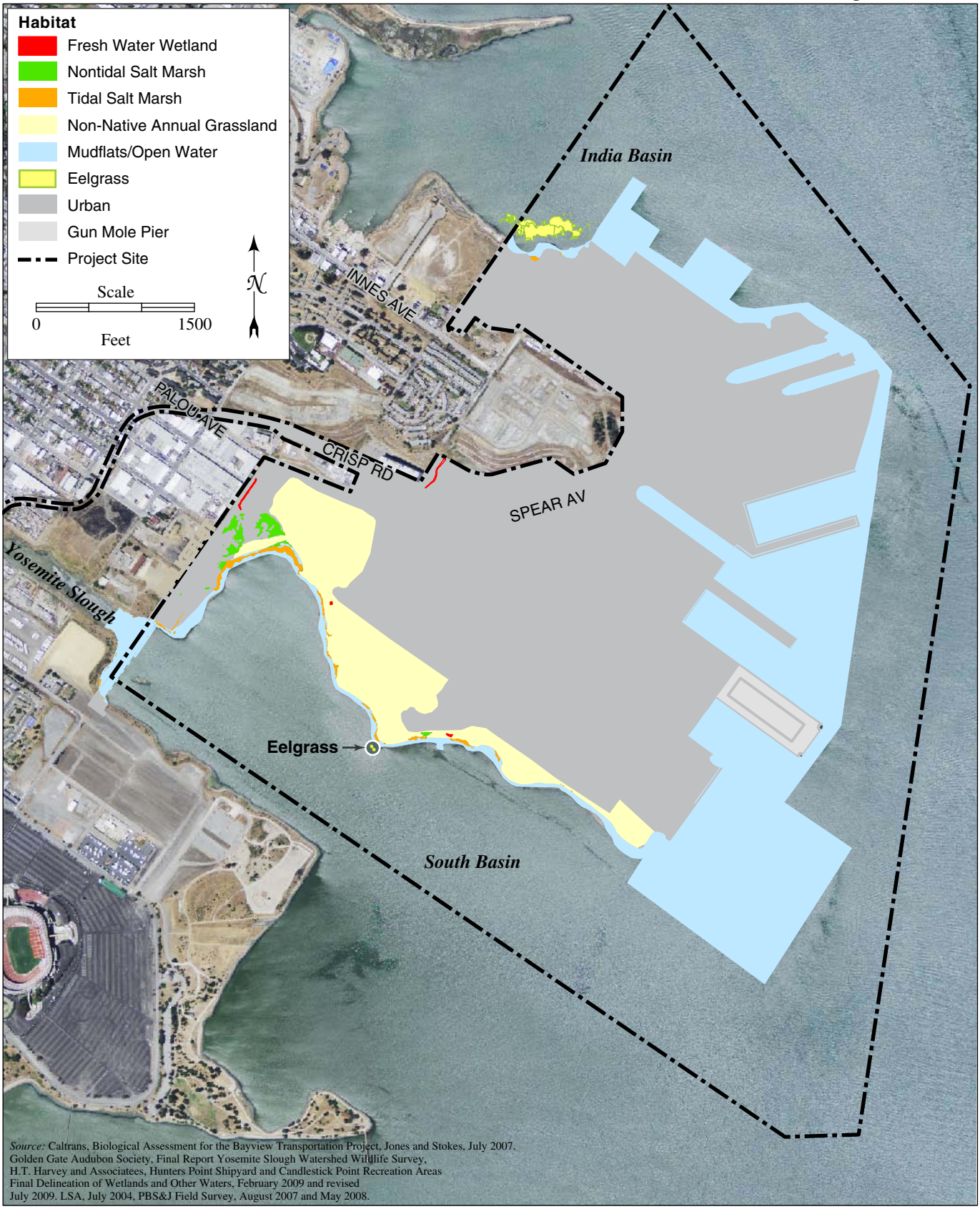


Figure 3.13.3-1. Project Site Habitats

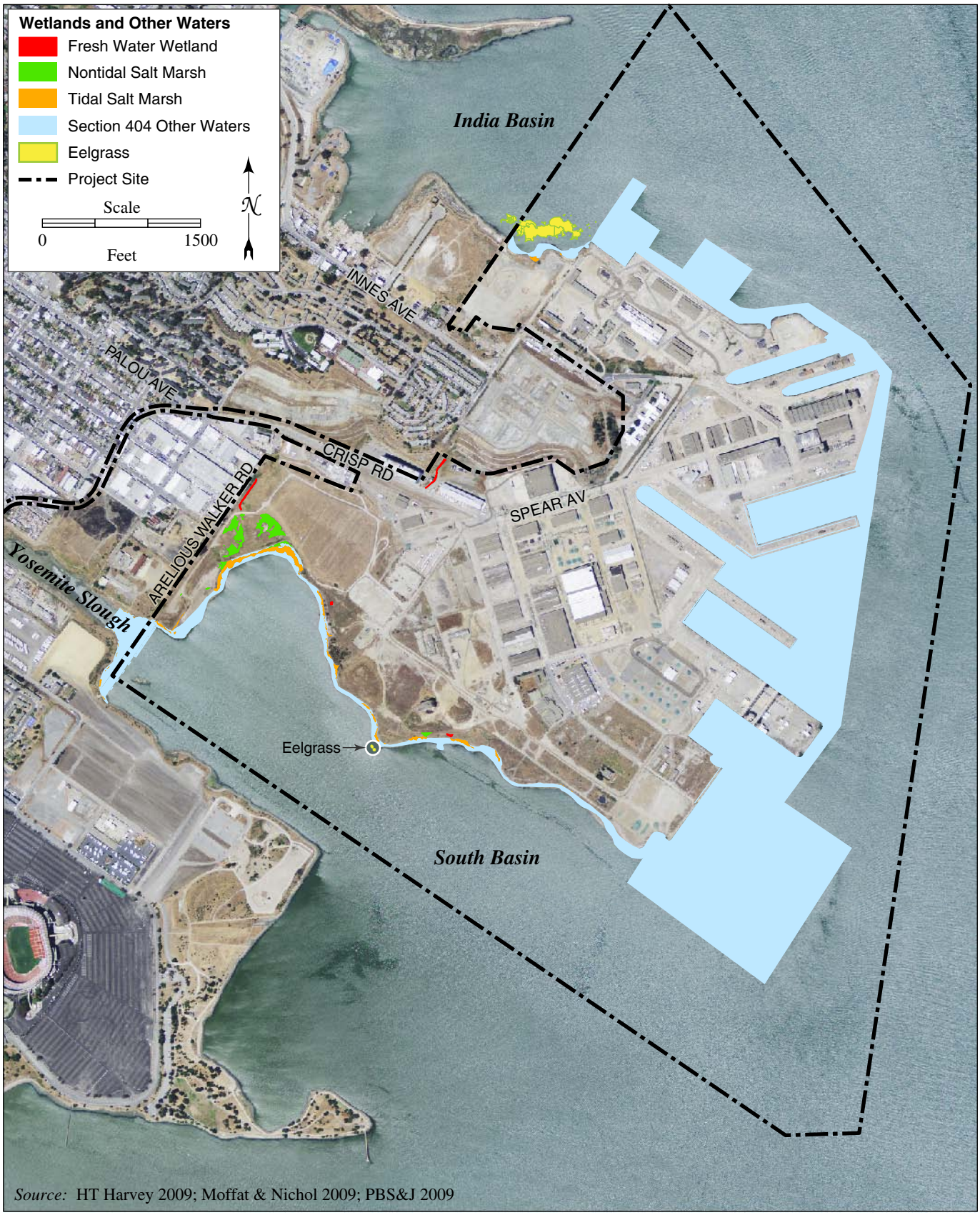


Figure 3.13.3-2. Wetlands and Other Waters of the U.S.

along with the non-native European sea rocket (*Cakile maritima*). Slightly lower areas above the MHW elevation support cord grass (*Spartina* spp.). In the area above the High Tide Line (HTL), common iceplant (*Carpobrotus edulis*) grows in some locations, carpeting the upland margins in a dense monoculture. The low growing shrub silver beach bur (*Ambrosia chamissonis*) also grows in the upland areas along the shoreline.

3.13.3.1.4 Seasonal Freshwater Wetland

Seasonal freshwater wetland habitat occupies a small amount of the project site, 0.20 ac (0.08 ha) in isolated depressions near the southern shoreline and two linear features at the west-central margins of HPS (Figure 3.13.3-2). These wetlands are characterized by the presence of annual wetland grasses and forbs in depressions that hold water for a short to medium duration during the rainy season. Wetlands in the southwestern portion of HPS consist of pools corresponding to shallow basins that lack drainage outlets. Seasonal water inundation in these pools creates a condition favoring hydrophytic (growing partly or wholly in water) plants such as spearscale (*Atriplex triangularis*), salt grass, bird's-foot trefoil (*Lotus corniculatus*), prickly ox-tongue (*Picris echioides*), saltmarsh bulrush (*Bolboschoenus robustus*), Italian ryegrass (*Lolium multiflorum*), rabbit's foot grass (*Polypogon monspeliensis*), and willow dock (*Rumex salicifolius*), as noted in Appendix N1 of the CP-HPS DEIR (SFRA 2009). The seasonal freshwater wetlands in the west-central part of HPS consist of narrow swales/ditches apparently fed by groundwater seepage. No other wetland or ponding features are expected to occur in the project site because of the extent of disturbance from development.

Table 3.13.3-2. Wetlands and Other Waters of the U.S. (Section 404) at the Project Site

Jurisdictional Feature (Waters of the U.S.)	***Area***	***Yosemite Slough*** [b.]		***Total Acreage*** [a.]
	Hunters Point Shipyard	**On Site**	**Off Site**	
Freshwater Wetland	0.20 (0.08)	—	—	0.20 (0.08)
Non-tidal Salt Marsh	1.81 (0.73)	—	—	1.81 (0.73)
Tidal Salt Marsh	1.75 (0.71)	0.01 (<0.01)	0.05 (0.02)	1.81 (0.73)
"Other 404 Waters"	169.29 (6851)	1.66 (0.67)	2.77 (1.12)	173.72 (70.30)
Totals for Section 404 Wetlands and Waters of the U.S.	**173.05(70.03)**	**1.67 (0.68)**	**2.82 (1.14)**	**177.54 (71.85)**

Notes:
a. Total equals sum of Freshwater Wetland, Non-tidal Salt Marsh, Tidal Salt Marsh, and Other 404 Waters
b. Onsite areas in Yosemite Slough refer to areas in the project site. Offsite areas in Yosemite Slough are those areas adjacent to the slough that are outside of the project site boundary but were included in wetland delineations.
Source: H.T. Harvey & Associates 2009.

3.13.3.1.5 Mud Flats

Mud flats are represented by broad expanses of the San Francisco Bay bottom that are exposed during low tides. These areas are comprised of very soft sediments and typically do not support substantial vegetation other than eelgrass beds. Mud flats are an important habitat because they support a wide diversity of invertebrates that provide food for resident and migratory shorebirds and waterfowl and serving as forage areas for fish (Section 3.13.3.3, Aquatic Wildlife Resources). Mud flats are exposed at low tides once or twice a day along the shorelines of Yosemite Slough and South Basin. These mud flats are relatively limited in extent compared to the vast mud flats present in other parts of San Francisco Bay, with correspondingly limited shorebird use except for occasional, brief migratory pulses (H.T. Harvey & Associates 2009).

3.13.3.1.6 Eelgrass Beds

Eelgrass is an aquatic plant found on soft mud-bottom bays and estuaries along the Pacific coast. Eelgrass occurs in both subtidal and intertidal areas of San Francisco Bay, and 1.99 ac (0.81 ha) occurs in

the project site (CDFG 2003). The distribution of eelgrass has been mapped relatively recently (in 2003) and the results of this effort indicate that low-density eelgrass beds are found on the north side of Hunters Point peninsula offshore from the end of Earl St and in a small patch in the South Basin (Merkel and Associates 2003). Eelgrass beds provide important habitat for birds, fish, and crustaceans and are one of the preferred spawning habitats of Pacific herring (Wyllie-Echeverria and Fonseca 2003). These plants also support grazing crustaceans, shrimp, and amphipods. Because it requires light for photosynthesis, eelgrass is limited by water clarity to depths of about 6 ft (2 m) or less. Both the USACE and CDFG consider eelgrass beds a sensitive resource because of their current relative scarcity, their importance in the overall ecology of the bay, and the lack of accurate information on their historic distribution.

3.13.3.1.7 Open Water Habitat (San Francisco Bay)

San Francisco Bay is the largest estuary on the California coast, covering between 400 and 1,600 square miles mi^2 (1,036 to 4,144 km^2) depending on which bays are included (Bay Institute 2008). Fresh water enters primarily through the Sacramento-San Joaquin Delta and mixes with seawater that enters via the Golden Gate. Tidal action and freshwater runoff determine the salinity of the bay. For the purpose of this assessment, the term "open water" refers to unvegetated tidal areas located below MHW, which in this region is 5.87 ft (1.79 m) relative to the North American Vertical Datum of 1988 (NAVD88) or 11.80 ft (3.60 m) relative to the San Francisco City Datum (SFCD). This is the same area regulated by the USACE under Section 10 of the *Rivers and Harbors Act*. These areas are subject to the normal ebb and flood of tides. For example, mud flat habitats described above are a subset of open water aquatic habitats since these areas are inundated for at least half the tidal cycle and for this reason, acreages of mud flat and open water habitats are not distinguished in Table 3.13.3-1. Open water habitats support an array of relatively common estuarine/marine species from encrusting tunicates, sponges, and algae, to bottom-dwelling and open water fish and marine mammals. The onsite open waters included in the SEIS analyses are those nearshore areas below the MHW elevation where project activities could occur (e.g., sea wall enhancements and marina improvements). Offsite open waters within a 5-mile radius of the project site were also considered for their potential to support sensitive species (see Section 3.13.3.4, Federally Listed Threatened and Endangered Species).

3.13.3.1.8 Landscaped Areas/Ornamental Plants

A 2009 tree survey was conducted in the entire project site as part of the EIR (H.T. Harvey & Associates 2009). Trees, even those planted, can provide valuable wildlife habitat if other crucial elements, such as water and food sources, are also present. The survey identified trees on HPS primarily in areas mapped as "Urban", and "Non-Native Annual Grassland" on Figure 3.13.3-1. However, because of the scattered nature of the trees remaining on the HPS site, trees could not be mapped as a distinct vegetation community. The survey identified single trees with multiple stems measuring at least 2 in (5.08 cm) in diameter as multiple "trees." The high number of trees recorded on HPS was driven largely by such multi-stemmed individuals, such as toyon (*Heteromeles arbutifolia*), a native species, though the trees on HPS were presumed to be of an ornamental variety, and several other non-natives including the hybrid London planetree (*Platanus* x *acerifolia*) and acacia (*Acacia* spp.) (H.T. Harvey & Associates 2009).

3.13.3.2 Terrestrial Wildlife Resources

3.13.3.2.1 Invertebrates

Fourteen butterfly species were observed during the series of surveys conducted in 2003 and 2004 and compiled in the Yosemite Slough Watershed Wildlife Survey report, which included large portions of Candlestick Point as well as the southwestern shorelines of HPS (LSA 2004) (refer to Figure 3.13.2-1). The most common species recorded included cabbage white (*Pieris rapae*), anise swallowtail (*Papilio zelicaon*), and common checkered skipper (*Pyrgus communis*). However, even the most common species

were observed in relatively low abundances during most surveys; the highest mean abundance of species recorded on the five HPS survey portions were 0.83 for common checkered skipper, 3.27 for anise swallowtail, and 7.59 for cabbage white. Other butterflies observed included mustard white (*Pieris napi*), orange sulphur (*Colias eurytheme*), California hairstreak (*Satyrium californicum*), gray hairstreak (*Strymon melinus*), western pygmy-blue (*Brephidium exile*), spring azure (*Celastrina ladon*), west coast lady (*Vanessa annabella*), red admiral (*Vanessa atalanta*), common buckeye (*Junonia coenia*), common ringlet (*Coenonympha tullia*), and monarch butterfly (*Danaus plexippus*). Numerous other invertebrate species, including insects, crustaceans, worms, and other taxa, were recorded on Candlestick Point and the project site as well. However, with the paucity of native plants remaining on HPS, which are essential for butterfly and other invertebrate survival, the project site would not be considered important invertebrate habitat nor support all life stages of many species.

3.13.3.2.2 Reptiles and Amphibians

The Yosemite Slough Watershed Wildlife Survey recorded one amphibian, two lizard species, and three snake species over the 2003-2004 surveys (LSA 2004). Reptiles and amphibians included California slender salamander (*Batrachoseps attenuatus*), southern alligator lizard (*Elgaria multicarinata*), western fence lizard (*Sceloporus occidentalis*), gopher snake (*Pituophis melanoleucus*), ring-necked snake (*Diadophis punctatus*), and western garter snake (*Thamnophis elegans*). The western fence lizard, California slender salamander, and southern alligator lizard were found in relatively high numbers, with the maximum number of individuals observed on a single survey corresponding to 49, 43, and 21 individuals, respectively. The other species were represented by few individuals, suggesting that populations of these other species are sparse in the project site.

San Francisco Bay and the small seasonal wetlands on the site do not provide suitable aquatic habitat for amphibians, primarily due to high salinity. The few freshwater habitats on or near the project site do not provide adequate breeding habitat for amphibians such as frogs or toads, likely because these habitats have a shallow and/or ephemeral nature (LSA 2004). The abandoned fields, extensive debris (providing cover), and presence of prey (i.e., mice, invertebrates, salamanders) on the project site provide suitable habitat for the five reptile species, particularly in upland areas that are dominated by disturbed vegetation and non-native grassland (LSA 2004). During one survey, 21 southern alligator lizards were observed in silvery beachweed along the shoreline of the South Basin (LSA 2004). The lizards were all juveniles and may have been from a single clutch.

Although the Yosemite Slough Watershed Wildlife Survey covered only the southern shoreline of HPS, it is expected that a lower abundance of these common reptile and amphibian species would be found in the disturbed areas of HPS because of the limited quantity and comparatively low quality of habitat present there. Intensive disturbance of ongoing remediation activities has undoubtedly affected the suitability of wildlife habitat on HPS. A few individuals of these reptiles and amphibians may occur in the developed portions of the project site, which represents approximately 63 percent of the overall acreage of the site, but numbers are expected to be minimal in such a low-quality habitat.

3.13.3.2.3 Birds

One hundred and eighteen bird species (named here according to the American Ornithologists' Union (AOU) Checklist of North American Birds (AOU 2008) were observed during the Yosemite Slough Watershed Wildlife Survey (LSA 2004). Of these, 51 species were represented by five or fewer individuals, suggesting that, for many bird species, the site is used by relatively low numbers of individuals (LSA 2004). The majority of the species observed were terrestrial species, followed by shorebirds, waterfowl, gulls and terns, and raptors. Terrestrial habitats supported large numbers of some common bird species such as white-crowned sparrows (*Zonotrichia leucophrys*), western meadowlarks (*Sturnella neglecta*), and house finches (*Carpodacus mexicanus*). The land birds that were most abundant during surveys were those associated with the weedy, ruderal habitats dominating the project site and

those tolerant of the urbanization and corresponding disturbance. In contrast, very few neotropical and other long-distance migrant songbirds were recorded during this study, and those present were often associated with Candlestick Point and the Yosemite Slough. In addition to the 118 bird species recorded during the Yosemite Slough Watershed Wildlife Survey, the report listed an additional 36 species that had been recorded by a local birder, Mr. Alan Hopkins, over the past 20 years (LSA 2004).

The sparse vegetation present on most of the project site limits its value to breeding and migratory birds. Numbers and diversity of land birds on HPS are likely low due to disturbance from restoration and the dearth of trees and shrubs, especially natives (LSA 2004). However, since ground-nesting species such as killdeer (*Charadrius vociferus*), horned lark (*Eremophila alpestris*), and burrowing owl (*Athene cunicularia*) have been observed during area surveys and these species are known to occur in disturbed areas, there is the potential for these species to use the project site. Also, a peregrine falcon pair has utilized the large onsite crane as a nesting location and barn owls may inhabit abandoned buildings on the project site. No nocturnal surveys for owls have been conducted nor have the abandoned buildings been surveyed for nests or roosting sites. Similar to other native bird species, owls and their active nest sites are protected under the MBTA.

The HPS project site provides limited value as migratory bird habitat. Past surveys in the area document that the small portion of the project site near Yosemite Slough is used by migratory birds for resting, roosting, and foraging, if only seasonally or occasionally (LSA 2004). However, the majority of the project site does not support a migratory bird habitat and, therefore, the numbers of species expected at the site is low. No important breeding or nesting habitat is known to be present in the project site area.

3.13.3.2.4 Terrestrial Mammals

The most abundant mammal observed during the Yosemite Slough Watershed Wildlife Survey was the California ground squirrel (*Spermophilus beecheyi*) (LSA 2004). This species was observed along the shoreline and riprap areas of HPS. The substrate along the shoreline is composed mostly of small rubble such as broken bricks that had been used as fill. Riprap composed of large rocks was placed along exposed sections of the shoreline, providing refugia for small mammals (LSA 2004). Other common mammals observed during the survey included feral domestic cat (*Felis silvestris*), feral domestic dog (*Canis familiaris*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), black-tailed jackrabbit (*Lepus californicus*), Botta's pocket gopher (*Thomomys bottae*), California vole (*Microtus californicus*), and Norway rat (*Rattus norvegicus*). Of the nine species recorded from the adjacent Yosemite Slough study, three are non-natives (domestic dog, domestic cat, and Norway rat); and two are common urban-adapted species (raccoon and striped skunk). Botta's pocket gopher and California vole were represented by no more than one individual on a given survey and thus may be uncommon on the site. As noted above for reptiles and amphibians, mammal diversity and abundance on HPS are expected to be low, as recent, intensive disturbance by remediation activities has likely reduced the natural onsite mammal populations. The shorelines, vacant lots, and undeveloped ruderal/non-native grassland areas of HPS are surrounded by urban and industrial development, which limits the potential for dispersal of mammals in and out of the site. Though no bat species have been observed onsite, no nocturnal surveys have been conducted for bats and the possibility remains that bats utilize the abandoned buildings onsite for roosting and breeding. There are no California Natural Diversity Database (CNDDB) reports of the occurrence of any special-status mammal species in the project site (CDFG 2010).

3.13.3.2.5 Wildlife Movement

Wildlife movement activities usually fall into one of three categories: 1) dispersal (i.e., juvenile animals from natal areas or individuals extending range distributions); 2) seasonal migration; and 3) local movements related to home range activities such as foraging for food or water, defending territories, searching for mates, breeding areas, or cover. Due to the low abundance and diversity of wildlife in the

project vicinity, movement activities also would be limited and not represent an important consideration in assessing impacts from the proposed action. For example, survey results did not identify any major or regional wildlife corridor/travel routes. The project site is surrounded by open water and urban development that tend to isolate habitats in the project site from large expanses of similar habitats in undeveloped areas elsewhere along the San Francisco Bay shoreline and in San Bruno Mountain State Park (approximately 2 mi [3.2 km] to the southwest). Primary movements are expected to be very localized, such as ground-dwelling animals moving in and between habitat patches at the project site for purposes of feeding and mating.

Bird flyways are not traditionally considered "wildlife movement corridors", but they are important travel routes for many species. San Francisco Bay wetlands and tidal lands serve as important habitat for bird species during migration through the Pacific Flyway. Flyways are international routes used by migratory birds over centuries, allowing them to spend both the breeding season and winter in a favorable climate. The Pacific Flyway connects Alaska to Mexico and beyond and its users are dependent upon important rest stops along its length. Many migratory bird species, including bay ducks such as canvasback (*Aythyla valisineria*), sea ducks (*Bucephala* spp.), red-breasted merganser (*Mergus serrator*), sandpipers (*Calidris* spp.), terns (*Sterna* spp.), and red-necked phalarope (*Phalaropus lobatus*), use bay wetlands as annual stopovers and staging locations for several days of rest and feeding prior to continuing migration. Thus, the project site is, by virtue of its location, a minor component of the much larger bay flyway system that provides a habitat for migratory birds.

3.13.3.3 Aquatic Wildlife Resources

3.13.3.3.1 Invertebrates

Shellfish found in the bay and in the vicinity of the project site include Dungeness crab (*Cancer magister*), other rock crab, and shrimp. Dungeness are the target of an important commercial fishery in the open ocean and the bay is important rearing habitat for young crab (CDFG 2009). Crab hatch in the Gulf of the Farallones and after several larval stages, migrate into the bay and primarily rear in San Pablo and Suisun Bays, over 20 mi (32 km) north of the project site.

The bay also supports a variety of mollusks, including native clams, mussels, oysters, and snails (gastropods). Some native species include bent-nosed macoma (*Macoma nasuta),* Olympia oyster (*Ostrea conchaphila),* and limpets (*Acmaea* spp.), while others have been introduced either intentionally, such as the Atlantic oyster (*Crassostrea virginica*), or unintentionally, such as overbite clam or Asian clam (*Corbula amurensis*). Many of the clams inhabit soft-bottom sediments and could be found on the seafloor near the project site aquatic boundaries. Oysters require a solid substrate for attachment, including artificial structures. Suitable habitat for oysters and mussels is generally found throughout the project site on bulkheads, pilings, and riprap associated with the shoreline; however, no large oyster beds have been observed within the project site.

3.13.3.3.2 Fishes

San Francisco Bay supports a diverse assemblage of fish species. These vary from resident fish such as assorted flat fish (flounder and sole) including Pacific halibut (*Hippoglossus stenolepis*) to a variety of rockfish (*Sebastes* spp.) and migratory species such as Pacific herring (*Clupea pallasi),* Pacific sardines (*Sardinops sagax),* anchovies (*Anchoa* spp.), and salmonids (*Oncorhynchus* spp.) which spend varying portions of their life cycle in the bay (Bay Institute 2003; Table 3.13.3-3). Estuaries including the bay provide important spawning habitat for fish such as Pacific herring that spawn in the bay and support a small commercial fishery. Other fish species with adults that spawn in the bay include flounder, sole, and Pacific halibut. Juvenile sturgeon (*Acipenser* spp.) rear in the bay for an undetermined length of time before moving to the ocean.

Table 3.13.3-3. San Francisco Bay-Dependent Fish Species Collected in the CDFG Bay Study Midwater Trawl and Otter Trawl Surveys

Bay-Dependent Fish Species (Common Names)	
Bay Resident Species Species with resident populations in the bay and/or bay-obligate species that use the bay as nursery habitat.	**Seasonal Species** Species regularly use the bay for part of their life cycle but also have substantial connected populations outside the bay.
Arrow goby Bat ray Bay goby Bay pipefish Brown rockfish Brown smoothhound Cheekspot goby Delta smelt Dwarf surfperch Jack smelt Leopard shark Longfin smelt Pacific herring Pacific staghorn sculpin Pile perch Shiner perch Threespine stickleback Topsmelt Tule perch White croaker	Barred surfperch California tonguefish Diamond turbot English sole Pacific tomcod Plainfin midshipman Sand sole Speckled sanddab Spiny dogfish Splittail Starry flounder Surfsmelt Walleye surfperch

Source: Bay Institute 2003.

3.13.3.3.3 Marine and Other Aquatic Birds

The waters of the South Basin and the bay surrounding the project site are used by a variety of water birds, some of which are fairly abundant (LSA 2004). Common water birds observed during the 2003-2004 site surveys included double-crested cormorant (*Phalacrocorax auritus*), California gull (*Larus californicus*), greater scaup (*Aythya affinis*), ruddy duck (*Oxyura jamaicensis*), surf scoter (*Melanitta perspicillata*), and bufflehead (*Bucephala albeola*). While these birds forage primarily or solely in aquatic habitats, some species, such as cormorants, California brown pelican (*Pelecanus occidentalis californicus*), gulls (*Larus* spp.), and possibly terns (*Sterna* spp.) regularly roost in large numbers on piers at the project site. Small numbers (fewer than 10 pairs) of western gulls (*Larus occidentalis*) nest on two rocks in South Basin known as Double Rock. Shorebirds such as the western sandpiper (*Calidris mauri*), least sandpiper (*Calidris minutilla*), and dunlin (*Calidris alpina*) forage on intertidal mud flats and along the shorelines of the southern part of the site, typically in low numbers but occasionally in higher numbers when migratory pulses of shorebirds are present in the bay. The majority of the project site is developed or urbanized and supports relatively few species of birds.

3.13.3.3.4 Marine Mammals

The most common marine mammals in San Francisco Bay are harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*), both protected under the *Marine Mammal Protection Act* (refer to Section 3.13.2.1 for regulatory details). The MMPA does not bestow a particular status designation for the species it protects, which is similar to the MBTA, but both equally protect all marine mammals and native birds, respectively. Harbor seals are year-round residents found throughout the bay, using haul-outs to bask, rest, and as pupping sites. The most frequently used pupping sites are in the North (Castro Rocks) and South bays (Mowry Slough); both sites are over 15 mi (24 km) from the project site. Pupping season begins in late March and peaks in early May (Green, *et al.* 2001). The closest haul-out site is on Yerba Buena Island, about 6 mi (9.6 km) from the project site. During the 2003–2004

Yosemite Slough Watershed Wildlife Survey, LSA observed nine harbor seals were observed on a flat, floating structure in the outer South Basin (open water between Candlestick Point and HPS); however, no land haul-outs were noted during the survey (LSA 2004). No harbor seals were observed during more recent surveys (SFRA 2009, Appendix N1). California sea lions do not breed in the bay, preferring offshore islands such as the Channel Islands near Santa Barbara or the Farallon Islands, but sea lions forage and rest at various locations around the San Francisco Peninsula (The Marine Mammal Center 2002). They are relatively social animals, frequently seen basking or foraging in large groups. Sea lions may occur around the project site, but the site does not support any known haul-out locations.

3.13.3.4 Federally Listed Threatened and Endangered Species

The potential for federally listed threatened and endangered species to occur in the project vicinity was determined by assessing habitat suitability information collected during biological reconnaissance surveys in August 2007 and July 2008; a rare plant survey in May 2008; and reviews of CNDDB, California Native Plant Society (CNPS) Inventories, and USFWS databases. CNDDB records were accessed by SAIC in February 2010. For botanical species, a search of the Hunters Point and San Francisco South USGS quadrangles was conducted. For all other species, a search was conducted for all species within a five-mile radius of the project site. In addition, approximately 29 wildlife surveys were conducted in the vicinity of Yosemite Slough between January 2003 and April 2004, in association with the Yosemite Slough Watershed Wildlife Survey. Table 3.13.3-4 was developed to present those species with federal ESA status that are known to occur or have the potential (low or better) to occur on the project site. All sensitive species that may occur in the general project vicinity, including those not listed under the federal ESA are presented in Appendix I. Several species known to occur within 5 mi (8 km) of the project site and listed in Appendix I were determined not likely to occur or to be absent from the project site because 1) the site lacks suitable habitat or is outside of the species' range and 2) there were no observations of the species during any of the field surveys. Those species or habitats with a minimal likelihood of occurrence, or those that were not present during the period (usually breeding season) when they have special status, are not addressed further because they are not expected to occur or be affected by the proposed action. Consequently, the detailed species' discussions and impact analysis in this SEIS address only those species listed in Table 3.13.3-4, representing those that have a "low" or higher probability to occur on the project site.

3.13.3.4.1 Aquatic and Related Species

California Brown Pelican (Pelecanus occidentalis californicus)

The California brown pelican was delisted from ESA in November 2009 and from the state list in June 2009 by the California Fish and Game Commission because of the successful recovery of the species. As is true for most native birds, this species remains protected under the MBTA. California brown pelican populations are generally considered healthy. However, in 2009 and early 2010, several instances of emaciated and dead brown pelicans occurred along California and Oregon coasts, with unknown cause (LA Times 2010). The brown pelican inhabits estuarine, marine sub-tidal, and marine pelagic (deep) waters along the California coast. Pelicans nest from the Channel Islands of southern California southward along the Baja California coast and in the Gulf of California to coastal southern Mexico (CDFG 2005). The pelican builds nests of sticks on the ground, typically on islands or offshore rocks. Post-breeding adults and immature birds are found along the Pacific Coast from Oregon south into Baja, Mexico. This species has been observed perching on piers in the project site, particularly the three piers in the southeastern corner of site, and it forages in San Francisco Bay. Brown pelicans have never nested as far north as the bay and nesting habitat for this species is not present on the project site.

Based on the likelihood of occurrence definitions provided in Table 3.13.3-4, this species is "known" to occur on the project site.

Table 3.13.3-4. Federally Listed Species Potentially Occurring at or near the Project Site

Common Name	Scientific Name	Status[a] Fed/ CA/ other	Habitat and Seasonal Distribution in California	Likelihood of Occurrence on or near the Project Site[b]
FISH				
Chinook salmon – Spring-run Evolutionary Significant Unit (ESU)	*Oncorhynchus tshawytscha*	FT/ST/ none	Central Valley streams with stable water supply, clean gravel, and good quality riparian habitat. Spawning occurs only in tributaries to the Sacramento River.	**Low.** The project site is outside the migratory corridor for this species. Adults migrate from the Golden Gate into the Sacramento River.
Chinook salmon – Winter-run ESU	*Oncorhynchus tshawytscha*	FE/SE/ none Critical habitat	Central Valley streams with stable water supply, clean gravel, and good quality riparian habitat. Spawning occurs upstream of the Red Bluff Diversion Dam.	**Low.** The project site is generally outside the migratory corridor for this species. Adults migrate from the Golden Gate into the Sacramento River. The project site is outside of designated critical habitat.
Green sturgeon	*Acipenser medirostris*	FT/SSC/ none Critical habitat	Migrates through the San Francisco Bay to spawning grounds in the upper Sacramento River. Juveniles move into the estuary and likely rear in San Francisco Bay.	**Moderate.** The species likely forages in the bay including the area near the project site. The project site is within designated critical habitat for this species.
Steelhead—Central California Coast Distinct Population Segment (DPS)	*Oncorhynchus mykiss*	FT/SSC/ none Critical habitat	Spawns in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating to the ocean.	**Moderate.** Juveniles and adult steelhead could be found in the open waters adjacent to the project site as they migrate to and from streams in the San Francisco Bay. Populations are known from relatively nearby creeks on the peninsula (i.e., San Francisquito Creek). The project site is within designated critical habitat for this DPS.
Steelhead—Central Valley DPS	*Oncorhynchus mykiss*	FT/none/ none Critical habitat	Spawns in cool, clear, well-oxygenated streams. Juveniles remain in freshwater for one or more years before migrating to the ocean.	**Low.** Even though their primary migratory pathway is into the Sacramento River, juveniles and adult steelhead could potentially be found in the bay near the project site. The project site is outside of designated critical habitat for this DPS.
BIRDS				
California brown pelican (rookery and communal roosts)	*Pelecanus occidentalis californicus*	Delisted/ Delisted/ FP	Typically in littoral ocean zones, just outside the surf line; nests on offshore islands.	**Known.** This species was observed roosting on piers in the project site. However, suitable nesting habitat for this species does not occur in the project site and the project site is outside the current breeding range.
California least tern (nesting colony)	*Sternula antillarum browni*	FE/ST/ FP	Nests on sandy, upper ocean beaches, and occasionally uses mud flats; forages on adjacent surf line, estuaries, or the open ocean.	**Low.** Suitable nesting habitat does not occur in the project site, but occurs within 5 mi (8 km) of the project site. Individuals may forage in the open water adjacent to the project site.

Notes:

a. Status:

Federal		State	
FE	Federally listed as Endangered	SE	State listed as Endangered
FT	Federally listed as Threatened	ST	State listed as Threatened
		FP	California Department of Fish and Game designated "Fully Protected"
		SSC	California Department of Fish and Game designated "Species of Special Concern"

b. Likelihood of occurrence evaluations:

A rating of "**Known**" indicates that the species/natural community type has been observed on the site.

A rating of "**Moderate**" indicates that it is not known if the species is present, but suitable habitat exists in the project site.

A rating of "**Low**" indicates that species was not found during biological surveys conducted to date on the project site and is not expected to occur given the species' known regional distribution or the quality of habitats located in the project site.

Sources: CDFG 2010; USFWS 2009.

California Least Tern (Sternula antillarum browni)

The California least tern was federally listed as an endangered species by the USFWS in 1970 (USFWS 1970a, 1970b). No critical habitat has been designated for this species, and the recovery plan has been revised several times (USFWS 1980, 1985). The California least tern is a migratory bird that historically nested in large beach colonies along the coastline from southern Baja, Mexico to central coastal California. Over time, California least tern nesting habitat has been drastically reduced as a result of regional urbanization. Nesting is currently limited to San Francisco Bay and areas along the coast from San Luis Obispo County to San Diego County. The largest concentrations of breeding pairs nest in Los Angeles, Orange, and San Diego Counties. During the 1973 listing, the statewide tern population totaled 625 pairs (Obst and Johnston 1992 in Caffrey 1993). Since then, intensive management practices have resulted in an increase in the tern population. For example, in 1992 the statewide tern population was up to 2,106 nesting pairs (Massey 1989; Caffrey 1993) and in 2003 a statewide record-high total of 6,688 pairs was reported, which represents more than twice the average annual breeding population size seen during the mid-1990s (Cal/EPA 2004). California least terns have not been observed at the project site. However, this species forages over the open water of San Francisco Bay and may forage near the project site. In addition, individuals could rest on pilings or piers in the project vicinity. A California least tern breeding colony exists on Alameda Island, less than 5 mi (8 km) from the project site, though there is no suitable breeding habitat at the project site.

Based on the likelihood of occurrence definitions provided in Table 3.13.3-4, this species has a "low" likelihood to occur on the project site.

Green Sturgeon (Acipenser medirostris)

The southern Distinct Population Segment (DPS, as defined by the NMFS) of green sturgeon (including those that reside in the Sacramento River) was listed as threatened under the ESA by NMFS on April 7, 2006 (NMFS 2006b). Green sturgeon is a long-lived, anadromous, native fish that occurs in low numbers in the San Francisco Estuary and Sacramento River. Adults spawn in freshwater rivers from British Columbia south to the Sacramento River. In the Sacramento River, spawning occurs near Red Bluff and possibly in the Feather River. Larvae develop in these freshwater systems, migrate downstream, and remain in the estuaries for between one and four years before migrating to the ocean. Mature adults move into estuaries in the spring and spawning adults move up the rivers of their origins in late spring/early summer. Post spawning adults return to the estuary before migrating back to the ocean in late fall. Sub-adult fish also are thought to enter estuaries during summer and fall months. The bay area associated with the project site is saltwater habitat and, therefore, would not support the necessary freshwater spawning habitat for adult fish (Moyle 2002). Juvenile fish and sub-adults may rear in adjacent waters of the bay.

In October 2009 NMFS designated critical habitat for the green sturgeon in the following areas: coastal U.S. marine waters within 60 fathoms depth (360 ft) from Monterey Bay, California, north to Cape Flattery, Washington, including the Strait of Juan de Fuca, Washington, to the United States-Canada boundary; the Sacramento River, lower Feather River, and lower Yuba River in California; the Sacramento-San Joaquin Delta and Suisun, San Pablo, and San Francisco bays in California; and certain coastal bays and estuaries in California, Oregon, and Washington (NMFS 2009a). The designated areas comprise 320 mi (515 km) of freshwater river habitat, 897 mi^2 (2323 km^2) of estuarine habitat (including San Francisco Bay), 11,421 mi^2 (29,580 km^2) of marine habitat, and 135 mi^2 (350 km^2) of habitat in the Yolo and Sutter bypasses (NMFS 2009a). Under the ESA, critical habitat includes those areas necessary to support the continued existence and recovery of this species. Critical habitat for green sturgeon includes all of San Francisco Bay. Critical habitat designations include the specific habitat and habitat functions that are necessary for the survival and recovery of the species; these are called primary constituent elements (PCEs). In the estuarine category of critical habitat, the PCEs include food, flow,

water quality, migratory pathways, depth, and sediment quality (NMFS 2009a). Food refers to an abundance of prey items, benthic invertebrates and shrimp, in the substrate upon which sturgeon can forage. Flow refers to ample movement of water in the estuary to allow adults to orient to the Sacramento River during their spawning migrations. Water quality refers to adequate levels of dissolved oxygen, salinity, and temperatures to allow for survival and growth. Water quality also includes low levels of contaminants that could affect survival or reproductive fitness. A migratory pathway refers to the fact that sturgeon migrate through the bay to and from upstream spawning areas. The PCE for migratory pathways allows for safe and timely passage of fish between the ocean and upstream spawning areas, but it also includes localized movement of rearing and holding sturgeon in the bay. The depth PCE refers to the variety of water depths required to provide suitable foraging, holding, and migratory areas. Sediment quality is important because sturgeons are benthic foragers (bottom feeders) and contaminant-free sediments support higher quality prey that do not affect the survival or reproductive fitness of the fish. The project site includes some elements of these PCEs. However, the sediment quality may be impaired by decades of industrial discharges, which has resulted in contamination. This in turn probably reduces the foraging quality.

Based on the likelihood of occurrence definitions provided in Table 3.13.3-4, this species has a "moderate" likelihood to occur near the project site.

Chinook Salmon (Oncorhynchus tshawytscha)

Populations of Chinook salmon potentially found adjacent to the project site fall into three Evolutionary Significant Units (ESUs): Winter-run, Spring-run, and Fall/late-Fall-run. The runs of Chinook are distinguished based on the timing of the adult return to freshwater on their spawning migration. At almost any time of year, there are Chinook at some life cycle stage or another in San Francisco Bay (Table 3.13.3-4). The occurrence of Chinook adjacent to the project site could involve any of those life stages. Juvenile fish are more likely to be found adjacent to the project site than adults because they are moving downstream from their natal streams and do not have the same swimming ability as adults. Juvenile fish from the Sacramento River populations would be expected to occur in low numbers as they stray south of the Golden Gate. Small numbers of Chinook have also recently appeared in Coyote Creek and Guadalupe River, which are both tributaries to the South Bay near Alviso. These fish are derived from hatchery releases in the native range of the species, which did not include the South Bay (Santa Clara County 2008; NMFS 2009b). Adult or juvenile fish from either of these populations would be expected to migrate through or past the project site on their way to and from the Pacific Ocean because the project site is between the Pacific Ocean and spawning sites in the South Bay. However, the overall likelihood of finding a substantial number of Chinook salmon within or adjacent to the project site is relatively low because the open water near the project site is not considered suitable rearing habitat for either life stage. The residence time that either life stage may spend in or adjacent to the project site is unknown.

Winter-run Chinook are listed as endangered under the California and Federal ESA. They spawn in the Sacramento River upstream of Red Bluff Diversion Dam and are distinguishable from other Chinook runs based on the timing of both upstream migration and the spawning season (Table 3.13.3-4). Prior to the construction of Shasta and Keswick dams in 1943 and 1955, respectively, winter-run Chinook spawned in the upper reaches of the Sacramento, McCloud, and lower Pit rivers (Moyle 2002), and Battle Creek. Presently, the majority of winter-run Chinook spawning occurs on the main stem of the Sacramento River between Keswick Dam and the Red Bluff Diversion Dam (Moyle 2002). Designated critical habitat extends from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San

Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Critical habitat does not extend into the project site.

Spring-run Chinook salmon are listed as a threatened species under the California and federal ESAs. Spring-run Chinook enter the Sacramento River between March and September and move upstream into the headwaters, where they hold in pools until they spawn between August and October. Juveniles emigrate from the tributaries from mid-November through June. However, some juveniles spend a year in the streams and emigrate as yearlings the following October (Moyle 2002). Typically, spring-run Chinook salmon use mid- to high-elevation streams that provide appropriate low water temperatures and sufficient flow, cover, and pool depth to allow over summering. Spawning occurs between August and October and, depending on water temperature, emergence occurs between November and March. Although spring-run Chinook salmon emigration is highly variable, the emigration period extends from November to early May, with up to 69 percent of young-of-the-year out migrants passing through the lower Sacramento River between mid-November and early January (Snider and Titus 2000). Designated critical habitat extends from Keswick Dam, Shasta County (River Mile 302) to Chipps Island (River Mile 0) at the westward margin of the Sacramento-San Joaquin Delta; all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge. Critical habitat does not extend into the project site.

Central Valley fall and late fall-run Chinook salmon are not listed under the state or federal endangered species act but are classified as a Species of Special Concern. Fall-run Chinook salmon is the most abundant ESU, documented to comprise about 80 percent of the Sacramento Basin stock in the early 1980s. The ESU includes all naturally spawned populations of fall-run Chinook salmon in the Sacramento and San Joaquin River basins and their tributaries, east of Carquinez Strait, California. Juvenile fall and late fall-run fish could stray into open waters in and adjacent to the project site if they miss the entrance to the Golden Gate and the Pacific Ocean.

A small population of Chinook salmon has become established in recent years in Coyote Creek and the Guadalupe River (Santa Clara County 2008). The regulatory status of this population is unclear because the fall/late fall-run ESU only includes naturally spawned fish from upstream of Carquinez Strait. There is not an ESU that includes fish spawning in the tributaries of San Francisco Bay. These fish exhibit a fall-run pattern similar to the fall-run ESU of the Central Valley, and are apparently derived from wandering individuals, likely hatchery-released fish, from that ESU (NMFS 1998). Regardless of their origin or what their regulatory status may be, these fish would pass the project site vicinity on their way to and from the ocean.

Based on the likelihood of occurrence definitions provided in Table 3.13.3-4, the spring-run, winter-run/and fall/late fall-run of this species has a “low” likelihood to occur near the project site.

Central Valley Steelhead (Oncorhynchus mykiss)

Central Valley steelhead (rainbow trout) were federally listed as a threatened species in 1998 (NMFS 1998) and this status was reaffirmed in 2006 (NMFS 2006c). The Central Valley steelhead population is a Distinct Population Segment (DPS; a.k.a. ESU) that includes all naturally spawned populations of steelhead in the Sacramento and San Joaquin rivers and their tributaries. Final critical habitat, designated in September 2005 for this species, does not include the project site (NMFS 2005). Critical habitat is designated by hydrologic unit, the closest to the project site of which is the Sacramento Delta Hydrologic Unit, over 25 mi (40 km) north of the project site (NMFS 2005). Central Valley steelhead, especially juveniles, may occasionally stray into the South Bay during their migration to the ocean, but the area adjacent to the project site is generally outside their migratory pathway.

Based on the likelihood of occurrence definitions provided in Table 3.13.3-4, this species has a "low" likelihood to occur near the project site.

Central California Coast Steelhead (Oncorhynchus mykiss)

The Central California Coast DPS of steelhead is a federally threatened species. This DPS includes all naturally spawned populations of steelhead from the Russian River south to, and including, Aptos Creek and the populations in San Francisco Bay (NMFS 1998). Steelhead begin their migration from the ocean when winter rains provide large amounts of cold water for migration and spawning. The peak migration period for adult fish is in mid-winter. They typically spawn in smaller streams and tributaries to mainstream rivers. Juvenile steelhead generally spend one to three years in freshwater before migrating to the ocean (Moyle 2002).

It is highly likely that both adults and juvenile steelhead from this DPS could be found adjacent to the project site. The closest potential steelhead spawning streams in South San Francisco Bay are San Mateo Creek (approximately 10 mi [16 km] south of the project site), Alameda Creek (approximately 16 mi [26 km] south of the project site), and San Francisquito Creek (approximately 22 mi [34 km] south of the project site). Other South Bay watersheds that support populations of steelhead include the Coyote Creek and Guadalupe River watersheds. Because the project site is between their spawning and rearing streams and the Pacific Ocean, fish from any of these streams could be found in the bay adjacent to the project site during adult migrations from the Pacific Ocean to spawning sites or during juvenile migrations from their natal streams to the Pacific Ocean.

The final critical habitat designation for the Central California Coast steelhead DPS was issued on 2 September 2005 (NMFS 2005). The specific primary constituent elements considered in the designation were freshwater spawning sites, freshwater rearing sites, freshwater migration corridors, estuarine areas, nearshore marine areas, and offshore marine areas. The lateral extent of critical habitat in estuarine areas is the area inundated by extreme high tide. The project site is in the designated critical habitat for this species.

Based on the likelihood of occurrence definitions provided in Table 3.13.3-4, this species has a "moderate" likelihood to occur near the project site.

3.13.3.4.2 Essential Fish Habitat

The Pacific Coast Groundfish FMP currently covers 89 species that use seven composite EFH units, including estuarine, rocky shelf, non-rocky shelf, canyon, continental shelf and basin, neritic and oceanic habitats (PFMC 2008). The Coastal Pelagics FMP covers Pacific mackerel, jack mackerel, Pacific sardine, northern anchovy, and market squid (PFMC 2006). Pelagic species live nearer to the surface than to the sea floor; as a result, their EFH is above the thermocline where sea surface temperatures range between 50° and 78.8° F (10° and 26° C) in the confines of the Exclusive Economic Zone (EEZ). The Pacific Coast Salmon FMP (through Amendment 15) covers all Pacific coast salmonids (PFMC 2007). Designated EFH in this plan includes marine waters from the shoreline to the EEZ limit, and all freshwater streams, rivers, lakes, and tributaries that have been historically accessible to salmon.

The tidal aquatic habitats adjacent to the project site are considered EFH by the NMFS for a species assemblage that includes anchovies, sardines, rockfish, sharks, sole, and flounder (NMFS 2006a, 2008). Areas supporting the native Olympia oyster found in San Francisco Bay are also considered EFH by NMFS because oyster beds generally increase fish abundance. A more detailed discussion of the provisions of the *Magnuson-Stevens Fisheries Conservation Act*, by which effects on EFH are regulated, is provided in section 3.13.2.